

United States Patent

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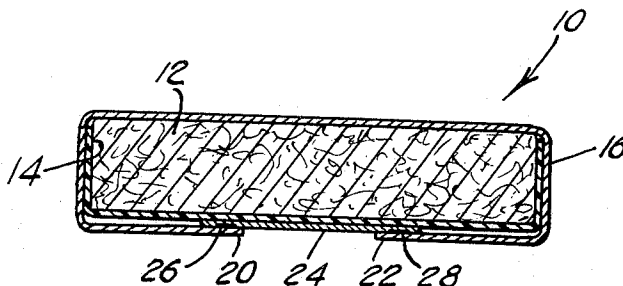
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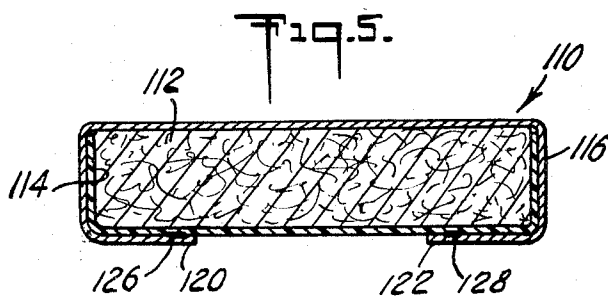
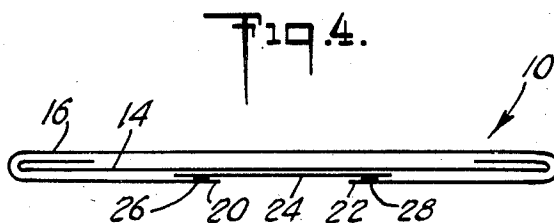
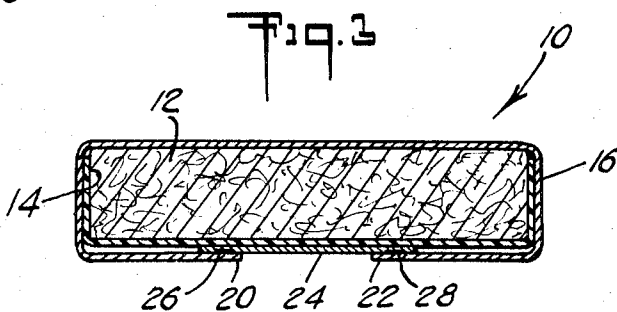
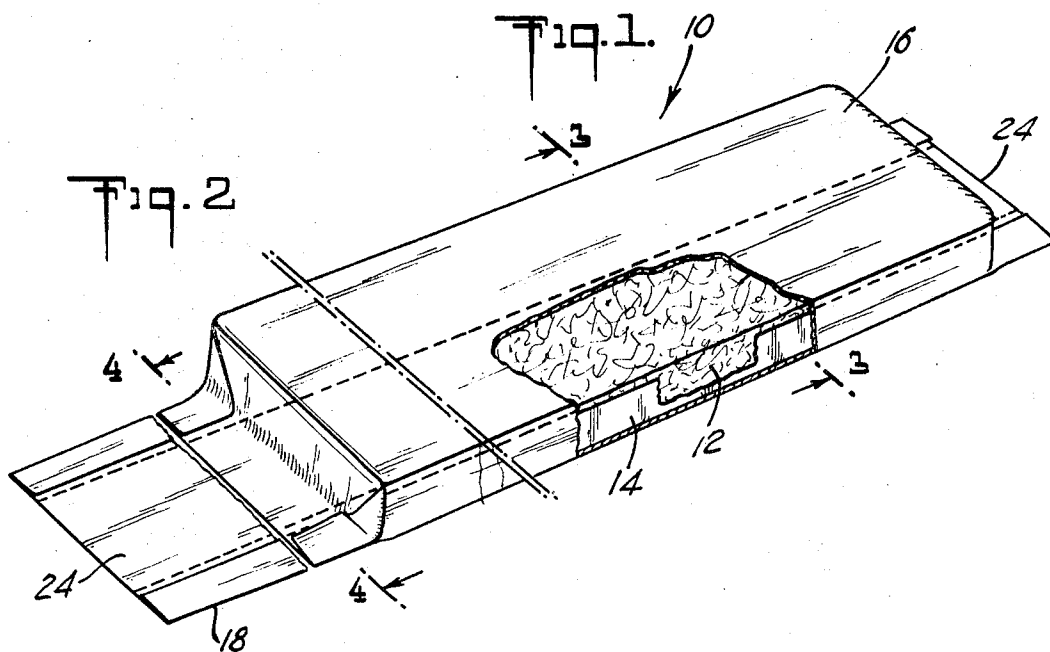
[54] **FLUSHABLE DISPOSABLE ABSORBENT PRODUCTS**
 10 Claims, 5 Drawing Figs.

