United States Patent [19]

Enloe

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[45] **Apr. 3, 1973**

[54] PREFOLDED DISPOSABLE DIAPER

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

[51] **Int. Cl.** **A61f 13/16**

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

[56] **References Cited**

UNITED STATES PATENTS

3,180,335	4/1965	Duncan et al.	128/287
3,196,874	7/1965	Hrubecky	128/287
3,426,756	2/1969	Romanek	128/287
3,561,446	2/1971	Jones, Sr.	128/287

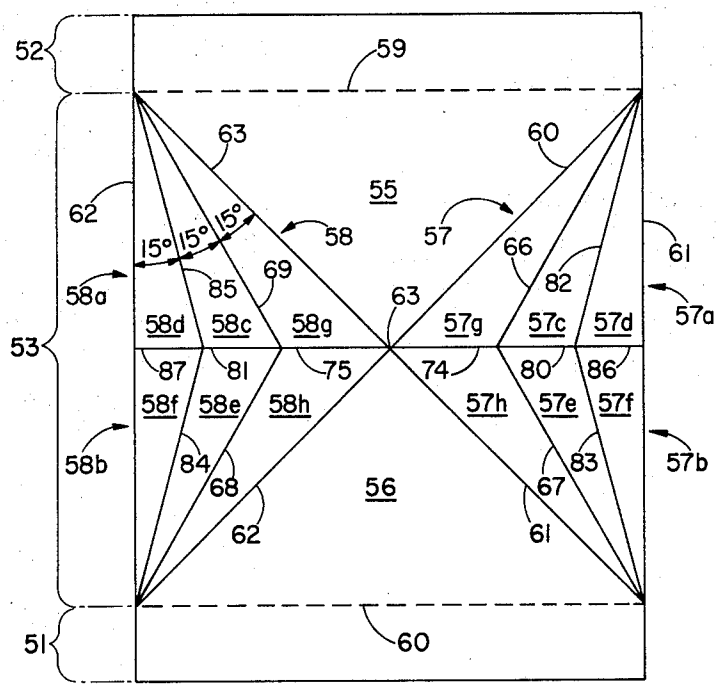
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[57] **ABSTRACT**

An improved prefolded disposable diaper folded to provide a centrally disposed, downwardly depending, main pocket flanked on each side by laterally disposed secondary pockets.

