

[54] **DIAPER WITH THIGH-OPENING CLOSURE MEANS**

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[52] **U.S. Cl.** 128/287

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

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

[57] **ABSTRACT**

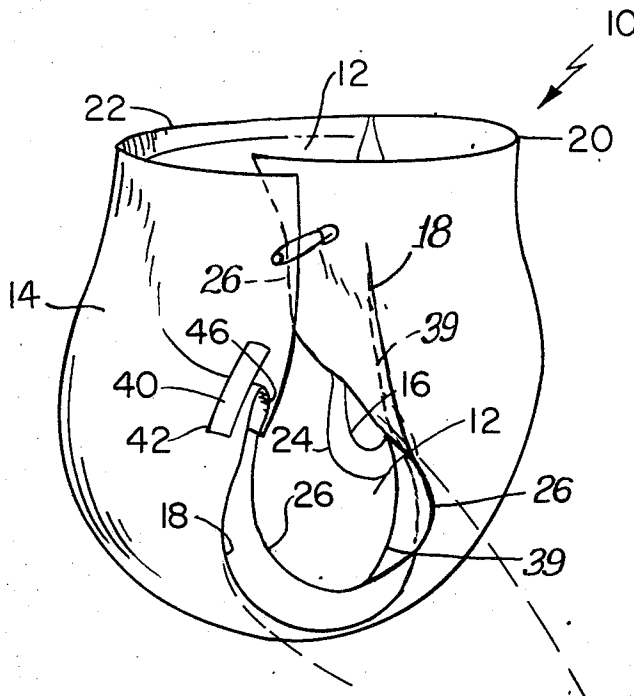
A diaper having a pair of end edges and a pair of sides connecting the end edges, and including, front and back waistband portions at the end edges with a crotch portion therebetween. The diaper has adhering means positioned below the waistband portion but above the bottom of the crotch section of the diaper and adjacent both of the connecting sides to tighten the diaper about an infant's legs after placement of the diaper about the infant.