[52] U.S. Cl. 128/290
 [51] Int. Cl. A61f 13/16
 [50] Field of Search 128/284-
 —287, 290, 296

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ABSTRACT: A body fluid absorptive and retentive product, such as a sanitary napkin, having an absorbent core and a waterproof moisture barrier, is wrapped in a wrapper material comprising a cover and a water-soluble or water-dispersible material which (1) maintains the structural stability of the absorbent product during use, and (2) is capable of disintegration upon subsequent treatment with water, whereby it may be disposed of readily and safely, such as by flushing in an ordinary water closet or toilet bowl.





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FLUSHABLE DISPOSABLE ABSORBENT PRODUCTS

This invention relates to disposable body fluid absorptive and retentive products and more particularly to sanitary napkins which are readily and safely disposed of by deposition in a body of water, such as by flushing in an ordinary water closet or toilet bowl.

One of the more common problems which are involved in the use of body fluid absorptive and retentive products, such as sanitary napkins, is the difficulty and inability to readily and safely dispose of such products after use by flushing in an ordinary water closet or toilet bowl.

It is essential that such absorbent products maintain their structural stability and shape when they are called upon during use to absorb and retain body fluids and exudates. Failure to do so wherein the absorbent product either comes apart or otherwise fails during use leads to dire personal consequences and very embarrassing situations. Structural resistance to fluids during use is therefore a necessity for such absorbent products.

However, once the absorbent product has been used and has served its purpose, it is extremely advantageous that it be water dissolvable or dispersible, or at least water disintegrable, whereby it can be readily and safely disposed of, such as by deposition in a body of water by flushing in a standard water closet or toilet bowl.

The principal purpose of the present invention is therefore to provide a disposable absorbent product, such as a sanitary napkin, capable of absorbing and retaining body fluids and exudates during use without losing its structural stability and shape but also capable of rapidly and safely dissolving, dispersing, or disintegrating after use by deposition in a body of water, such as by flushing in an ordinary water closet or toilet bowl.

The present invention will be described with greater particularity by reference to a sanitary napkin as the disposable absorbent product but it is to be appreciated that the general principles of the present invention are equally applicable to other disposable absorbent products wherein similar use and disposability requirements are involved. Typical of such other disposable absorbent products are surgical dressings, disposable diapers, compresses, hospital underpads, etc. For larger products such as hospital underpads, deposition in a tank containing a larger volume of water accompanied by agitation, if necessary, is desired prior to flushing or other discharge into a sewer system.

The invention will be described and illustrated in greater particularity by reference to the following specification and accompanying drawings wherein:

FIG. 1 is a perspective drawing of a portion of a tabless sanitary napkin, partially in cutaway view to disclose the interior components thereof;

FIG. 2 is a perspective drawing of a portion of a sanitary napkin similar to FIG. 1 but being provided with tabs at the ends thereof;

FIG. 3 is a cross-sectional view of the sanitary napkin of FIG. 1, taken on the line 3-3 thereof, looking in the direction indicated;

FIG. 4 is a schematic, cross-sectional view of the sanitary napkin of FIG. 2, taken on the line 4-4 thereof, looking in the direction indicated; and

FIG. 5 is a cross-sectional view, similar to FIG. 3 but disclosing another embodiment of the principles of the present invention.

Referring to FIG. 1, there is shown a sanitary napkin 10 comprising an absorbent core or pad 12, a waterproof moisture barrier 14, and a cover material 16 which is wrapped around the absorbent core 12 and the waterproof moisture barrier 14 to maintain such elements in proper position during use.