4 Claims, 6 Drawing Figures



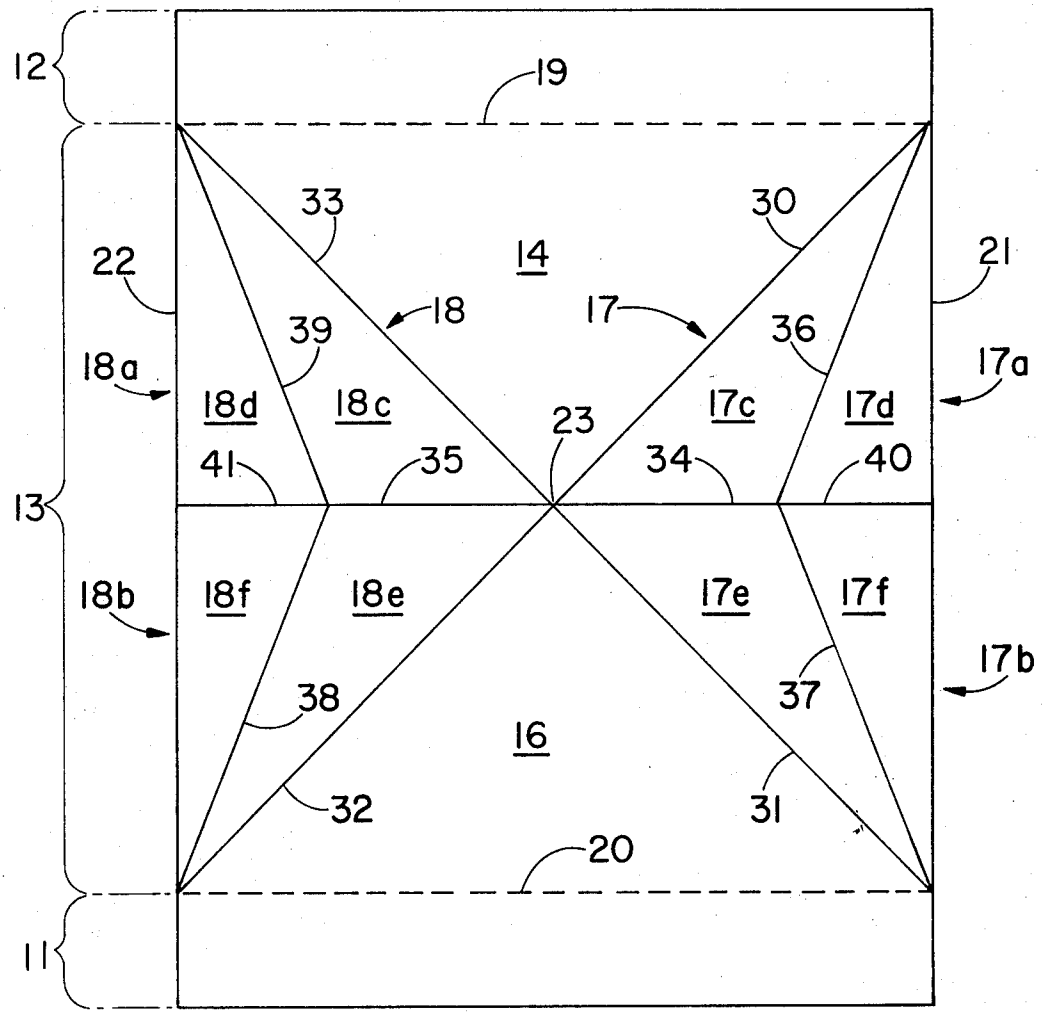


FIG. 1 (PRIOR ART)

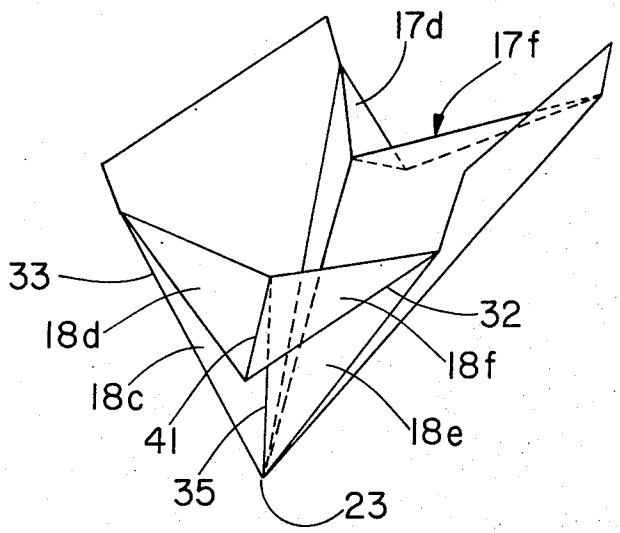


FIG. 1A (PRIOR ART)