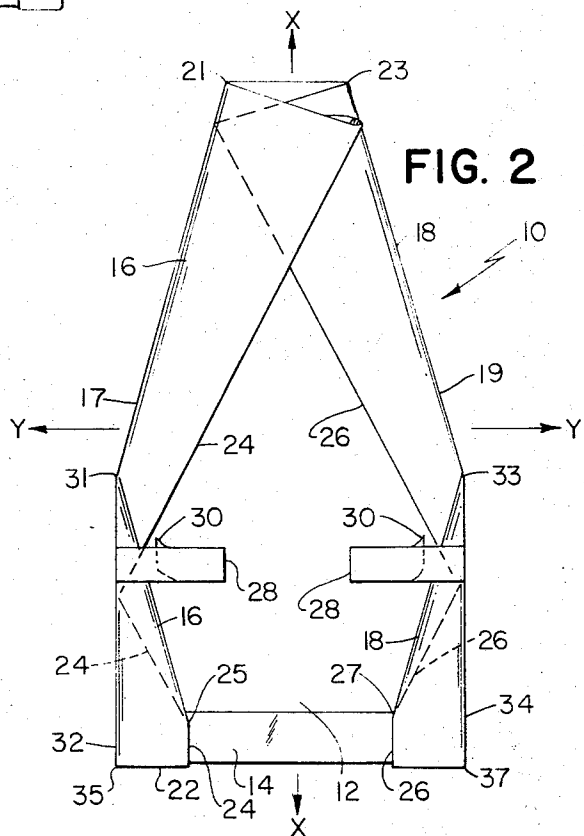
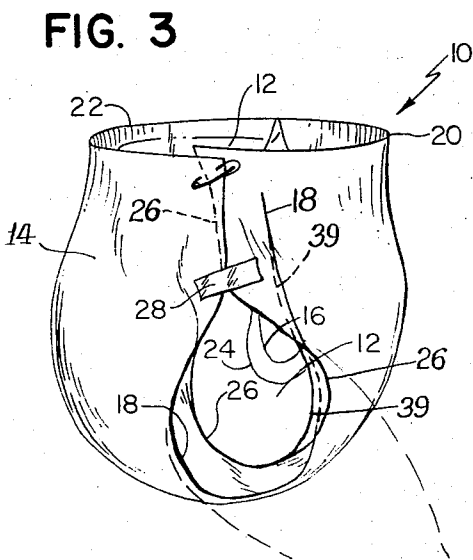
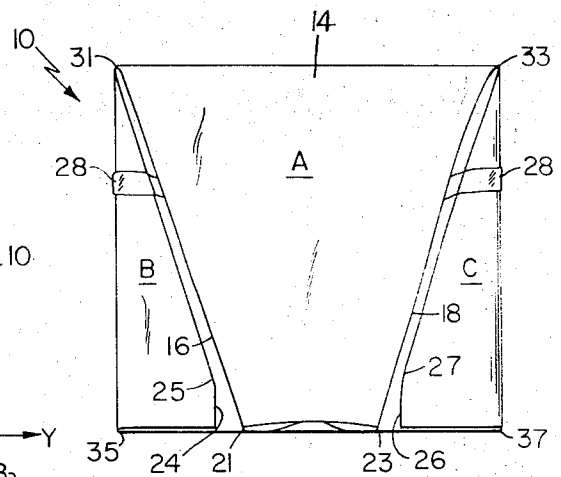
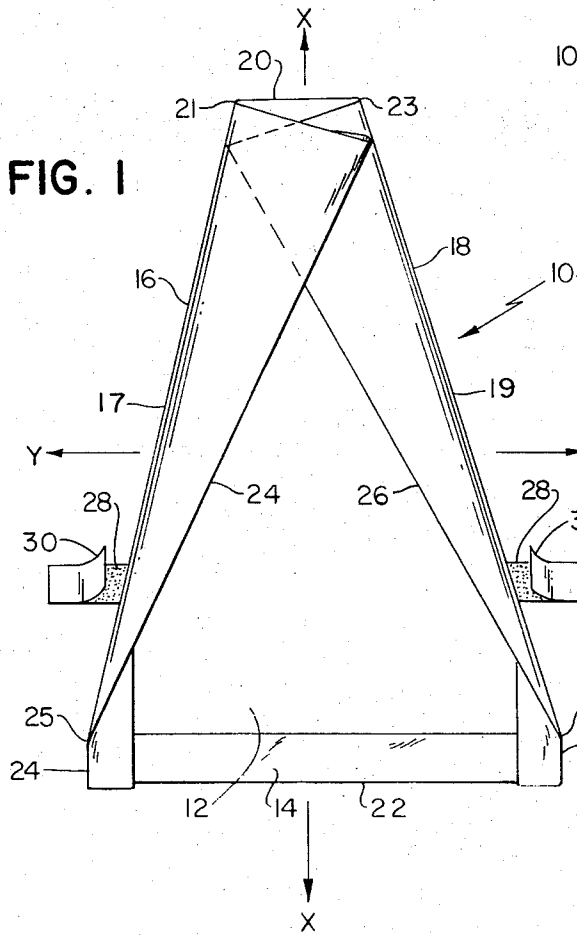
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19 Claims, 9 Drawing Figures