The absorbent core 12 normally comprises one or more bodies or layers of highly absorbent, relatively dense, fibrous materials customarily of a cellulosic origin such as cotton, rayon, wood pulp fluff, etc. These bodies or layers are generally in the form of carded cotton or rayon webs, air-laid

cellulosic fibrous webs, comminuted wood pulp bats, absorbent tissue, etc.

The waterproof moisture barrier 14 comprises a fluid repellent film or filmlike material and is so shaped as to conform generally to the bottom and sides of the absorbent core 12 (see FIG. 3). As such, it possesses a concave, boatlike construction having a U-shaped cross section. The particular configuration of the waterproof moisture barrier 14 is not of the essence of the invention. It is merely required that the boatlike waterproof moisture barrier 14 be capable of normally preventing fluids deposited on the absorbent core 12 from migrating or passing beyond the confines thereof.

The waterproof moisture barrier 14 normally comprises a film made of a water-insoluble, synthetic organic material such as polyethylene, polypropylene, polyvinyl chloride, polytetrafluoroethylene, polytrifluoro chloroethylene, cellulose acetate, vinyl chloride-vinyl acetate copolymer, etc. Films of such materials are available commercially in thicknesses ranging down to about 0.2 mil. Within the preferred limits of the present invention, thicknesses of the waterproof moisture barrier are in the range of from about 0.2 mil to about 1 mil. Heavier films may be used, if desired or required. Other waterproof moisture barriers such as repellent paper tissue, wax or paraffin paper, etc., may be used.

The cover material 16 is made of a porous, water-pervious material conventionally used as the wrapper or cover for sanitary napkins. Nonwoven fabrics of cotton or rayon fibers are preferred but woven fabrics such as gauze; knitted fabrics such as tricot; etc., are also of use. The cover material 16 and the underlying absorbent core 12 are adapted to be placed in proximity to and to conform to the contours of a body during use and to receive and retain body fluids or exudate therefrom.

The sanitary napkin may be tabless, as shown in FIG. 1, or, as shown in FIG. 2, it may possess a tab 18 at each end for attachment during use.

In the modification of FIGS. 1-4 and as most clearly shown in FIG. 3, the ends 20 and 22 of the cover 16 do not meet and a space or gap is thereby created which, of course, runs the full length of the bottom of the sanitary napkin 10.

The width of the cover 16 should be sufficient as to cover the entire top surface of the absorbent pad 12, go completely down the lateral sides thereof, and partially wrap around the bottom surface sufficiently inwardly of the edges thereof that the sidewalls of the waterproof moisture barriers 14 be covered. Inasmuch as the width of an average sanitary napkin is about 2½ inches and the lateral sides require at least about ½ inch additional material, and since it is desired that at least about another ½ inch of the bottom surface be covered on each side, such will result in the width of the cover being in the range of from about 4½ inches to about 6 inches. A gap or space of from about ½ inch to about ½ inches is thus created.

A water-sensitive or water-activatable strip of material 24 is adapted to close this space or gap and hold the ends of the cover 16 in proper position during use. The strip is secured in place to the ends of the cover 16 by adhesive spots or lines 26 and 28.

The width of the water-activatable strip 24 is sufficient to completely cover the gap and to provide sufficient overlap with each end of the cover to enable suitable adhesion thereto. In practice, the width of the water-activatable strip is in the range of from about 1 inch up to about 2 inches.

The water-sensitive or water-activatable strip 24 is made of water-soluble or water-dispersible material and is capable of dissolving or dispersing immediately upon being placed in a body of water such as is normally present in a standard water closet or toilet bowl.

The water-activatable strip 24 is normally a water-soluble or water-dispersible paper or film, such as the known, commercially available water-soluble papers, or it could be a water-soluble synthetic organic film of polyvinyl alcohol, a water-soluble ether of cellulose such as methyl cellulose, ethyl cellulose, etc., water-soluble polyethylene oxide, and the like.

