

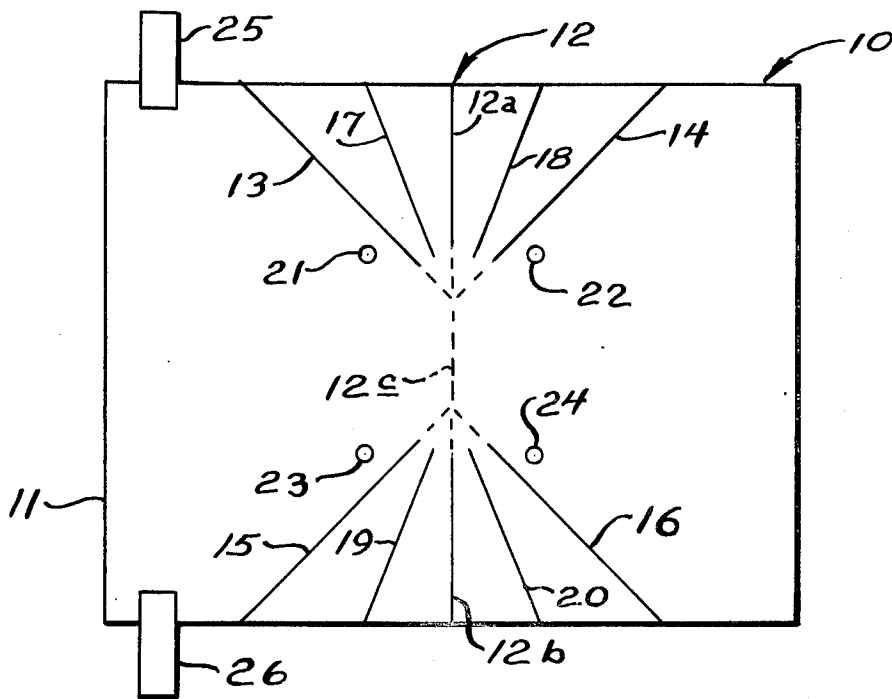
[54] **DISPOSABLE DIAPER**
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[73] Assignee: **Paper Converting Machine Company**, Green Bay, Wis.
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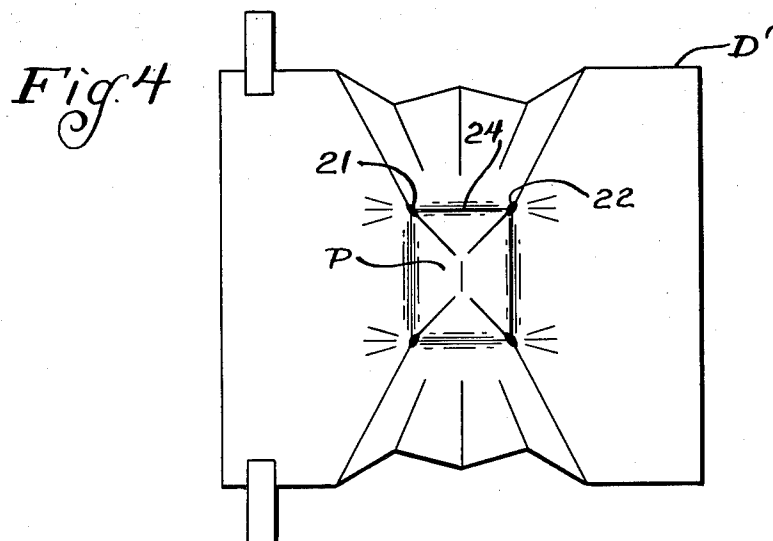
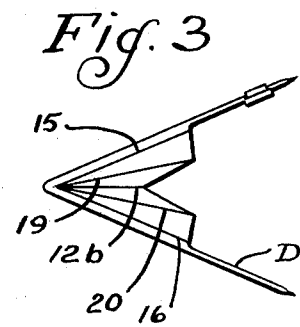
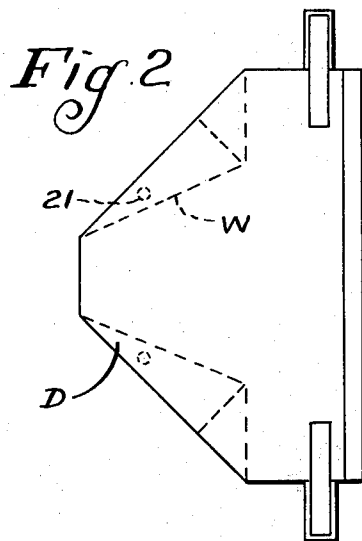
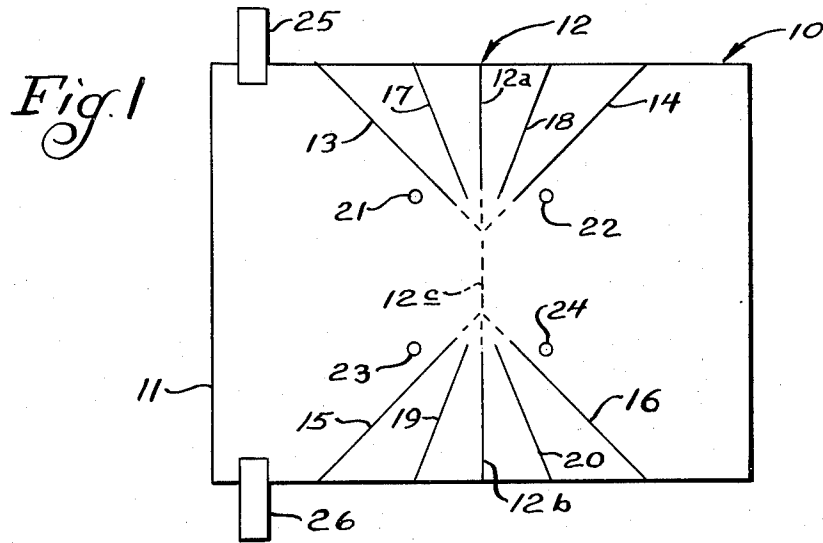
Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 373,247, June 25, 1973, abandoned.
[52] U.S. Cl. **128/287**
[51] Int. Cl.² **A61F 13/16**
[58] Field of Search **128/284-287**