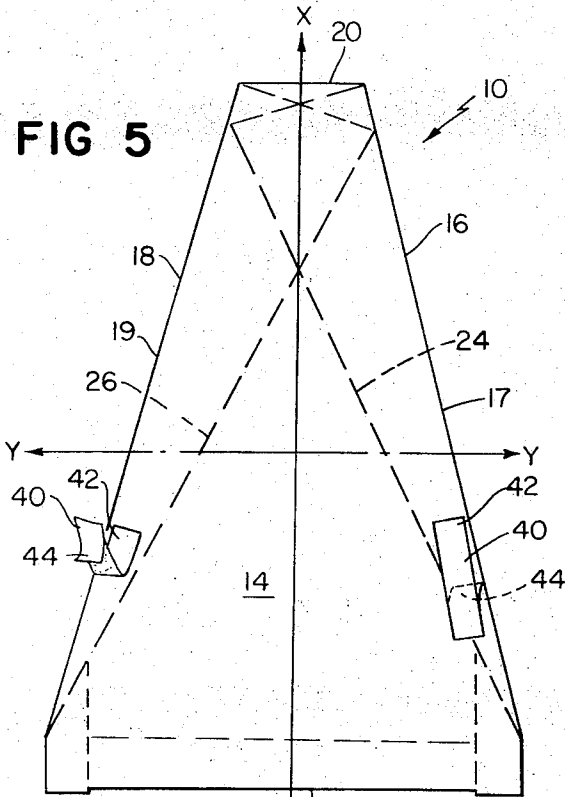


FIG. 5

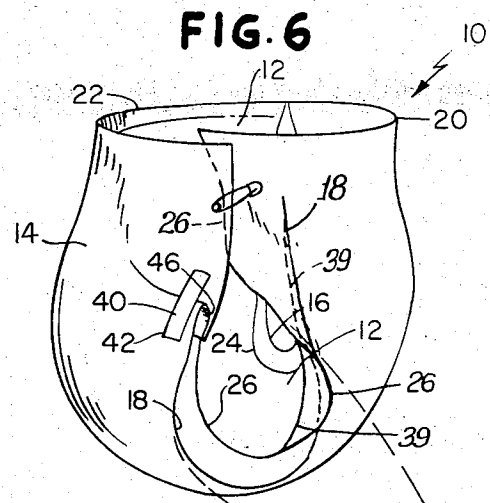


FIG. 6

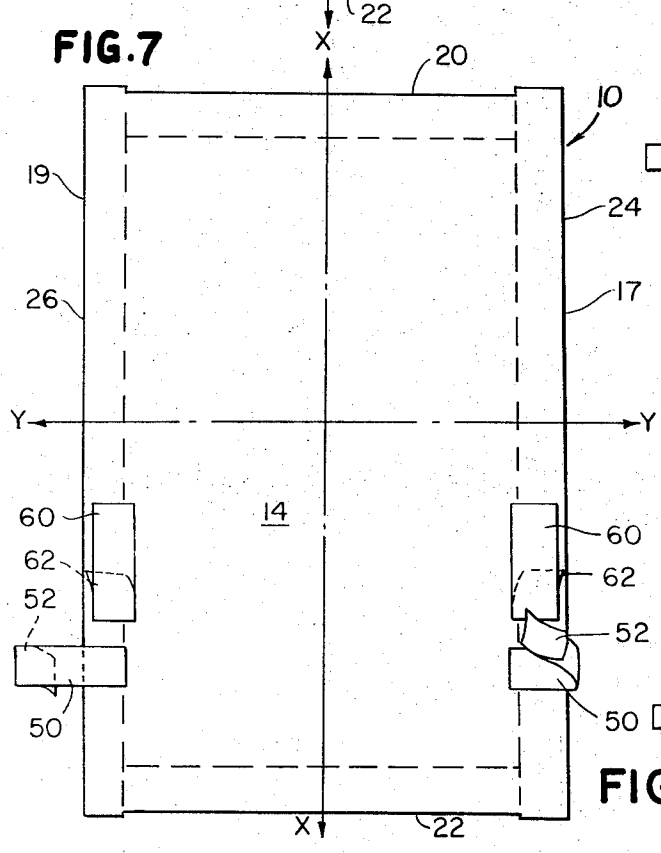


FIG. 7

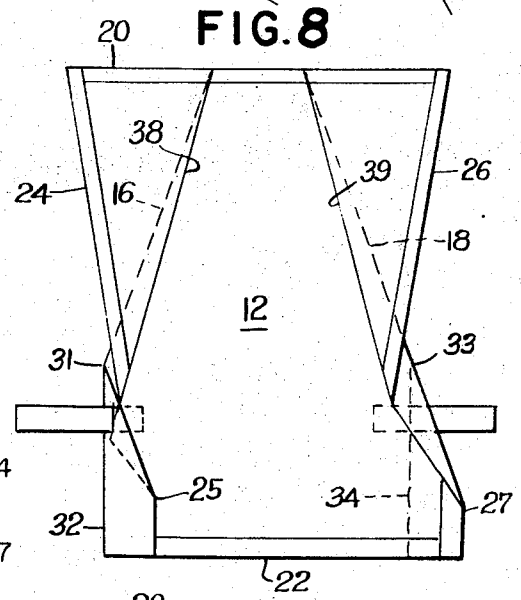


FIG. 8

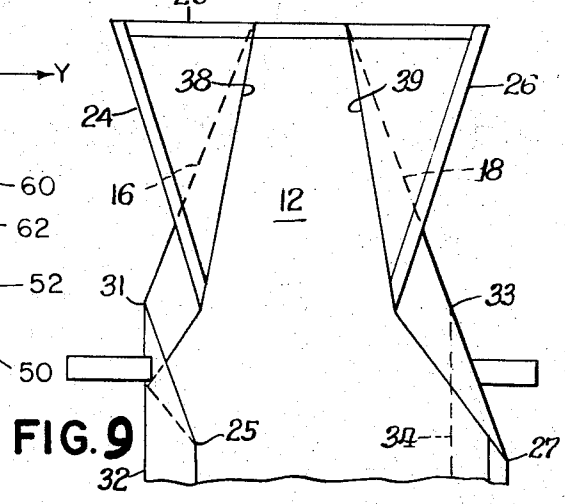


FIG. 9

DIAPER WITH THIGH-OPENING CLOSURE MEANS

BACKGROUND OF THE INVENTION

This invention relates to diapers.

Although an assortment of diapers, both disposable and non-disposable, have been proposed for the diapering of infants, problems have been encountered in achieving a close fit of the diaper to certain parts of the infant's body. In particular, there has been difficulty in obtaining a snug fit of the diaper about the legs of the infant, and such diapers generally develop gaps adjacent the legs, thus permitting the escape of body fluids through these openings. Moreover, if a close fit about the legs has been achieved upon the initial diapering of the infant, later movement of the legs frequently develops such gaps in the diaper.

SUMMARY OF THE INVENTION

The principal feature of the present invention is the provision of a diaper which closely conforms to the contour of the body about an infant's legs to prevent the escape of waste from the diaper.

The diaper of this invention comprises an absorbent pad having a pair of end edges and a pair of sides connecting the end edges, and includes front and back waistband portions at the end edges, a crotch portion located substantially midway between the waistband portions, and front and back body-covering sections between the crotch and waistband portions. The diaper has adhering means adjacent both of the connecting sides located in the body-covering sections intermediate the waistband and crotch portions.

A feature of the present invention is that the adhering means extend beyond the connecting sides intermediate one of the waistband portions of the diaper and its center, such that the adhering means may be adhered to the corresponding diaper portion between the other waistband portion and the center after placement of the diaper to secure a snug fit about the infant's legs.

Another feature of the invention is that the adhering means are generally aligned with the connecting sides, permitting the adhering means to secure a tuck in the diaper adjacent the infant's legs to tighten the diaper.

