

United States Patent

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[54] DISPOSABLE DIAPER
8 Claims, 3 Drawing Figs.

[52]	U.S. Cl.....	128/287
[51]	Int. Cl.....	A61F 13/16
[50]	Field of Search.....	128/284, 286, 287

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ABSTRACT: A contoured disposable diaper having a greater concentration of absorptive cellulose fiber material toward one end and thereby adapted for maximum absorptive capacity in use on both male and female infants by end for end reversal of the diaper for strategic location of the more absorptive area as dictated by the sex of the infant. The liner is preferably apertured for more efficient moisture reduction of semisolid waste materials and a central channel in the absorptive pad promotes even distribution of liquid waste for absorption throughout the pad area.

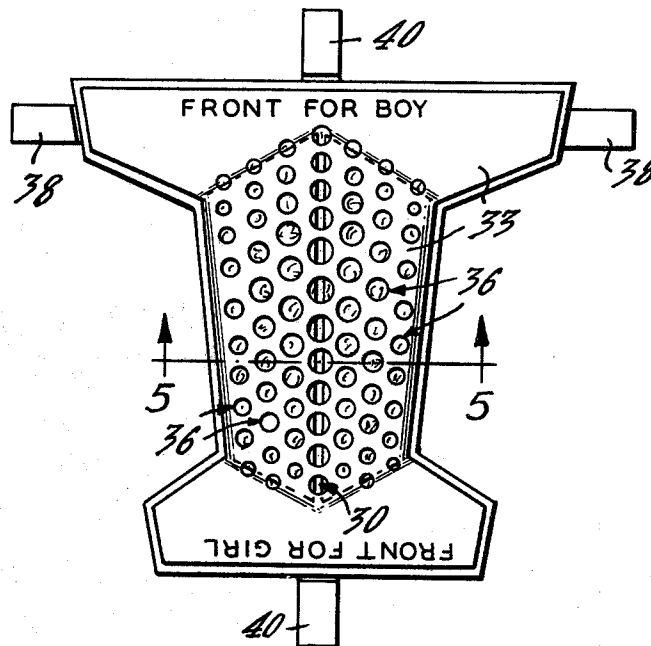


FIG. 1

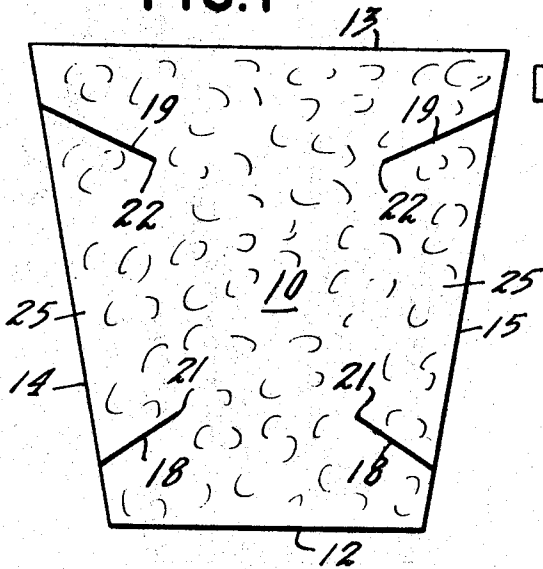


FIG. 2

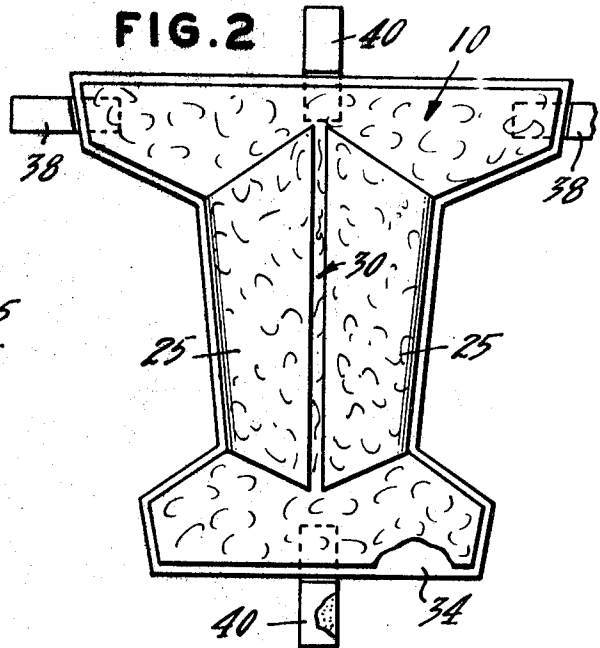


FIG. 3

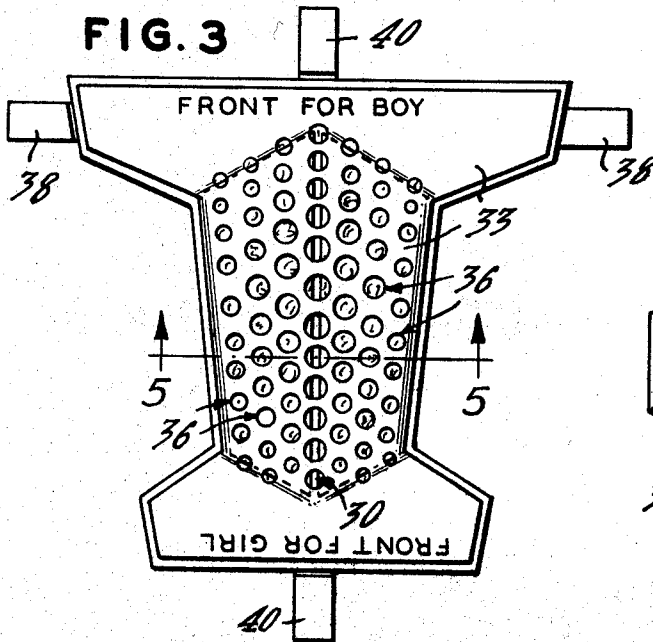


FIG. 4

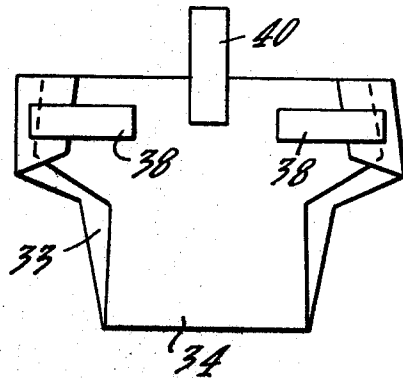
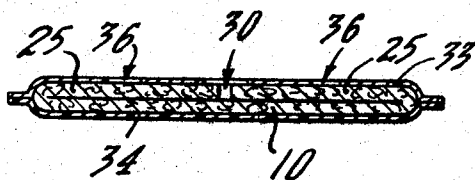


FIG. 5



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DISPOSABLE DIAPER

BACKGROUND OF THE INVENTION

This invention relates to diapers for infants, and more particularly to diapers constructed primarily of paper cellulose fibers and intended to be discarded after a single use.

Two types of disposable diapers are currently in general use; one of these is substantially rectangular while the other is contoured in a shape reminiscent of an hour glass. Although the rectangular diaper is economical in manufacture and has a maximum of