[56] **References Cited**
UNITED STATES PATENTS
3,744,494 7/1973 Marsan 128/287
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Attorney, Agent, or Firm—Dawson, Tilton, Fallon & Lungmus

[57] **ABSTRACT**
A disposable diaper for producing the same wherein interrupted transverse and angled convergent lines of compression are applied to a diaper blank with adhesive adjacent the convergent lines to provide a diaper having a relatively rounded, unstressed crotch-forming portion and a natural drape of the outer center portions.
1 Claim, 4 Drawing Figures





DISPOSABLE DIAPER

This application is a continuation-in-part of my co-pending application Ser. No. 373,247 filed June 25, 1973, and now abandoned.

BACKGROUND AND SUMMARY OF INVENTION

Increasingly those in the art of producing disposable diapers have striven to provide suitably prefolded diapers so that the diaper conforms readily and fits comfortably on the infant. Exemplary of this are the diapers seen in U.S. Pat. Nos. 3,196,874 and 3,710,797. The diaper of the instant invention is an improvement on the diapers in the above-mentioned patents.

The inventive diaper and apparatus therefor provide interrupted transverse and foreshortened angled convergent lines of compression so as to develop a single legfold diaper and with legfold adhesive adjacent the interrupted angled convergent lines of compression to develop a natural drape of the outer center portions.

DETAILED DESCRIPTION:

The invention is described in conjunction with an illustrative embodiment in the accompanying drawings, in which:

FIG. 1 is a plan view of a diaper blank prior to folding;

FIG. 2 is a plan view of the folded diapers;

FIG. 3 is a side elevational view of the diaper of FIG. 2; and

FIG. 4 is a plan view of the unfolded diaper showing the various stress lines;

In the illustration given, and with reference first to FIG. 1, the numeral 10 designates a diaper "blank." By this, I refer to the precursor of the final disposable diaper, but one wherein the essential, conventional elements are already assembled. For example, the blank 10 includes an outer impermeable sheet 11, a layer of liquid absorbing material, and an inner liquid permeable sheet, all united perimetrically. Such blanks are provided in a connected stream (prior to scoring and adhesive application). Conventional apparatus is available for the production of such a multi-ply diaper web.

The diaper blank in FIG. 1 is seen to include a plurality of lines of compression, i.e., lines of incipient folding. First, reference is made to an interrupted, centrally positioned, transverse line generally designated 12 which includes line segments 12a and 12b. The middle portion of the line 12, i.e., the interrupted portion designated 12c in FIG. 1, provides a crotch-forming portion P of the diaper (see FIG. 4) which is relatively rounded and unstressed, and which has excellent containment characteristics. The development of fold lines — as by compression, creasing, etc. — may impair the containment characteristic, and, in extreme cases, result in leakage.