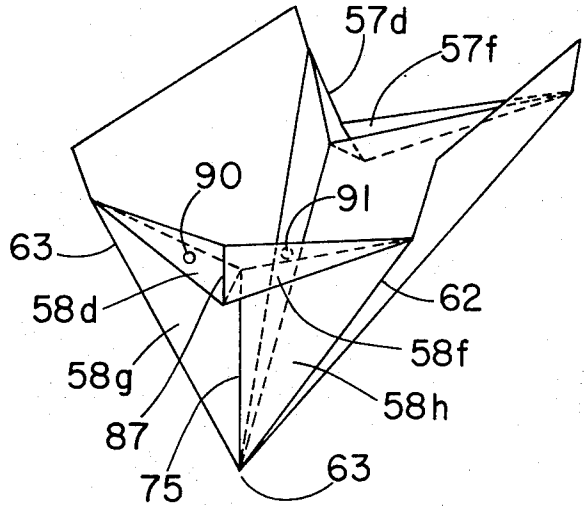


FIG. 2A

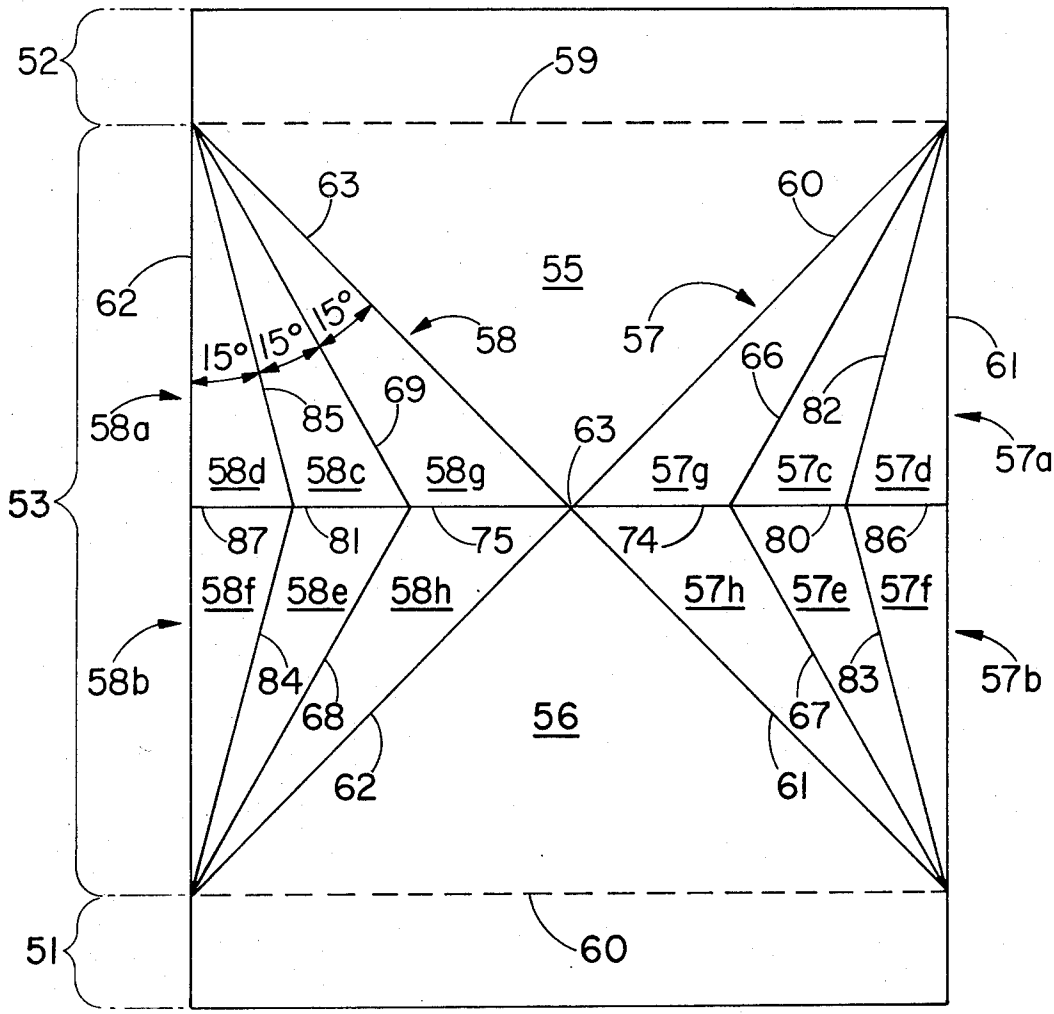

52
59
63
60
62
55
15°
15°
15°
58
57
66
61
58a
85
69
82
63
57a
58d
58c
58g
57g
57c
57d
53
87
81
75
74
80
86
58f
58e
58h
57h
57e
57f
58b
84
83
57b
68
56
67
62
61
51
60