absorptive area in the crotch area of the diaper, it is difficult to apply to the infant and relatively uncomfortable due to the necessity for bunching up of the diaper in the crotch. The resultant bunched-up area is not as absorptive as would be desirable and leakage of waste matter around this area is frequent.

The contoured diaper is more easily and neatly applied to the infant, but is more expensive to manufacture due to wasted material removed in forming the contours and is also less absorptive due to the removal of the cutout portion.

Furthermore, although it is well recognized that it is desirable to provide a higher concentration of absorptive material in the front portion of a diaper which is to be utilized on a male infant and in the central or rearward portion of the diaper if it is to be utilized on a female infant, presently available disposable diapers have not made adequate provision for this particular requirement, either in the rectangular or in the contoured diaper mentioned above.

Both of the above types of diaper generally have a moistureproof outer layer of a thin, flexible plastic material such as polyethylene or similar synthetic plastic, a central absorptive pad, suitably of fibrous cellulose wadding and an inner, moisture-permeable layer of a nonwoven textilelike sheet material. The inner, infant-contacting sheet, although highly permeable to liquids, is not readily permeated by semisolid or solid waste materials, which therefore remain in contact with the skin of the infant, resulting in considerable discomfort on the part of the baby and an undesirable and messy cleaning chore on the part of the mother caring for her child.