Natural film-forming water-soluble organic materials such as gum tragacanth, alginates, etc., are also of use. Water-dispersible materials may also be used, such as fiber RD-100 and/or fiber RD-101, water-dispersible, bonded combination fibers comprising short cellulose fibers and long, flat, hydrophilic, ribbonlike, aerated regenerated cellulose fibers of the general collapsed, multicellular form. Such fibers are described more specifically in U.S. Pat. 3,171,773 which issued Mar. 2, 1965.

The water-activatable strip 24 should be as thin as conveniently possible as long as it possesses sufficient strength to perform its basic purpose of keeping the ends of the cover 16 in position during use. The thickness of the water-activatable strip 24 is normally in the range of from about 0.02 mil to about 0.2 mil but other thicknesses are of use, if desired or required.

Substantially any adhesive may be used to bond the sanitary napkin cover material 16 to the water-activatable strip material 24. However, water-based adhesives made from materials which can be dissolved or dispersed in water are preferred. Examples of such adhesives include starch, dextrin, animal glue, blood albumin, egg albumin, methyl cellulose, polyvinyl alcohol, etc.

It is to be appreciated that during use any body fluids or exudates which are deposited on the cover 16 will flow into the absorbent pad 12 but will not normally be permitted to flow beyond the absorbent pad because of the waterproof moisture barrier 14. In this way, the water-activatable strip 24 remains unaffected and continues to hold the ends of the cover 16 in proper position.

However, after use, the sanitary napkin 10 may be deposited in the water present in a toilet bowl, whereupon the water-activatable strip 24 immediately dissolves or disperses, the cover 16 immediately opens, and the sanitary napkin 10 comes apart. The coming apart of the sanitary napkin 10 is, of course, facilitated and expedited by the fact that the ends 20 and 22 of the cover material 16 are in contact with the smooth, slippery film surface of the moisture barrier 14. There is very little tendency for such parts to cling together, either mechanically or physically, and separation takes place immediately in a few seconds. Flushing of the sanitary napkin disposes of it readily and promptly.

A modification of the sanitary napkin 10 is illustrated in FIG. 5 wherein there is shown a sanitary napkin 110 having an absorbent core 112, a boatlike waterproof moisture barrier 114, and a cover material 116 having ends 120 and 122 which are wrapped around the absorbent core 112 and the waterproof moisture barrier 114 to maintain such elements in proper position during use.

The absorbent core 112, the waterproof moisture barrier 114 and the cover 116 are basically similar in construction, nature and function to the absorbent core 12, the waterproof moisture barrier 14, and the cover 16 respectively, of the sanitary napkin 10. However, the ends 120 and 122 of the cover material 116 are secured in position by water-activatable adhesive materials 126 and 128 directly to the waterproof moisture barrier 114. These water-activatable adhesive materials 126 and 128 are similar to the adhesive materials 26 and 28 previously described herein.

If desired, the cover 116 may be made sufficiently wide that the ends thereof reach each other and overlap on the bottom of the sanitary napkin 110. In such a construction, merely one line of water-activatable adhesive material will be required to secure the overlapped ends together. Deposition in water will activate the adhesive and it will lose its grip on the ends of the cover material 116, thus permitting them to open whereby the component parts of the sanitary napkin 110 separate.

More specifically, the water-activatable adhesive 126 and 128 is readily water-soluble or water-dispersible in a body of water as is present in a standard water closet or toilet bowl. It may be selected from the list of water-soluble or dispersible adhesives listed hereinbefore. However, inasmuch as rapid dissolution or dispersion is preferred, the more water-sensitive adhesives should be selected or disposal problems may arise.

It is to be appreciated that the adhesively bonded cover 116 will hold the sanitary napkin together in proper fashion during use but, upon being placed in a body of water, will open to permit the components of the sanitary napkin to come apart and be readily and safely disposed of in the water of a water closet or toilet bowl.

The invention will be described in greater particularity by reference to the following examples wherein there is set forth specific embodiments of the present invention for illustrative but not for limitative purposes. The broader aspects of the invention, therefore, are not to be construed as limited thereby but possess a scope defined by the claims appended hereto.

