United States Patent [19]

Schrading

[11] **3,881,487**

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[54] **FLUSHABLE DISPOSABLE DIAPER STRUCTURE**

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[52] **U.S. Cl.** **128/284**

[51] **Int. Cl.** **A61f 5/44**

[58] **Field of Search** 128/284, 286, 287, 290, 128/296

[56] **References Cited**

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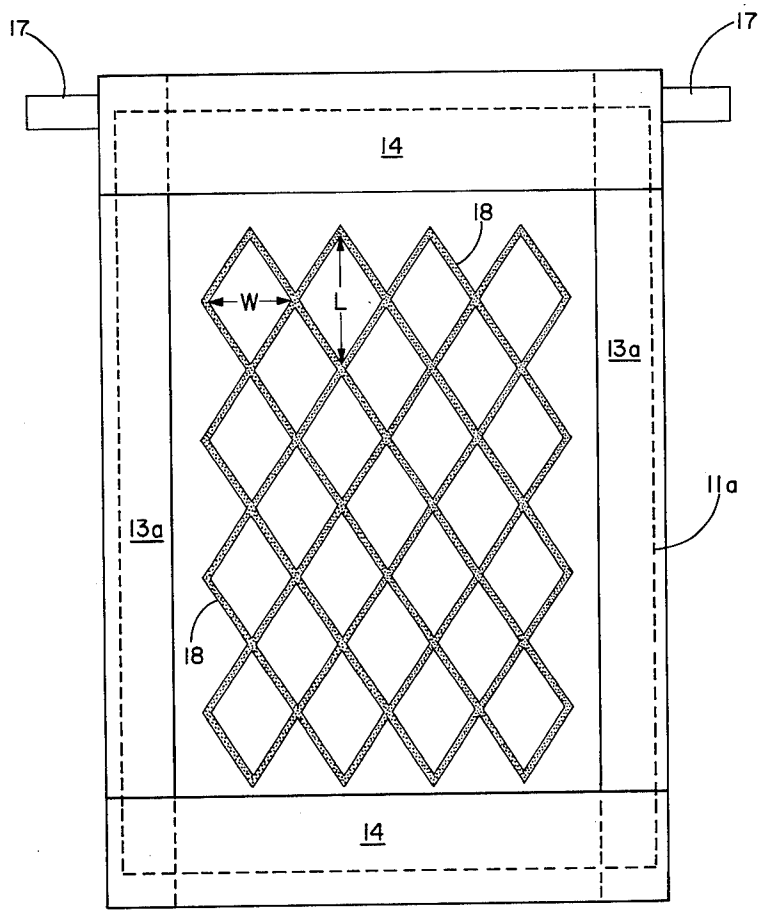
Attorney, Agent, or Firm—Daniel J. Hanlon, Jr.; William D. Herrick; Raymond J. Miller

[57] **ABSTRACT**

A disposable diaper structure adapted to facilitate disposal of the absorbent pad element by flushing. The diaper is of the general type which comprises an air-formed pad of absorbent wood pulp fibers disposed between a fluid-permeable cover sheet and a thin plastic film backing sheet. The wood pulp pad is adhered to a specified area of the plastic film backing by an open lattice-like pattern of adhesive. When the diaper is immersed and rinsed in a toilet, the adhesive prevents the pad from falling out in a single piece as it is being rinsed, and instead enables the pad to break up into controlled size pieces which are easily flushed away without reagglomerating or causing stoppage.