SUMMARY OF THE INVENTION

The present invention provides a substantial alleviation of the problems inherent in previous diapers. The basic construction comprises a diaper contoured symmetrically about the long axis thereof and asymmetrically about the short axis, thus providing a greater concentration of absorptive material at one end of the central contoured area than at the opposite end of the contoured section. The diaper is thus designed to accomplish the particular requirements of both male and female infants by end for end reversal of the diaper to strategically position the area of greater absorbability. Further, the inner, moisture-permeable liner layer of the diaper is preferably afforded with a series of apertures of varying size in order to allow semisolid waste material to penetrate to the absorptive layer with resultant improved reception and retention of this type of waste material. A centrally located channel area assists in distributing both liquid and semisolid waste material throughout the absorptive pad in order to achieve maximum absorptive capacity from a given quantity of the absorptive component.

DESCRIPTION OF THE DRAWINGS

The invention may be best understood from the following description taken in connection with the accompanying drawing, wherein:

FIG. 1 is a plan view of the absorptive pad component of the invention;

FIG. 2 is a plan view of the diaper of the present invention at an intermediate stage in its assembly;

FIG. 3 is a plan view of a finished diaper viewed from the inside;

FIG. 4 is a perspective view of a diaper folded in a manner to encompass an infant; and

FIG. 5 is a cross-sectional view of the diaper taken along line 5-5 of FIG. 3

DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

In producing the diaper of the present invention, a pad of absorptive material such as cellulose wadding or air blown cellulose fibers is provided in the contour of an isosceles trapezoid as generally indicated by the numeral 10 in FIG. 1, the trapezoid having opposed parallel ends 12 and 13 and opposed nonparallel sides 14 and 15. From each of the side edges two slits 18 and 19 extend inwardly in a converging manner toward the central area of the pad from points removed a short distance from the pad corners. The inwardly directed slits diverge substantially from parallelism with the respective nearby end edges 12 and 13 of the pad. The slits 18 and 19 terminate at points 21 and 22, each of which is a distance from the closer side edge of the pad slightly less than one-fourth of the overall pad width on a line passing through the particular point in question and parallel to the end edges of the pad.

The areas 25 of the pad adjacent the respective side edges and between the slits 18 and 19 constitute panel portions which may be folded inwardly to overlie the main central section of the pad, as shown in FIG. 2, thus doubling the thickness and absorptive capacity of the pad in this area.

It will be noted, however, that, due to the particular placement of the points 21 and 22 marking the inner limits of the slits, the infolded panel portions 25 just fail to meet in the central portion of the pad, leaving a narrow channel 30 running lengthwise of the pad in its central area for a purpose to be fully set forth hereinafter.

The inward folding of panel portions 25 reduces the overall width of the pad in its central portion by nearly 50 percent, whereby this portion of the pad fits more comfortably in the crotch area of an infant than the standard rectangular diaper but without the reduction of absorptive capacity which is the usual result of contouring this area by removal of a portion of the absorptive material.

The portion of the pad extending from the median line of the pad toward the longer end edge 13 of the pad contains substantially more absorbent material than the portion toward the shorter end edge 12 and is therefore best adapted to be placed toward the front in application to a male infant and toward the rear in application to a female infant. If desired, suitable indicia, as shown in FIG. 3, may be applied to the diaper near the long end edge 13 to indicate that this end is to be applied in the front of a male infant, while similar indicia near the shorter end edge 14 would indicate that this end should be in front when applied to a female infant. Suitably, these indicia could be printed or in the form of perforations forming the letters of the desired message.

A lining sheet 33 formed of a moisture-permeable material such as a nonwoven, textilelike sheet of high wet strength is superposed on the central absorbent pad, folded as above described, the liner being of a size and shape to extend beyond all edges of the pad by a nominal amount. An outer, moistureproof layer 34 of a material such as polyethylene or similar barrier type sheet material is applied to the reverse side of the pad and is of comparable size to the liner sheet so that these two sheets may be adhered together in their marginal areas to completely enclose the pad between the liner and the barrier sheet. The sheets may be marginally bonded by a suitable adhesive or by heat-sealing if one of the sheets is a suitable thermoplastic material. The outer moistureproof layer may be embossed or printed with a suitable pattern, if desired.

