

[54] **CONFORMABLE BABY DIAPER**
 [75] Inventor: **Richard L. Zoephel**, Lake Villa, Ill.
 [73] Assignee: **The Kendall Company**, Napole, Mass.
 [22] Filed: **Aug. 21, 1972**
 [21] Appl. No.: **282,117**

2,905,581	9/1959	Maxey	128/288
3,245,407	4/1966	Mason	128/288
3,315,676	4/1967	Cooper	128/287
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Primary Examiner—Richard A. Gaudet
Assistant Examiner—Ronald L. Frinks

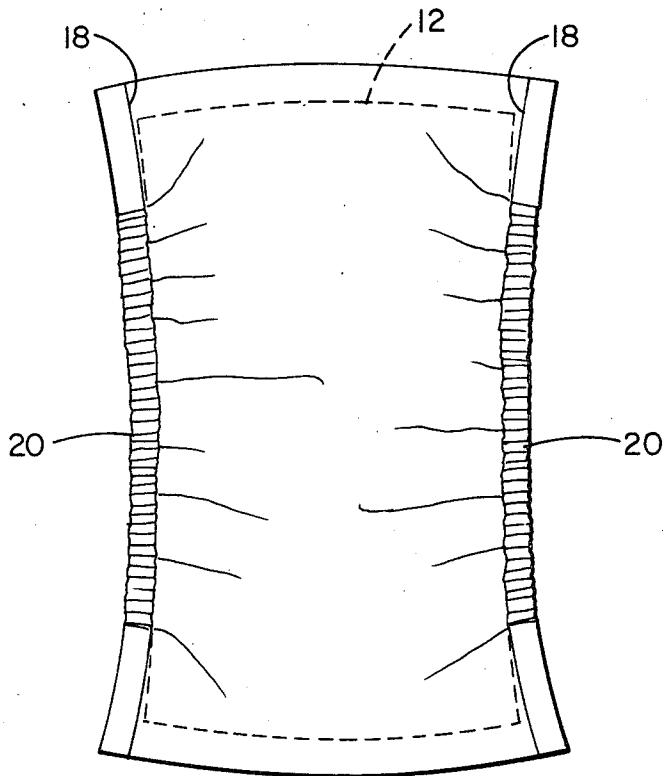
[52] **U.S. Cl.** **128/287**
 [51] **Int. Cl.** **A61f 13/16**
 [58] **Field of Search**..... 128/284, 286-288,
 128/290, 296

[57] **ABSTRACT**

A diaper is micropleated along a portion or all of its borders to shape the diaper for better conformability when applied to an infant and provide extensibility along at least the side portions to provide a fit for various leg sizes and reduce the likelihood of leakage between the legs and the encircling diaper portion.

[56] **References Cited**
UNITED STATES PATENTS
 2,866,459 11/1958 Sobelson..... 128/284