4 Claims, 8 Drawing Figures



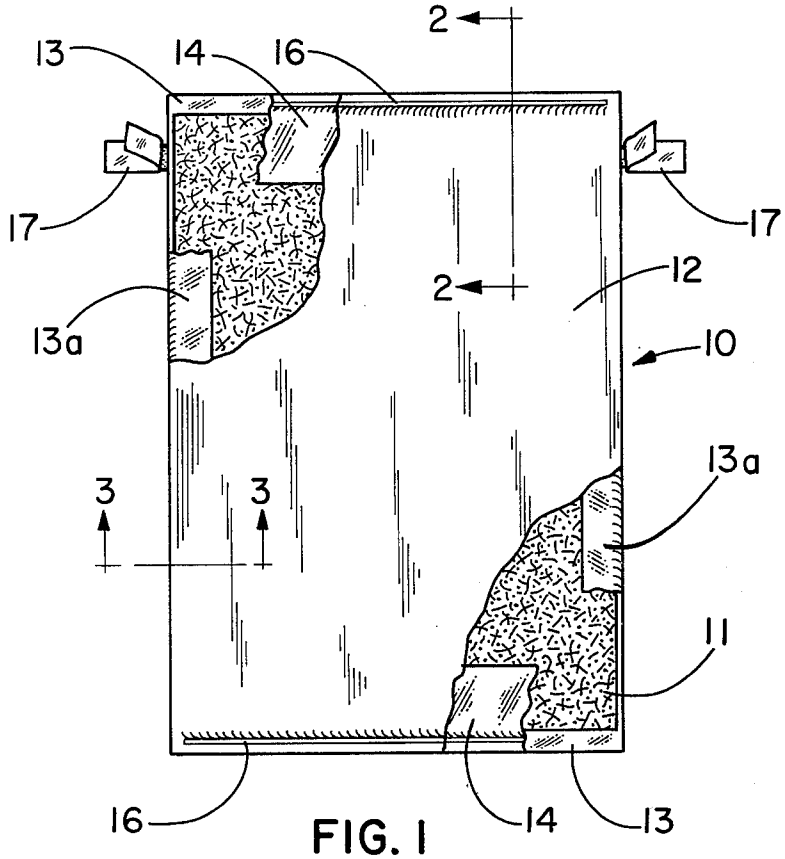


FIG. 1

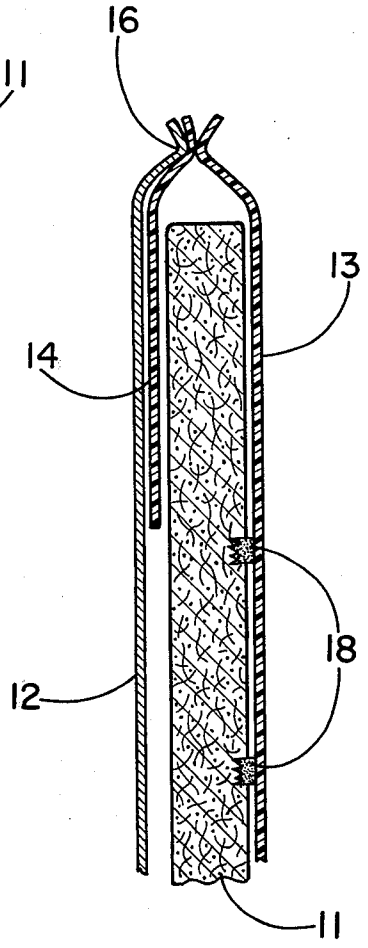


FIG. 2

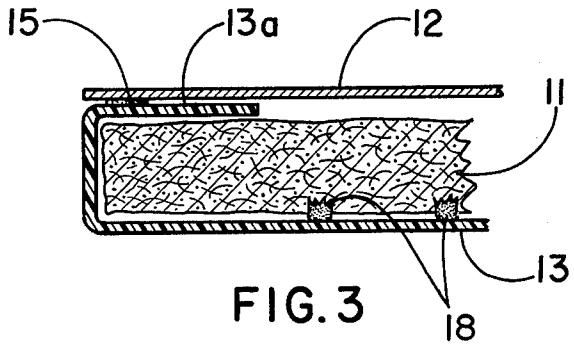


FIG. 3

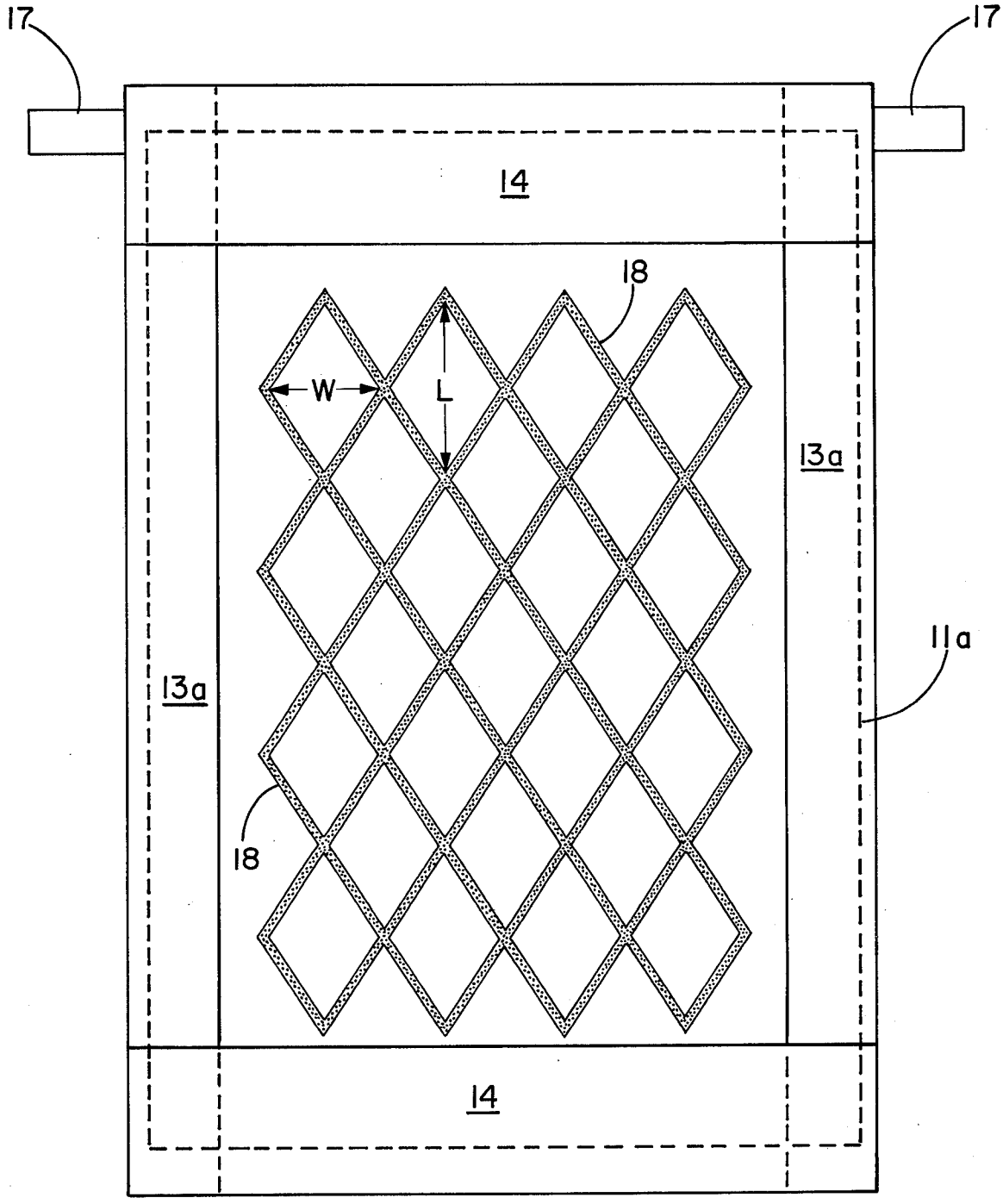


FIG. 4

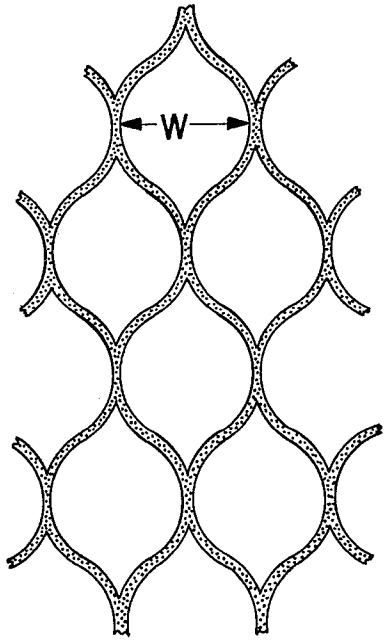


FIG. 5

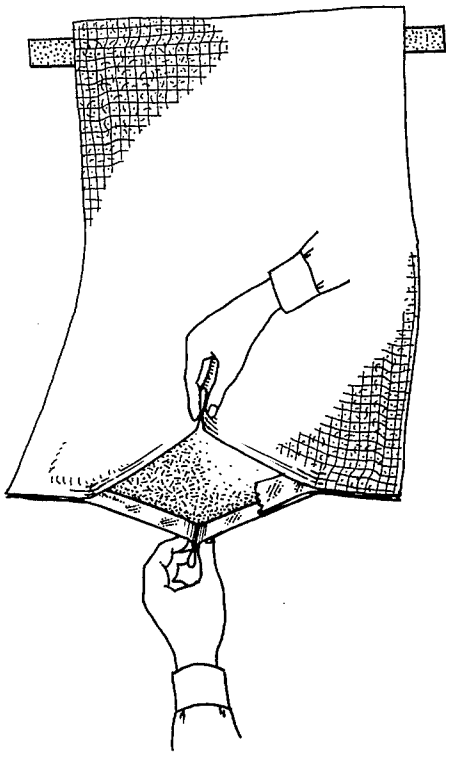


FIG. 6

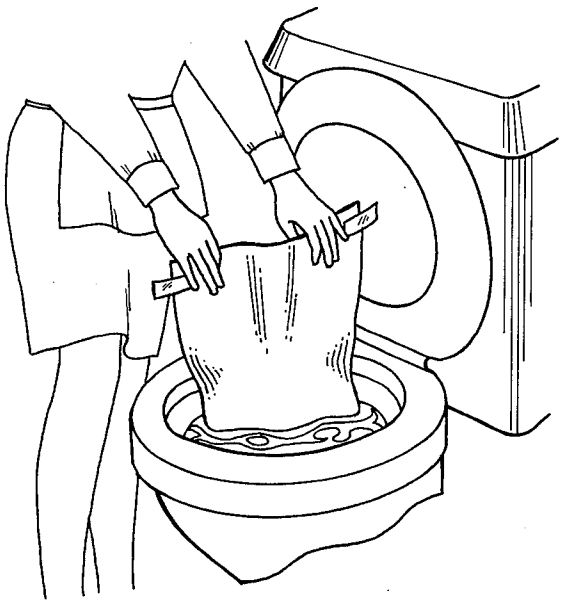


FIG. 7

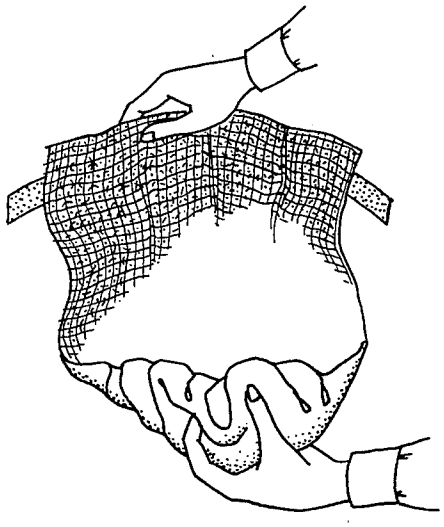


FIG. 8

FLUSHABLE DISPOSABLE DIAPER STRUCTURE

BACKGROUND OF THE INVENTION

This invention relates to an improved structure for disposable diapers which permits disposal of the absorbent pad element of the diaper by flushing it away in a conventional sanitary toilet system.

The most common form of disposable diaper now on the market generally comprises an air-formed pad of absorbent wood pulp fiber known as fluff which is disposed between a fluid-permeable cover sheet and a thin plastic film backing. The fluff pad commonly has a basis weight of less than **60** grams per square foot. Used diapers are often disposed of by wrapping the soiled surface within the plastic backing film and discarding it in the garbage. However, because fecal matter is often present, it would be much more desirable to discard the contaminated absorbent media by flushing it away in the toilet. For most single use diaper structures disposal by flushing is inconvenient. In most cases this entails stripping away the plastic backing to gain access to the absorbent material, to rinse the cover sheet if fecal matter is present, and then to discard these elements by means other than flushing. When carrying out such an operation it is difficult to avoid contact with the contaminated portions of the diaper, which is undesirable.

For flushing operations, it has been proposed to open one end of the diaper, then grasp the other end at the corners, and then immerse and rinse the diaper in the toilet whereby the inner absorbent pad will fall out from between the cover and backing sheet into the toilet bowl. However, in instances where the pad is adhered to the plastic film backing by a closely spaced pattern of adhesive, which is done in some diaper structures to help maintain the integrity of the fluff pad, the pad will not fall out and even if repeatedly rinsed, only a portion will be dispersed. In other instances where the fluff pad is not attached to the backing film, the pad does fall out, but remains in one large piece which is often too bulky for flushing, thus frequently causing stoppages.

In this invention, a disposable diaper of a particular structure has the fluff pad arranged so that when the diaper is immersed and rinsed in the toilet the fluff pad will break up into controlled size pieces which will flush away with little difficulty.

SUMMARY OF THE INVENTION

This invention is directed to an improvement in the structure of the disposable diaper of the type described in U.S. Pat. No. 3,520,303 to Endres which issued July 14, 1970.