FIG. 2

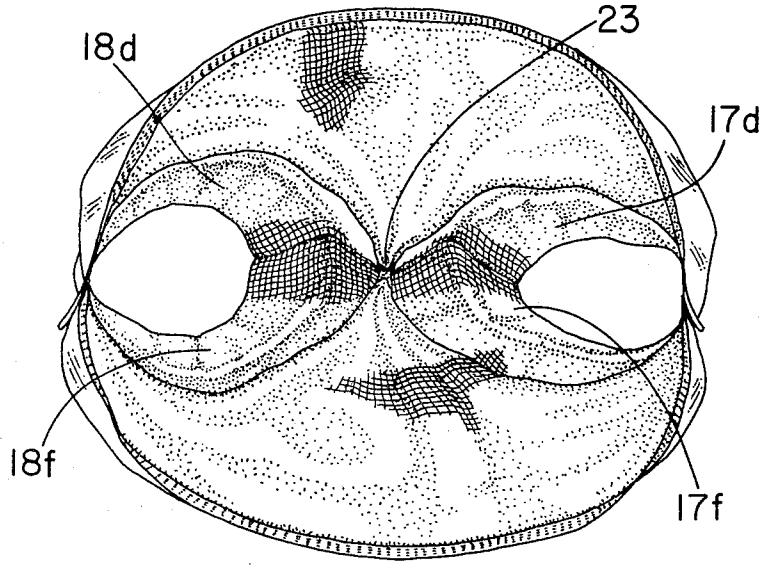


FIG. 3 (PRIOR ART)

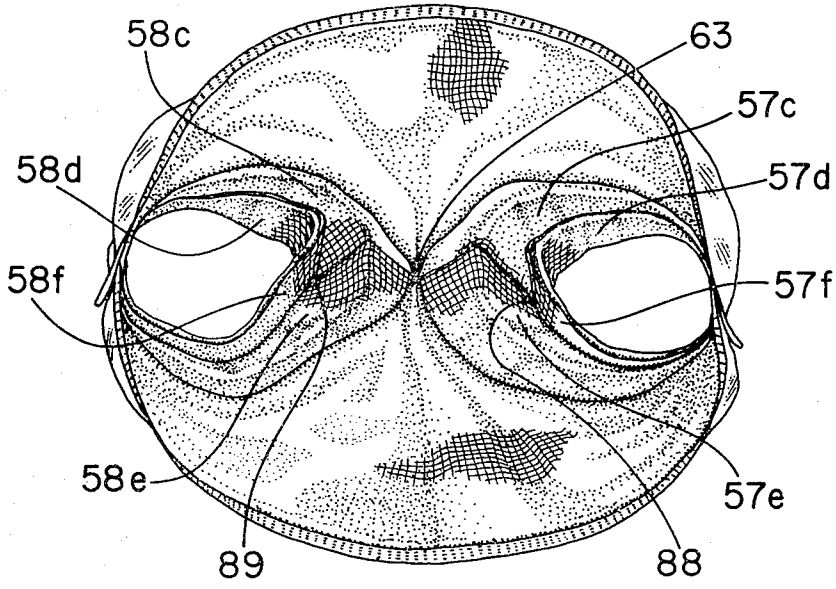


FIG. 4

PREFOLDED DISPOSABLE DIAPER

BACKGROUND OF THE INVENTION

Disposable diapers are becoming more and more acceptable as a sanitary protection item in infant and child care. Unitary, preshaped diapers which require no supplementary supporting holders or panties have proved to be especially popular. Among the latter is a diaper of the type described in Hrubecky U.S. Pat. No. 3,196,874. This diaper is in the form of a rectangular pad folded along lines which define cooperating triangular segments, into a substantially triangular-shaped prefolded diaper having a centrally disposed downwardly depending pocket.

Diapers with this prefolded construction conform neatly to the shape of the child, without necessitating additional preliminary folding operations by the mother. This preshaped diaper performs especially well in absorbing urine and fecal discharges of small children who have not reached the walking or crawling stages, and of newborn infants who remain relatively quiescent. However, for larger and more active children it was found that leakage sometimes occurred in the inner leg area while the child was standing, walking, climbing, or otherwise actively engaged. It has now been discovered that by modifying the fold construction of the diaper in the leg area much of this latter type leakage is prevented.

Accordingly it is the principal object of this invention to provide an improved prefolded diaper which provides a better fit and less leakage.