The narrow central channel 30 is covered only by the moisture-permeable liner sheet 33. This channel serves to direct and disperse fluid waste material entering the pad through the liner sheet so that the fluid is contacted by a greater area of absorptive material rather than tending to saturate a smaller localized area of the pad. This prevention of over saturating a localized area of the pad by dispersing the

waste fluid throughout substantially the entire pad area increases the overall efficiency of the diaper and prolongs the period of its effectiveness in use.

Although the liner 33 is readily permeated by liquid, it has a limited permeability to semisolid waste material. In order to allow this type of material to come into direct contact with the central absorptive medium so that the pad may withdraw liquid from the waste to lower its moisture content and make it less irritating, the liner is preferably provided with a number of apertures 36 of any desired geometric configuration, concentrated particularly in the central portion of the diaper. Suitably, the apertures in the central portion of the liner will be of fairly substantial size, approximating perhaps one-fourth to one-half of a square inch in area and will decrease in size and/or frequency toward the side and end edges of the diaper. In general, the apertures 36 would be formed primarily in the area of the liner 36 covering the double thickness portion of the pad and the central channel formed by the infolding of the panel portions 25.

For convenience in applying the diaper to an infant, a pair of suitable tapes 38 having a pressure-sensitive adhesive coating on one surface thereof may be attached to the diaper outer layer 34 to extend beyond the side edges 14 and 15 near their junction with one of the end edges 12 or 13 which form the waistline of the diaper when applied to an infant. Prior to use, the adhesive coating on the extending portions of tapes 38 will bear a protective covering paper sheet which will be stripped off when the diaper is applied to expose the adhesive for its intended purpose. After placing the diaper on an infant in the conventional manner, the extending portions of the tapes are brought into adherence with the opposed portions of the diaper at the waistline to complete the application of the diaper.

Further, if desired, additional tapes 40 may be attached to the diaper to extend from the central portion of one or both of edges 12 and 13 for attachment to the lower edge of an undershirt or similar clothing worn by an infant. It is to be understood, of course, that the diaper may, as an alternative to the use of tapes 38 and 40, be secured on the infant by pinning in the conventional manner.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A disposable diaper having a middle layer comprising:

a pad of absorptive fibrous cellulose material, an outer layer of a moisture-barrier sheet material and an inner layer of a moisture-permeable high wet strength fibrous sheet material;

5 said absorptive pad being trapezoidal in shape and having pairs of slits directed inwardly in a converging manner from each of the nonparallel sides of the trapezoid from points near the ends of said sides to define foldable panel portions lying between said pairs of slits;

10 said panel portions being infolded to form in said pad a narrowed central area of double thickness;

said inner, moisture-permeable layer overlying said pad with said panels infolded and having the margins of said inner layer extending beyond the margins of said pad;

15 said outer, moisture-barrier layer underlying said pad with said panels infolded and having the margins of said outer layer substantially coincident with the margins of said inner, moisture-permeable layer; and

20 said inner and outer layers being adhered in the marginal areas lying outside the margins of the middle absorptive pad area.

2. A diaper according to claim 1 wherein said infolded panel portions of said pad fail to abut in the central area of said pad, thereby leaving a narrow centrally located channel between the infolded edges of said panel portions.

3. A diaper according to claim 1 wherein said inner moisture-permeable layer is provided with a plurality of apertures located in the area overlying said infolded panel portions of said absorptive pad.

30 4. A diaper according to claim 3, wherein said apertures are of varying size in a range up to about one-half square inch in area.

5. A diaper according to claim 4, wherein said apertures of larger size are positioned in the central area of said pad and said apertures of smaller size are positioned more remotely from said central area.

6. A diaper according to claim 1, wherein suitable indicia are applied near an end edge of the diaper, said indicia directing the positioning of the diaper for most efficient diapering of an infant of a specified sex.

7. A diaper according to claim 1, wherein tabs bearing a pressure-sensitive adhesive coating on one side thereof extend outwardly from opposite side edges of the diaper adjacent the junction of said side edges with an end edge.

45 8. A diaper according to claim 7, wherein an additional tab bearing on one side thereof a pressure-sensitive adhesive coating extends from an end edge of said diaper for attachment to an item of clothing of an infant.

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