The preferred embodiment of the diaper described therein comprises a substantially rectangular absorbent pad of wood pulp fibers known as fluff, disposed between a fluid-permeable cover sheet and a fluid-impervious backing of thin plastic film. The longitudinal side edges of the backing film are folded over the edges of the pad and are attached to the underside of the cover sheet along the entire length. Each of the ends of the cover sheet and the backing film extend beyond the respective ends of the pad and have a narrow sheet of thin plastic film baffle material interposed between them. The cover sheet, backing film and film baffle are bonded to each other on a line transverse of the diaper adjacent the pad ends. The unbonded edge

of the film baffle extends over edge portions of the pad between the pad and the cover sheet.

The improvement of this invention comprises adhering the pad to the backing film in that area of the pad which does not underlie the folded over portion of the backing sheet or the film baffle. The adherence is accomplished by an open lattice-like pattern of adhesive lines. The open area in the pattern comprises an area in the range of about 2 to 3 square inches.

When it is desirable to flush away the fluff pad after use, the seal between the cover sheet, backing sheet and baffle is pulled apart at one end of the diaper. The opposite corners of the diaper are then grasped and the diaper is immersed in the toilet and allowed to wet out. It is then rinsed up and down in the bowl whereby the fluff pad separates from the backing in discrete pieces about the size of the open area in the adhesive pattern, and these pieces fall into the toilet bowl through the opened end of the diaper. These pieces readily disperse in the toilet and are easily flushed away without stoppage. The cover sheet is rinsed, if necessary, and disposed of separately with the backing sheet.

Other features and advantages will become apparent by reference to the drawings and the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is a plan view with portion partially cut away of a diaper structure particularly adaptable to this invention.

FIG. **2** is a section taken along line **2—2** of FIG. **1** showing part of the improved structure.

FIG. **3** is a section taken along line **3—3** of FIG. **1.**

FIG. **4** is a diagrammatic representation of a preferred adhesive pattern as arranged with respect to other elements of the diaper.

FIG. **5** is a partial representation of another suitable pattern.

FIGS. **6, 7, 8** illustrate the steps utilized in disposing of the absorbent fluff pad in a toilet.

DETAILED DESCRIPTION OF THE DRAWINGS AND PREFERRED EMBODIMENTS

As shown in FIGS. **1, 2,** and **3,** a diaper **10** which has a general structure particularly adapted to this invention comprises an absorbent pad **11** preferably of wood pulp fibers known as fluff, a fluid-pervious cover sheet **12,** a fluid-impervious plastic film backing sheet **13,** and a thin flexible baffle film **14.** The fluff pad preferably has a basis weight of less than **60** grams per square foot.

Longitudinal edge portions **13***a* of backing film **13** are folded around the edges and over the top of fluff pad **11** and heat-sealed or otherwise adhesively attached to cover sheet **12** at **15** (FIG. **3**) along substantially the entire length of the diaper.

Baffle film **14** is interposed between cover sheet **12** and backing film **13** at both the front and back ends of the diaper and the three elements are heat sealed together along line **16** at each end. The diaper may also have pressure-sensitive tape fastening means **17,** and may be prefolded in known ways to facilitate application to the child.

All of the above elements are shown and described in the aforementioned U.S. Pat. No. 3,520,303.

In the improvement of this invention fluff pad **11** is attached to the backing film by lines of adhesive **18** in a selected pattern, shown in section in FIGS. **2** and **3**, and in a diagrammatic plan view in FIG. **4**.

In FIG. **4**, the outer border line represents the outer border of the backing film as folded around the fluff pad and dotted line **11a** represents the disposition of the fluff pad within the backing film. Panels **13***a* represent the folded over longitudinal edges of the backing film as in FIG. **1**, and panels **14** represent the baffle film at each end.

With the location of these elements in mind, reference may now be made to the lattice-like diamond pattern of lines indicated at **18**. The pattern shown is the preferred adhesive pattern for adhering the fluff pad to the backing film. It should be noted that the adhesive is spaced inwardly from the edges of the folded over backing film **13***a* and from the edges of the baffle film **14**. The reason for this will be set forth later.

In this preferred pattern the dimension W which is the width or narrow dimension of the individual diamonds making up the pattern should be between about 1.5 inches and 2.0 inches with 1.9 inches preferred. Dimension L which is the length or long dimension of the individual diamonds should be between 2.5 inches and 3.0 inches with 2.8 inches preferred.

Stated another way, the open area encompassed within the invidual segments of the pattern should be from about 2 square inches to 3 square inches in area.