In accordance with one embodiment of the invention, the diaper includes lateral edges extending between the end edges, and the lateral edges are folded at least inwardly in the crotch portion of the diaper.

A further feature of the present invention is that the folds of the diaper define at least a portion of the connecting sides, with the folds providing an improved fit of the diaper about the infant's legs.

The diaper may be folded for packaging into a generally rectangular shape having a central trapezoidal region of multiple thickness and a pair of generally right-triangular regions of multiple thickness. Each of the right-triangular regions has a hypotenuse generally aligned with one of the non-parallel sides of the trapezoidal region.

Another feature of the invention is that the sides of the right-triangular and trapezoidal regions are in close proximity without overlap, thus providing a generally flat folded diaper which is desirable for packaging.

Further features will become more fully apparent in the following description of the embodiments of this invention and from the appended claims.

DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a diagrammatic plan view of a diaper illustrating the location of the adhering means in one embodiment of the invention, the diaper being prefolded preparatory to diapering an infant;

FIG. 2 and FIG. 4 are diagrammatic plan views of the diaper of FIG. 1, further folded for packaging;

FIG. 3 is a diagrammatic perspective view of the diaper of FIG. 1 illustrating a configuration of the diaper after application to an infant;

FIG. 5 is a diagrammatic plan view from the backside of a diaper partially folded as in FIG. 1, illustrating another embodiment of the adhering means;

FIG. 6 is a diagrammatic perspective view of the diaper of FIG. 5 in its configuration after application to the infant;

FIG. 7 is a plan view from the backside of a generally flat diaper having the adhering means of the present invention; and

FIGS. 8 and 9 are diagrammatic plan views illustrating configurations of the diaper of FIG. 1 during placement on the infant.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The following detailed description will be directed to a disposable diaper. However, it will be apparent that the invention additionally relates to conventional cloth diapers.