6 Claims, 8 Drawing Figures



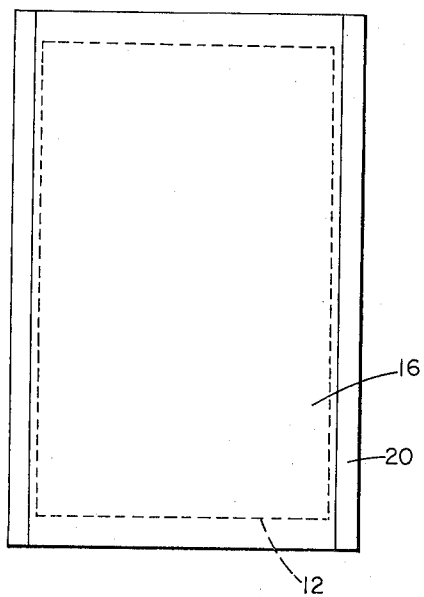


FIG. 1

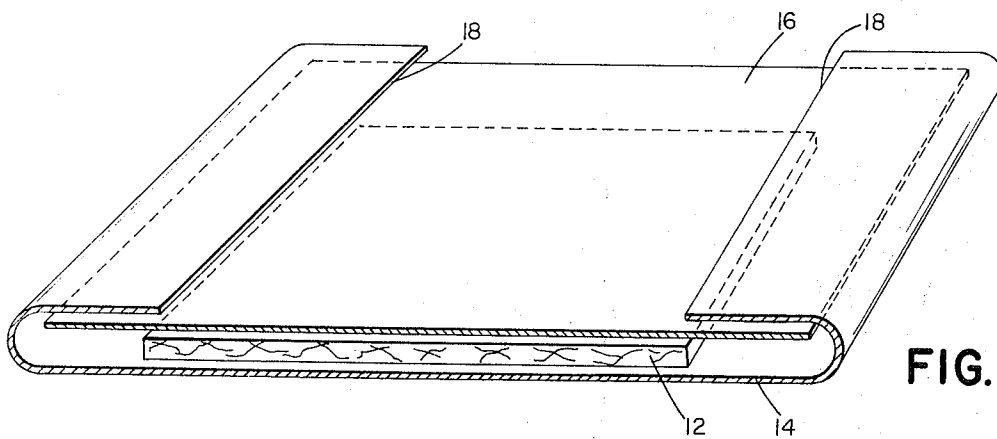


FIG. 2

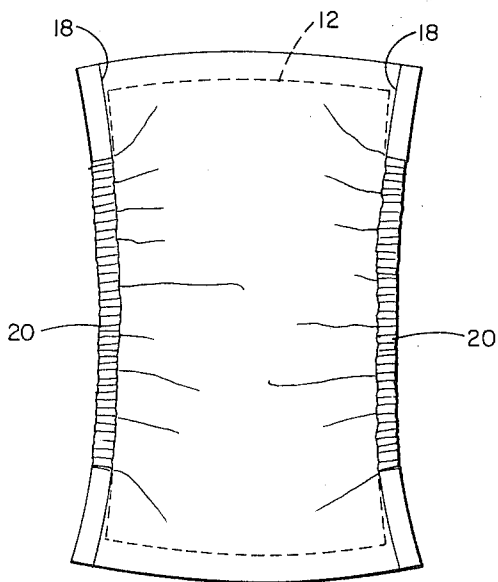


FIG. 3

FIG. 4

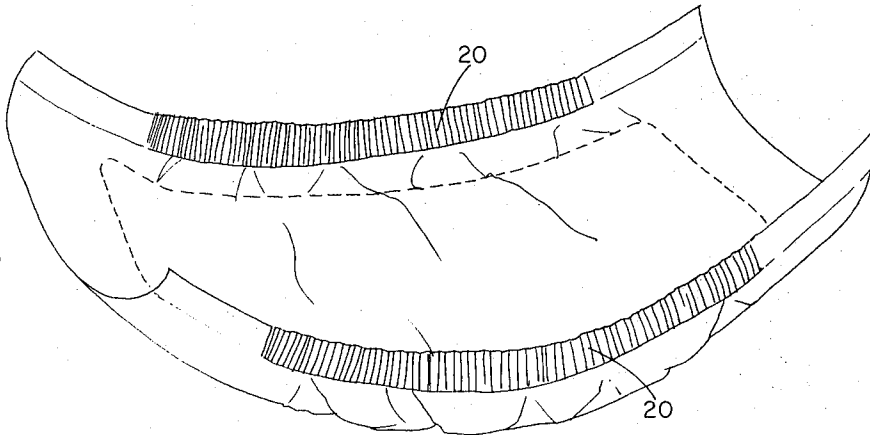


FIG. 5

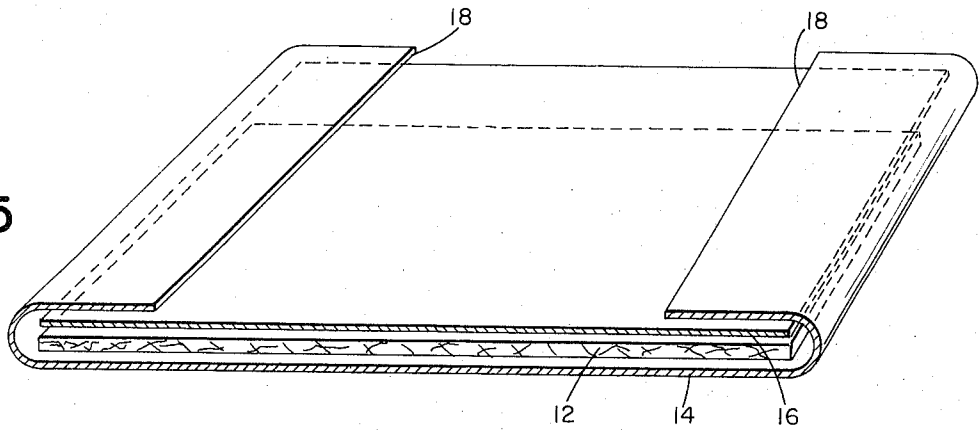


FIG. 6

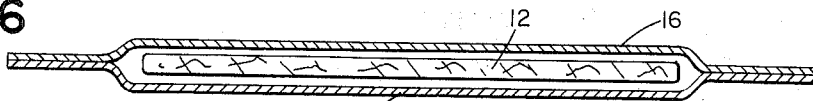


FIG. 6a

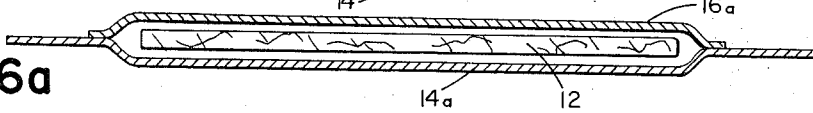
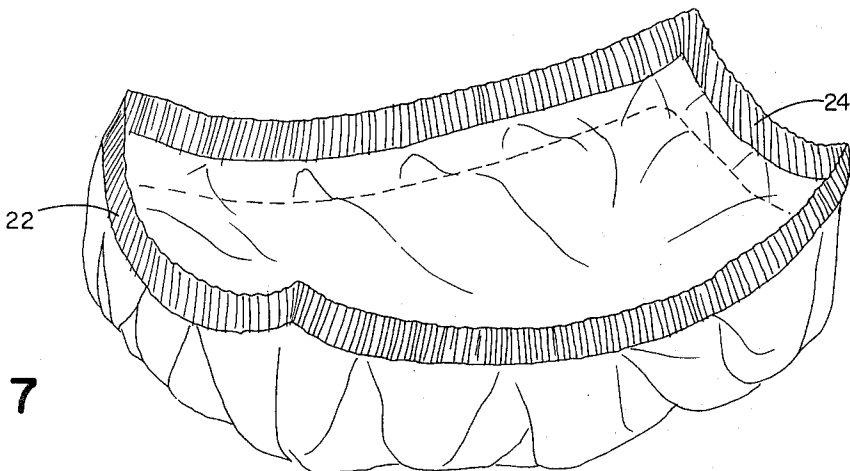


FIG. 7



CONFORMABLE BABY DIAPER

This invention relates to diapers and more particularly to a disposable diaper having improved conformability.

While rectangular diapers are traditional, contoured diapers give a better and snugger fit around the legs. The contouring is sometimes done with cutouts as in U.S. Pat. No. 2,507,197 and sometimes with tacked-down longitudinal pleats.

In accordance with this invention a contoured diaper is formed by microcreping the diaper along its side edges to shorten the side edges enough to "pinch" in the middle portions of the diaper. Simultaneously the transverse compaction provides an extensibility so that the contoured diaper is adjustable in its conformability to various infants' leg sizes. Urine leakage around the legs is thus reduced.

Moreover, compaction of portions of the side edges results in a bowling or dishing of the diaper in a relaxed state giving a desirable shape for application to the infant. As such, the compaction-type micropleats imparted in accordance with this invention are wholly different in structure and functions from embossing or crimping utilized solely to adhere co-planar layers of material together as referred to in U.S. Pat. Nos. 2,890,700 and 2,507,197 (column 2, line 24).