EXAMPLE I

A sanitary napkin such as illustrated in FIG. 1 is made from an absorbent core of woodpulp fluff, a U-shaped, boatlike waterproof polyethylene moisture barrier having a film thickness of about 0.5 mil, and a rayon nonwoven fabric cover adhesively held together by a strip of water-soluble polyvinyl alcohol film having a thickness of about 0.1 mil. Upon being placed in a body of water in a standard toilet bowl, the water-soluble polyvinyl alcohol film dissolves immediately, the woodpulp fluff pad falls apart in the water, and the entire sanitary napkin separates into its various components, allowing it to be readily and safely flushed. A specially manufactured toilet bowl having a transparent exit pipe with two traps reveals that the sanitary napkin is separated into its separate components before it has travelled 5 feet along the exit pipe or traps. No blocking or clogging of the exit pipe, traps, or of the sewer system is observed.

EXAMPLE II

The procedures of Example I are followed substantially as set forth therein with the exception that "DISSOLVO" cellulose polymer soluble paper (Gilbreth Co., Philadelphia, Pa.) is used as the water-activatable strip. The results are similar and are equally satisfactory. The "DISSOLVO" cellulose polymer soluble paper comes apart in the toilet bowl in a matter of a few seconds.

EXAMPLE III

A sanitary napkin such as illustrated in FIG. 5 is made from the materials set forth in Example I. The nonwoven fabric cover is adhesively bonded to the polyethylene moisture barrier by a water-soluble polyvinyl alcohol adhesive. Upon being placed in the water in a toilet bowl, the sanitary napkin goes into pieces and is readily and safely flushed without any blockage or clogging of pipes or traps, or of the sewer system.

Although the present invention has been described with reference to the preceding examples wherein specific embodiments and materials were shown, the invention is not to be limited thereto except as defined in the following claims.

I claim:

1. An absorbent product for absorbing body fluids which comprises: an absorbent core adapted to be placed in proximity with the body to receive body fluids; a waterproof moisture barrier overlying the surface of said absorbent core worn away from the body and adapted to deter the spread of body fluids beyond said absorbent core; a cover material wrapped around said absorbent core and said waterproof moisture barrier with its edges overlying the outer surface of said moisture barrier and adapted to maintain said absorbent core and said moisture barrier in proper position during absorption of body fluids; and water-activatable means engaging the edges of said cover material and being capable of holding said cover material in position to maintain the structural stability of said absorbent product during absorption of body fluids but capable of activation upon subsequent treatment with water to disengage the edges of said cover material thereby permitting disintegration of said absorbent product.

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2. An absorbent product as defined in claim 1, wherein the water-activatable means is a water-dispersible material.

3. An absorbent product as defined in claim 1, wherein the water-activatable means is a water-soluble material.

4. An absorbent product as defined in claim 3, wherein the water-soluble material is a water-soluble paper.

5. An absorbent product as defined in claim 3, wherein the water-soluble material is water-soluble polyvinyl alcohol.

6. An absorbent product as defined in claim 3, wherein the cover material covers only a portion of the bottom of said absorbent core and said waterproof moisture barrier and the water-activatable means is a strip of water-soluble material which covers that portion of the bottom of said absorbent core and said waterproof moisture barrier which is not covered by said cover material; and means to adhere said cover material to said strip of water-soluble material.

7. An absorbent product as defined in claim 6, wherein the strip of water-soluble material is a water-soluble paper.

8. An absorbent product as defined in claim 6, wherein the strip of water-soluble material is water-soluble polyvinyl alcohol.

9. An absorbent product as defined in claim 3 wherein the cover material covers only a portion of the bottom of said absorbent core and said waterproof moisture barrier and the water-activatable means are lines of water-soluble adhesive which secure the spaced apart edges of said cover material directly to the waterproof moisture barrier.

10. An absorbent product as defined in claim 3 wherein the cover material surrounds said absorbent core and said waterproof moisture barrier with its longitudinal edges overlapping on the outer surface of said moisture barrier and the water-activatable means is a line of water-soluble adhesive adapted to secure the overlapped edges of said cover material together.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,575,173 Dated April 20, 1971

Inventor(s) Michael Loyer

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In Column 2, line 54, " $\frac{1}{2}$ inches" should read -- $1\frac{1}{2}$ inches--.

Signed and sealed this 13th day of July 1971.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

WILLIAM E. SCHUYLER, J
Commissioner of Patent