Referring now to FIG. 1, a disposable diaper, generally designated 10, is shown having a customary absorbent pad 12 and a water-impervious backing sheet 14 having marginal portions thereof folded over to the front or absorbent side of the diaper along the periphery thereof. The diaper 10 has top and bottom edges 20 and 22, respectively, and lateral edges 24 and 26 which extend between the end edges 20 and 22. The longitudinal and center axes of symmetry of the diaper are respectively designated by the lines X—X and Y—Y.

In one embodiment of the invention the lateral diaper edges 24 and 26 are folded inwardly, with the fold lines 16 and 18 defining a major portion of the sides of the diaper 17 and 19 which connect the end edges 20 and 22. The fold lines 16 and 18 may be conveniently defined by the location of their end points, and one end (21,23) of each fold line 16 and 18 lies on the top diaper edge 20 intermediate the axis X and the respective lateral edge 24 and 26. The second ends (25,27) of the fold lines 16 and 18 lie respectively on the lateral edges 24 and 26 near the end diaper edge 22.

Strips of adhesive tape 28, which serve as adhering means, are secured to the water-impervious sheet 14 at the unfolded backside of the diaper adjacent both of the connecting sides 17 and 19. These strips are secured to the diaper in the body-covering section thereof intermediate the waistband portion of the diaper at one end edge 22 and the center of the crotch portion of the diaper which may be coincident with the center axis of symmetry Y—Y. The strips are spaced away from the waistband portion towards the center axis of the crotch portion and located at a distance from the axis approximately equal to one-half the dimension of the circumference of the infant's upper thigh which is to be located in this region of the diaper when the diaper is in place upon the infant. Since dia-

pers, and particularly disposable diapers, are made in a variety of sizes in which the sizes are related to weight ranges of infants, it is possible to determine the average location of these strips for the various sizes of the diapers. Furthermore, these strips can be placed in a variety of positions when adhered to the corresponding part of the diaper to secure the diapers snugly in place about the thigh of the infant when the diaper is placed upon the infant, thereby being able to serve its function with infants having thigh sizes which are different from the average of infants within the size range for which the diaper is designed. The tape strips 28 extend beyond the connecting sides 17 and 19, and may include facing strips 30 to cover the adhesive on the protruding portions of the tape strips 28 until those portions are utilized during application of the diaper 10 to an infant.

The diaper of FIG. 1 may be further folded for convenience of packaging and for compact storage, as described below. As illustrated in FIG. 2, the diaper 10 is folded inwardly along the fold lines 32 and 34, which may be defined by the location of their end points. Thus, one end (31,33) of each fold line 32 and 34 lies on the corresponding first fold line 16 and 18 intermediate the axis Y and the tape tabs 30. The other end (35,37) of each second fold line (32,34) lies on the diaper end edge 22 directly in line with the first end of that fold line, with the fold lines 32 and 34 being generally aligned with the longitudinal axis X.

As illustrated in FIG. 4, the diaper 10 has a final fold generally along the center axis Y, thus providing a final configuration which is substantially rectangular for convenient packaging of the diaper. The folded diaper has a central trapezoidal region A of multiple thickness and a pair of right-triangular regions B and C of multiple thickness, with the fold line portions 25-31 and 27-33 defining hypotenuses of the regions B and C, respectively, and the fold line portions 31-21 and 33-23 defining non-parallel sides of the region A. Accordingly, each of the regions B and C has a hypotenuse in close proximity to and generally aligned with a non-parallel side of the region A without overlap of the regions, providing a folded diaper of uniform thickness which is ready for packaging.

The packaged diaper is applied to the infant as described below. The diaper 10 of FIG. 4 is first removed from the package and unfolded along the fold line coincident with the center axis Y-Y to provide the diaper in its configuration shown in FIG. 2. The second set of folds in the diaper of FIG. 2 are then unfolded along the fold lines 32 and 34 providing the folded diaper of FIG. 1, and the infant is positioned on the diaper with the edge 22 of the diaper located at the back of the baby at the waistline thereof. Next, the first set of folds in the diaper of FIG. 1 are at least partially unfolded along the fold lines 16 and 18 either before or after the diaper edge 20 is brought up forward between the baby's thighs.