It is a further object to provide a disposable prefolded diaper with an improved excrement-trapping structure.

SUMMARY OF THE INVENTION

In Hrubecky U.S. Pat. No. 3,196,874 the central side areas of the diaper are folded on lines defining two triangular sections within adjoining equi-sided right-angled triangles The diaper is first folded inwardly on the innermost lines of these triangular sections to provide a deep, centrally disposed pocket. A second fold on the outermost lines of these triangular sections provides downwardly directed edge portions which press against the inner thigh when the diaper is in place.

In the present invention the equi-sided right-angled triangles are divided into three triangular sections to provide an additional upwardly directed folded portion adjacent the outer edges of the diaper. This arrangement provides the diaper with two supplementary side pockets of less depth than the central pocket, with one such pocket laterally disposed on each side of the central pocket. The side pockets are effective in more positively trapping body discharges. In addition, the edge portions of the diaper in this area point upward, rather than downward as in the prior art construction, so that excess fluids and fecal matter from the central pocket, as well as any misdirected discharges, have more difficulty escaping.

The above features and other advantages of the present invention will become apparent by reference to the following specification and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is an idealized plan view of the prior art diaper showing the disposition of lines on which the diaper is folded.

FIG. 1A is an idealized perspective view of the prior art diaper of FIG. 1 after partial folding.

FIG. 2 is a similar plan view of an embodiment of the diaper of this invention.

FIG. 2A is an idealized perspective view of the FIG. 2 diaper after partial folding.

FIG. 3 illustrates in plan view the configuration the prior art diaper of FIG. 1 takes when worn.

FIG. 4 is a plan view similar to FIG. 3 but showing the configuration of the diaper of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For a better understanding of the improved diaper of this invention, it would appear best to first describe the prior art diaper as shown in FIGS. 1, 1A, and 3.

In both the prior art and in the improved versions of the diaper, the diaper itself may be of any of the well known constructions now employed. These generally comprise an inner core of absorbent material such as wood pulp fluff, rayon, or cotton fibers, or multiple sheets of cellulose wadding, or combinations thereof; a fluid impervious bottom sheet of plastic film or water-repellent treated tissue which may extend around the sides and partially over the pad edges; and a soft, fluid-pervious top sheet such as non-woven fabric or a wet strength tissue. In the drawings idealized top views of a diaper of this general construction are utilized, without showing the detailed structure of the above components, since it is the folding arrangement in which the principal novelty lies. However, the invention is especially applicable to disposable diapers with fluff-filled, or cellulose wadding cores and a thin plastic film backing sheet.

In the prior art, as shown in FIG. 1, the rectangular diaper area is divided into transversely elongate waistband portions **11** and **12** at each end thereof, and a centrally disposed main diaper portion **13**.

The central portion is divided into four substantially equal isosceles triangles **14**, **16**, **17** and **18**. Triangles **14** and **16** have their base lines **19** and **20** horizontally disposed, while triangles **17** and **18** have their base lines **21** and **22** vertically disposed. The apices of all four of these triangles meet at the approximate geometric center **23** of the diaper. Triangles **17** and **18** are further divided into two equi-sided right-angled triangles, **17*a***, **17*b*** and **18*a***, **18*b*** respectively. Each of these equi-sided right-angled triangles are still further divided into two triangles. One of the triangles comprising a narrower based right-angled triangle **17*d***, **17*f***, **18*d***, **18*f*** bordering on its respective edge of the diaper, and the other being an obtuse-angled triangle **17*c***, **17*e***, **18*e*** located toward the interior of the diaper.

The diaper is folded into its finished configuration by folding inwardly on diagonal line segments **30**, **31**, **32** and **33** while folding outwardly on horizontal line segments **34** and **35**, and outwardly on diagonal line segments **36**, **37**, **38**, and **39** while folding inwardly on horizontal line segments **40** and **41**.

This provides a folded diaper as shown in the idealized partially open perspective view of FIG. 1A.

A top view of how this prior art diaper would appear when fastened in position on a child is shown in FIG. 7.