As with other disposable diapers, a variety of fibrous and non-fibrous materials may be used in various combinations, but it is preferred to use a multi-layer sheet material which includes a customary central absorbent "fluff" with an overlying layer of non-woven fabric and a backing sheet of plastic, with the edges of the plastic sheet enfolding the side edges of the top layer or, alternatively, being sealed thereto face-to-face.

The marginal layers of plastic and unwoven fabric may thus be microcreped outside of the side edges of the fluff if so desired to form discontinuous micropleats extending transversely, i.e., perpendicular to the side edges.

The microcreping can be done on any commercial machine which mechanically compacts and has relieved sections to permit the central portion of the fabric to be uncompacted and the side edges compacted; or the side edges may be compacted by passing the fabric assembly in tandem through successive microcreping machines or, alternatively, successively through the same machine.

In the accompanying drawings:

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

FIG. 2 is a cross-sectionally cut-away enlarged view of the diaper of FIG. 1;

FIG. 3 is a two-dimensional view or projection of the diaper of FIG. 1 after compaction along a portion of its side edges;

FIG. 4 is a perspective three-dimensional or relaxed view of the diaper after compaction;

FIG. 5 is a cross-sectionally cut-away enlarged view of an alternative assembly which may be utilized in making diapers of the invention, prior to the compacting operation;

FIGS. 6 and 6a are cross-sectional views of still further alternative constructions that may be used instead of the assemblies shown in FIGS. 2 and 5; and

FIG. 7 is a perspective view similar to that of FIG. 4 but showing the microcreping extended around the en-

tire borders or marginal portions of the rectangular fabric assembly.