Since the baby's thighs rest on the first set of folds in the crotch portion of the diaper, they remain folded in this diaper portion when the first diaper folds are unfolded, and an additional pair of fold lines 38 and 39 are formed extending generally from the baby's thighs to the end edge 20, as illustrated in FIGS. 8 and 9. For purposes of clarity in further describing the fold lines 38 and 39, the left and right second diaper folds, as viewed in FIGS. 8 and 9, are shown in the folded and unfolded configuration, respectively. As shown in FIG.

8, if the baby's legs are in a raised position when the first set of folds are unfolded, the diaper edges 24 and 26 may be folded over to bring these edges adjacent the end points 31 and 33, respectively, and the fold lines 38 and 39 extend from the crotch region in the diaper portion which will be located adjacent the lower surface of the infant's thighs to the end edge 20. However, if the baby's legs are stretched out in a straight, lay flat condition, the fold lines 38 and 39 intersect the edges 24 and 26 closer to the end edge 20, and the fold lines 38 and 39 extend from the upper or front part of the thighs to the edge 20, as shown in FIG. 9.

After bringing the diaper edge 20 forward between the thighs, the portions of the diaper at the waist can then be held together around the waist of the infant in any customary fashion, for example, by pinning as shown in FIG. 3. After placement of the diaper about the infant by unfolding and pinning as directed, the strips of adhesive tape 28 will project from the back portion of the diaper immediately above the infant's legs. The facing strips 30 may then be removed and the protruding portions of the tape strips 28 may be adhered to the corresponding front body-covering portion of the diaper intermediate the waistband portion at the other end edge 20 and the center of the diaper.

Thus, the adhering means 28 are utilized to tighten the diaper about the infant's legs to secure a snug fit and reduce any openings in the diaper through which waste may pass. Moreover, the diaper portion which remains in a folded condition provides a narrowing of the diaper in the crotch region, in order that the diaper may conform to the body contour about the infant's legs for an improved fit, and the bulk of the diaper material in the thigh region is brought closer against the side of the thighs. Further, the "bulk" of the diaper in the crotch area is reduced due to retention of the pleated or folded diaper material firmly against the infant's thighs by the thigh-opening closure tabs 28.

As illustrated in FIG. 5, the diaper of FIG. 1 is shown in an inverted position and having another embodiment of the adhering means. The diaper 10 includes a pair of adhesive tape strips or adhering means 40 having one end 42 secured to the backside of the sheet 14. The tape strips 40 are positioned adjacent the connecting sides 17 and 19 and are generally aligned with the sides 17 and 19. The free ends of the tape strips 40 may have removable facing strips 44 to cover the adhesive, as previously discussed. As illustrated in FIG. 6, after placement of the diaper about the infant by unfolding and pinning, as described in connection with FIG. 3, a tuck or fold 46 is made in the diaper adjacent the infant's legs, the facing strips 44 are removed, and the free ends of the tape strips 40 are secured to the diaper 10 across the tucks 46. In this manner, the tucks or pleats 46 are secured by the adhering means 40 to eliminate gaps in the diaper about the infant's legs and secure a snug fit.

It is contemplated that the tape strips 40 may be positioned anywhere along the connecting sides 17 and 19, but preferably they are located in the region of the diaper which surrounds the infant's leg after placement, which includes the front portion of the diaper. The adhering means of the present invention may also include a plurality of the tape strips 40 along each of the connecting sides, which may be utilized to reduce larger gaps in the diaper or may be strategically placed to eliminate certain configurations of openings. Also, the

free ends of the strips may be directed toward either of the end edges 20 or 22.

In another embodiment of the invention, the adhering means is secured to a generally flat diaper 10, as illustrated in FIG. 7, which is similar to the diaper of FIGS. 1 and 5 in an unfolded configuration. The diaper 10 has a pair of end edges 20 and 22 and a pair of lateral edges 24 and 26 which extend between the end edges 20 and 22, with the lateral edges 24 and 26 defining sides 17 and 19 connecting the end edges 20 and 22.