The width of the adhesive lines themselves may suitable be from about 0.075 inch to about 0.125 inch with 0.10 inch preferred.

While the diamond lattice pattern is preferred, other suitable patterns may be used within the prescribed limits.

One other suggested pattern is shown partially in FIG. **5**.

The adhesive used may be any non-toxic flexible adhesive which adheres to the plastic film, which film in the preferred embodiment is polyethylene. Many such adhesives are known and it is not necessary to detail them here although polyvinyl acetate type latices are preferred ones to use.

The adhesive should be applied in sufficient amounts to penetrate the fluff pad to a short depth, but should not be applied in such large quantity as to cause stiffness.

Also in manufacturing all-fluff pads it is more convenient to handle the pad if a thin carrier sheet or wrap of cellulose wadding is used to cover each side of the fluff pad. When such a carrier sheet is used it is important to use a sheet which does not have wet strength since the latter interferes with the desired disintegration of the fluff pad during rinsing and tends to hold the fluff pad together in one piece.

In FIGS. **6**, **7**, and **8** there is illustrated a sequence of steps used to dispose of the fluff pad. After the diaper has been soiled during use and is ready for disposal, it is carefully laid flat on a counter or the like to prevent the contents from falling out and creating a mess. If the diaper is folded and adhesively attached at the crotch area, these attachments are broken and the diaper pulled open to assure that it lies flat. The untaped end of the diaper is then pulled apart as shown in FIG. **6**. This is easily done because while heat seal **16** has good shear strength, it peels open without much difficulty.

The fecal contents of the diaper are then dumped into the toilet and the ends of the diaper grasped at the corners near the tapes (FIG. **7**). The diaper is then lowered into the toilet and allowed to wet out for a moment. It is then rinsed up and down in the toilet, whereupon the adhered filler pad will fall out in controlled size pieces which stay dispersed and are easily flushed away.

After most of the fluff pad has been rinsed out, and the cover sheet thoroughly rinsed, if needed, the cover sheet is rolled up inside the plastic backing film and discarded separately (FIG. **8**).

As indicated above, the adhesive pattern should be spaced from the edges of the film components in the diaper and not extend under the folded over backing sheet or under the baffle film. If the adhesive extends under these areas to any extent, the fluff pad will not break up readily in these areas because the rinsing action is not as effective since the water is blocked out by the film. Accordingly, some material might tend to remain behind in these areas, rather than being completely dispersed in the toilet.

Preferably the spacing of the adhesive pattern from the baffle film at the top or taped end of the diaper may be greater than at the bottom end, but this is not essential.

In any event, the fluff pad should not be attached to the backing film adjacent the ends and sides of the diaper, otherwise normal rinsing is not sufficient to detach the fluff in those areas.

What is claimed is:

1. In a disposable diaper comprising a substantially rectangular absorbent pad of intermingled wood pulp fibers, a fluid-pervious cover sheet, a fluid-impervious backing sheet of thin plastic film and narrow plastic film baffle members extending transversely across the diaper at each end thereof; in which the longitudinal edge portions of said backing sheet are folded around the respective pad edges to extend over the top of the pad for a short distance and are attached to said cover sheet along the entire length thereof; in which each of the ends of said backing sheet and said cover sheet extend beyond each of the ends of said pad and have said baffle member interposed therebetween; in which the cover sheet, backing sheet and baffle are bonded to each other on a line adjacent the pad ends; and in which the free edge of said baffle member opposite from the bonded portion is interposed between said pad and said cover sheet; the additional structure wherein said pad is adhered to said backing sheet by interconnected lines of adhesive disposed in a selected lattice-like open pattern in only that area of said pad which does not underlie said baffle members or said folded-over portion of said backing sheet, said adhesive being applied in sufficient quantity to penetrate said pad for a short depth, the open area encompassed within the individual segments defined by the unbonded spaces between the lines of said pattern being between about 2 square inches and 3 square inches in area.

2. The disposable diaper of claim **1** wherein said pattern is a diamond grid pattern.

3. The disposable diaper of claim **2** wherein the dimensions of the individual diamonds in said diamond grid pattern are in the range of between about 1.5 inches and 2.0 inches at the narrow dimension and between about 2.5 inches and 3.0 inches at the wide dimension and the width of said adhesive lines which make up the pattern are between about 0.075 inch and and 0.125 inch.

4. The disposable diaper of claim **1** wherein an absorbent non-wet strength tissue is disposed on each side of the absorbent pad.

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