As indicated in FIG. 2 the material may include a layer of absorbent fluff 12 sandwiched between a plastic backing 14 and an unwoven fabric top sheet 16. The side edges 18 of the plastic sheet are folded over the top sheet 16 and preferably sealed thereto.

This assembly, after the fold sealing operation, is subjected to microcreping treatment as on the edge of Walton microcreper (U.S. Pat. No. 3,260,778) to compact the folded-over marginal portions 20 and render them extensible. Because of the presence of the plastic backing sheet, the edge portions are rendered somewhat elastic so as to provide a snug fit around the infant's leg when the diaper is applied in the usual manner to an infant.

As shown, the microcreping so compacts the marginal portions 20 relative to the remainder of the assembly that the edges are foreshortened and tend to pinch in the assembly at least in a 2-dimensional configuration or projection as shown in FIG. 3. In a relaxed state, however, the assembly assumes a dish or bowl shape as shown in FIG. 4 which enhances its conformability to the infant.

FIG. 5 is a view similar to that of FIG. 2 with the modification that the fluff 12 has a width substantially equal to that of the top sheet 16 and is enfolded therewith beneath the folded-in side edges 18.

In FIG. 6, the top sheet and back sheet are sealed together face-to-face without enfolding. When the sealed-together faces are microcreped as heretofore described, the side edges are foreshortened as in the case of the assembly of FIG. 2.

In FIG. 6a, the top sheet is still sealed face-to-face to the back plastic sheet 14, but the top sheet is much narrower than the back sheet 14 so that the side marginal portions of the diaper are formed solely of plastic sheet material which can be compacted either throughout a crotch portion of its length or throughout its whole length.

A construction as shown in FIGS. 1-4 may have a plastic backing sheet of $\frac{3}{4}$ to 1 $\frac{1}{2}$ mil. polyethylene film; the unwoven top sheet may be 5-9 mils. thick, 15 to 20 gm/yd² carded rayon fiber with a binder; and the fluff may be 1/32 to $\frac{1}{8}$ inch thick, 200 to 250 gm/yd² fiberized pulp stock.

In the form shown in FIG. 2 the compaction may run from a minimum of 5 percent up to 20 percent utilizing 25 pleats per inch with the amplitudes varying from about 0.01 inches to 0.06 inches randomly.

Another sample of diaper made with the construction of FIG. 5 produced a 5 percent compaction with 20 pleats per inch and with the pleat amplitudes varying from 0.003 inches to 0.03 inches randomly.

A construction following that shown in FIG. 6 was pleated to give 55 pleats per inch with a compaction which ran up to 35 percent with the pleat amplitudes varying from 0.01 inches to 0.04 inches randomly.

In another structure as shown in FIG. 6a the pleating ran higher to 100 pleats per inch giving a 10 to 40 percent compaction with the pleat amplitudes running from 0.003 to 0.03 inches.

FIG. 7 shows a construction wherein the microcreping has been extended all around the edge of the sheet assembly so that extensibility and elasticity is also provided along the waistline edges 22 and 24, it being noted that along these edges the micropleats are gener-

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ally parallel to the side edges of the diaper and perpendicular to the end edges.

What is claimed is:

1. A disposable diaper comprising a multi-layer generally inextensible composite of absorbent and non-absorbent sheet material having portions along its opposite marginal sides in the crotch area secured together to define side edges of the diaper, said edges being transversely only mechanically compacted providing extensible borders encircling the legs of a wearer when said diaper is worn said compacted edges being foreshortened and dishing the diaper into a bowl-like shape.

2. A diaper as claimed in claim 1 wherein the composite includes stretchable plastic film and the pleated borders have elasticity.

3. A diaper as claimed in claim 1 wherein the pleated

portion of the diaper presents between 20 and 100 pleats per inch.

4. A diaper as claimed in claim 1 wherein the pleats have amplitudes varying from 0.003 inches to 0.06 inches.

5. A diaper as claimed in claim 1 wherein the pleated side edge portions are compacted from 5-40 percent by the pleats.

6. A disposable diaper comprising a multi-layer generally inextensible composite of absorbent and non-absorbent sheet material having portions along its opposite marginal side edges in the crotch area transversely only compacted to provide extensible pleated borders encircling the legs of a wearer when said diaper is worn, the pleats pinching in the side edges and narrowing the diaper in the crotch area.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,828,784 Dated August 13, 1974

Inventor(s) Richard L. Zoepfel

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

Item [73] should read ~~Colgate-Palmolive Company~~ --.

Signed and sealed this 10th day of June 1975.

(SEAL)

Attest:

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Attesting Officer

C. MARSHALL DANN
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