The deep pointed bottom 23 of the central pocket is easily discernible as are the downwardly directed edge portions 18*d*, 18*f*, and 17*d*, 17*f* adjoining the pocket. Fecal matter and urine are readily trapped in the deep pocket 23, but when a discharge is misdirected or when pocket 23 is tilted, as is often the case if the child is moving about or if the diaper is not applied in a perfectly centered position, some of the waste matter can easily run down edge portions 18*d*, 18*f*, 17*d* or 17*f* onto the thighs of the wearer, causing undesirable leakage.

FIG. 2 illustrates in plan view the idealized pattern of fold lines employed in the improved diaper of this invention. As in FIG. 1, the rectangular diaper area is divided into transversely elongate waist-band portions 51 and 52 at each end, and a centrally disposed main diaper portion 53.

The central portion is again divided into four substantially equal isosceles triangles 55, 56, 57 and 58. Triangles 55 and 56 have their base lines 59 and 60 horizontally disposed, while triangles 57 and 58 have their base lines 61 and 62 vertically disposed. The apices of all four of these triangles meet at the approximate geometric center 63 of the diaper.

Triangles 57 and 58 are further divided into two equi-sided right-angled triangles 57*a*, 57*b* and 58*a*, 58*b*, respectively. Each of these equi-sided right-angled triangles are still further divided into a narrower based right-angled triangle 57*d*, 57*f*, 58*d*, 58*f*. each bordering on its respective edge of the diaper, an obtuse-angled triangle 57*c*, 57*e*, 58*c*, 58*e* located more toward the interior of the diaper, and a more obtuse-angled triangle 57*g*, 57*h*, 58*g*, 58*h* located still nearer the diaper center.

This diaper is folded into its finished configuration by folding inwardly on diagonal line segments 60, 61, 62 and 63 while folding outwardly on horizontal line segments 74 and 75; outwardly on diagonal line segments 66, 67, 68 and 69 while folding inwardly on horizontal line segments 80 and 81; and inwardly on diagonal lines 82, 83, 84 and 85 while folding outwardly on horizontal line segments 86 and 87. It is noted that in each case the diagonal line segment defining the inner boundary of each triangle is the longest dimension line of that particular triangle.

The result is a folded diaper as shown in the idealized partially open perspective view of FIG. 2A.

When this diaper is fastened into position on a child, the top plan view would appear somewhat as in FIG. 8. The deep pointed bottom 63 of the central pocket is again easily discernible, as are the downwardly directed mid-portions formed by the obtuse-angled triangles 57*c*, 57*e*, 58*c* and 58*e*. Also discernible are upwardly turned edge portions formed by the narrow right-angled triangles 57*d*, 57*f*, 58*d* and 58*f*. These downwardly directed mid-portions and upwardly directed edge-portions form shallower side pockets 88 and 89 on the right and left hand sides of the deep main pocket 63. Most of the wastes discharged by the wearer are readily trapped in pocket 63. In addition, any material which escapes the main pocket, as well as any misdirected discharges will be caught in the supplementary pockets 88 and 89, thus minimizing the chances that undesirable leakage will occur in the thigh area even when the child is moving around.

While the versions of the diaper shown in the drawings are idealized for clarity, it will be understood that in the manufacturing process the fold lines will not necessarily define the perfectly shaped triangles as shown in the drawings. However, even with the normal variations which do occur, the pockets formed will generally be of the configuration shown, enabling them to perform the improved function as described above. Also due to manufacturing limitations, the main central portion of the diaper will not always be perfectly centered between equal width waist-bands as shown in the idealized versions. As a result, one waist-band area will often be wider than the other, but this does not materially hamper performance.

It is noted that in the representation shown in FIG. 2, the fold lines extending from the point or peak of the equi-sided right-angled triangles divide the angle at that peak into equal 15° segments. While this is the idealized form, it will be seen that the angular disposition of these lines and the resulting width of these segments can be varied from about 5° to 20° without detracting substantially from the functions described.