Associated with each line segment 12a or 12b, as the case may be, are a first pair of inwardly convergent, foreshortened lines of compression and which are disposed at about 45° relative to the associated line segment. As can be readily appreciated from FIG. 1, the angled lines associated with the line segment 12a are designated 13 and 14, while those associated with the line segment 12b are designated 15 and 16. It will be seen that if the lines 13 and 14 were extended, they would converge on the line 12, the same being true in the case of the lines 15 and 16. The foreshortening aids

in developing the advantageous unstressed crotch-forming portion.

Associated with each line segment 12a or 12b are a second pair of inwardly convergent, foreshortened lines of compression disposed at about 22½° relative to the associated line segment. For example, lines 17 and 18 are associated with segment 12a with line 17 being positioned between line 13 and segment 12a. Line 18 is between line 14 and segment 12a. In like fashion the lines 19 and 20 are positioned relative to the segment 12b and its first pair of lines 15 and 16.

Adhesive may be applied by an applicator of conventional design in the spots designated 21, 22, 23, and 24 in FIG. 1, with each spot 21-24 being adjacent a longitudinal edge, but spaced inwardly therefrom, and also adjacent to but spaced from an associated convergent line of compression 13-16, respectively. Before leaving FIG. 1, reference is made to the tabs 25 and 26 which are provided in conventional fashion to secure the diaper in place about the infant's waist, and which are conventionally provided on the diaper web 11 upstream of the scoring and adhesive applicator rolls.

Referring now to FIG. 4, the diaper is seen in its partially unfolded condition and designated D' the folded configurations being designated D in FIGS. 2 and 3. It is in this configuration that the diaper is ready to receive the body of an infant. The foreshortened lines of compression 13-20 cooperate with the interrupted portion 12c of the line 12 to define the relatively rounded, unstressed crotch-forming portion — the absence of intentional creasing, but the presence of slight rounding being illustrated in FIG. 4 by means of a series of lines in the central portion P.

Still referring to FIG. 4, the points of adhesive (as at 21 and 22) develop an imaginary line 24 which ultimately becomes a rounded leg outfold when the diaper is applied to the body of an infant. It will be appreciated that the term "outfold" is used in contrast to an "in-fold" which is developed, for example, along the lines 13, 12a and 14, viz., where the confronting, abutting faces of the fold are the inner liquid permeable sheet. Contrarily, the lines 17-20 define outfolds. However, up to the time of applying the diaper to the infant, no outfold exists along the imaginary line 24, but instead, a relatively flat or thin wing as at W (see FIG. 2) exists. Thus, the provision of the various lines of compression, along with the adhesive spots, not only develops a thin, advantageously packageable diaper, but one which results in the provision of a body-conforming leg outfold. The advantageous thinness or compactness can also be appreciated from FIG. 3 which represents the diaper D in a partially unfolded condition, and wherein there is an infold at 12b, 15 and 16, and an outfold at 19 and 20. The outfolds 17-20 thus cooperate with the infolds 12a, 12b and 13-16 in developing a readily contourable leg portion on the diaper.

I claim:

1. A generally rectangular disposable diaper comprising an outer impermeable sheet, a layer of liquid absorbing material and an inner liquid permeable sheet all united perimetrically,

said diaper having a central transversely extending interrupted line of compression whereby the diaper is adapted to be folded on itself to provide a crotch-forming portion in the middle of said interrupted line of compression,

said line having a segment extending in from each longitudinal edge with each segment terminating

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short of the crotch-forming portion of the diaper,
 a first pair of inwardly convergent foreshortened
 lines of compression associated with each of said
 segments and disposed at about 45° relative
 thereto, and a second pair of inwardly convergent
 foreshortened lines of compression associated with
 each of said segments and disposed at about 22½°
 relative thereto, each of said convergent lines of
 compression extending in from each longitudinal
 edge but terminating short of the crotch-forming
 portion of the diaper and short of the inner end of
 its associated segment and cooperating with said
 associated segment to provide a relatively rounded,

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unstressed crotch-forming portion, said diaper
 prior to installation on an infant being folded along
 said interrupted lines and having an infold along
 each line segment and an infold in said crotch-
 forming portion, and further having an infold along
 each first pair convergent line and an outfold along
 each second pair convergent line,
 and means adhering said inner sheet together adja-
 cent each longitudinal edge but spaced inwardly
 therefrom on opposite sides of each of said first
 pair of convergent lines of compression.

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