When the diaper is in its finished folded configuration, the pressure associated with packaging will normally form permanent creases in the material so that the triangular folds and pocket configurations will be retained under ordinary handling. However, to insure that the folded shape and associated pockets are retained even under the most severe handling conditions, adhesive joining of the contacting faces of at least the outer triangles to each other near the base fold line of these triangles is preferred. A representation of this adhesive joining may be found in FIG. 2A by adhesive dot 90. This dot will serve to fasten 58*d* to 58*f* near the fold line. An alternate form is to also attach a portion of the surface of the outer triangle such as 58*f* to a portion of the surface of the adjacent inner triangle as illustrated by adhesive spot 91 in the same figure.

While the emphasis throughout this specification has been directed toward the use of the described diaper for small children and infants, it will readily be seen that the improved structure may also be employed in diapers designed for use by incontinent older children and adults as well.

What is claimed is:

1. A prefolded diaper formed from an elongate flat rectangular pad of absorbent material, said pad comprising narrow unfolded end portions at each end and a major folded mid portion between said end portions, the end portions of said pad defining a body-encircling waist band and the mid portion of said pad comprising a multiplicity of adjoining triangular sections folded to provide a main pocket depending from the approximate center point of said mid portion and two secondary pockets laterally disposed on each side of said main pocket, said main pocket being formed at the juncture of six centrally disposed triangular sections, and each of said secondary pockets being formed at the juncture of four triangular sections disposed at each side of said pad, said centrally disposed main pocket being substantially deeper than each of said side pockets, and a portion of the outer faces of the two adjoining triangular sections on each side of the pad which form the outer edge of the diaper being adhesively joined.

2. The diaper of claim 1 wherein an inside portion of the centrally disposed main pocket is adhesively joined to each of the adjoining faces of the inner two triangular sections disposed at each side of said pad.

3. A folded diaper construction formed from an elongate flat rectangle of absorbent material comprised of narrow transverse waist-band portions disposed at both ends and a substantially square central portion; said central portion being divided into four adjoining triangular segments comprising isosceles triangles with two of the triangle bases horizontally disposed and the other two bases vertically disposed; the apices of all four of said isosceles triangles meeting at the approximate geometric center of said square central portion; each of the two triangles with the vertically disposed bases being further divided into two equal right-angled triangles by a horizontal line which passes through the meeting point of said apices and intercepts the vertically disposed bases; each of said right-angled triangles being further segmented into three adjoining triangles by lines which start at each of the peaks of said right-angled triangles adjacent the diaper edges and intercept said horizontal line; said segmenting lines dividing each of said right-angled triangles into a narrower right-angled triangle bordering on said vertically disposed base, a first obtuse-angled triangle adjoining said narrower right-angled triangle, and a second more obtuse-angled triangle adjoining said first obtuse-angled triangle; said horizontal line on each side of the diaper being a common base to two of said narrower right-angled triangles of equal dimension, two of said first obtuse-angled triangles of equal dimension, and two of said second obtuse-angled triangles of equal dimension; said horizontal line and the longest dimension line of each triangle into which said right-angled triangle is divided comprising fold lines on which said diaper is folded to form said folded diaper construction; said folds comprising a first inward fold on each of the longest dimension lines of said second obtuse-angled triangles and a cooperating outward fold on the line forming the base of said second obtuse-angled triangles, an outward fold on each of the longest dimension lines of said first obtuse-angled triangles and a cooperating inward fold on the line forming the base of said first obtuse-angled triangles, and a second inward fold on each of the longest dimension lines of said narrower right-angled triangles and an outward fold on the line forming the base of said narrower right-angled triangles; the folds in said diaper defining a central main pocket bottoming at the fold juncture located at the apices of said isosceles triangle segments, and supplementary side pockets laterally disposed on either side of said central pocket; the bottom of said side pockets being disposed at the fold where the long dimension lines of each of the two adjoining narrower right-angled triangles meet at said horizontal line, the contracting faces of said narrower right-angled triangular segments being adhered together in an area close to the outward fold forming the base of said narrower, right-angled triangles.

4. The diaper of claim 3 in which a portion of the face of each of said narrower right-angled triangular segments is adhered to a portion of the face of its respective adjoining second obtuse-angled triangular segment.

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