A pair of adhesive tape strips 50 are secured to the backside of the sheet 14 adjacent the connecting sides 17 and 19 and intermediate the waistband portion of the diaper at one end edge 22 and the center of the crotch portion of the diaper. The tape strips 50 extend beyond the connecting sides 17 and 19 and may include facing strips 52, as previously described. A pair of tape strips 60 are secured to the sheet 14 adjacent to and generally aligned with the connecting sides 17 and 19, and may include facing strips 62. The strips 60 are preferably positioned along the sides 17 and 19 in the region of the diaper which surrounds the infant's legs after placement. The diaper 10 of FIG. 7 is placed about the infant without folding, and the portions of the diaper at the waist are fastened in the customary fashion, such as by pinning. After placement, the tape strips 50 are utilized to secure the body-covering sections of the diaper above the infant's legs, as discussed in connection with FIGS. 1-3, while the tape strips 60 are used to secure tucks in the diaper adjacent the infant's legs, as described in connection with FIGS. 5 and 6. Thus, the adhering means of FIG. 7 combines both types of adhering means previously discussed to obtain a close fit about the infant's legs, but it is understood that the flat diaper of FIG. 7 may utilize either of the strips 50 or 60 alone. Similarly, it is contemplated that the two types of adhering means may be combined in a single folded diaper, such as by including the tape strips 40 in the diaper 10 of FIG. 1, along with the tape strips 28.

The foregoing detailed description is given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as modifications will be obvious to those skilled in the art.

I claim:

1. A folded diaper having:

- a pair of end edges;
- a pair of lateral edges extending between said end edges, said end edges comprising front and back waistband portions of the diaper;
- a crotch portion located substantially midway between said waistband portions;
- front and back body-covering sections intermediate said crotch and waistband portions;
- a first pair of inward folds of the lateral diaper edges, with the first folds defining a pair of first fold lines extending from adjacent the juncture of one end edge and the lateral edges to the other end edge, with the juncture of the first fold lines and the other end edge being spaced from said lateral edges, and with the first fold lines defining at least a major portion of sides connecting the front and back waistband portions of the diaper;

adhering means located adjacent each of said connecting sides intermediate at least one of said waistband portions and the center of the diaper,

whereby said diaper may be tightened about an infant's legs by the adhering means after placement of the diaper about the infant to secure a snug fit; a second pair of inward folds of the connecting sides, with the second folds defining a second pair of fold lines generally aligned with the longitudinal axis of the diaper and extending from the one end edge to the connecting sides adjacent the center of the diaper; and

a third fold about the lateral center axis of the diaper, thereby defining a substantially rectangular configuration of the folded diaper.

2. The diaper of claim 1 wherein said diaper is a disposable diaper having an absorbent pad and a water impervious backing sheet overlying the back of the absorbent pad, and said adhering means comprises tape secured to said sheet.

3. The diaper of claim 1 wherein said adhering means is located on at least one of said body-covering sections and positioned intermediate one of said waistband portions and the crotch portion of the diaper, whereby said adhering means may be adhered to the other body-covering portion intermediate the waistband and crotch portions after placement of the diaper.

4. The diaper of claim 3 wherein said adhering means extend beyond said connecting sides.

5. The diaper of claim 4 wherein said adhering means is secured to the back body-covering section and is adhered to the front body-covering section after placement of the diaper.

6. The diaper of claim 4 wherein said adhering means are spaced a distance from the center of the diaper approximately equal to one-half the circumference around the thighs of an average-sized infant.

7. The diaper of claim 1 wherein said adhering means are generally aligned with the connecting sides, whereby the adhering means may secure a tuck in the diaper adjacent the infant's legs.

8. The diaper of claim 7 wherein said adhering means is positioned intermediate said waistband portions and the crotch region of the diaper.

9. The diaper of claim 7 wherein said adhering means is positioned adjacent the infant's legs after placement of the diaper.

10. The diaper of claim 7 including additional adhering means located adjacent each of said connecting sides on at least one of said body-covering sections and positioned intermediate one of said waistband portions and the crotch portion of the diaper, with the additional adhering means extending beyond said connecting sides, whereby said additional adhering means may be adhered to the other body-covering portion intermediate the waistband and crotch portions after placement of the diaper to tighten the diaper about the infant's legs.

11. A diaper having:

- a pair of end edges;
- a pair of sides connecting said end edges, said end edges comprising front and back waistband portions of the diaper;
- a crotch portion located substantially midway between said waistband portions;
- front and back body-covering sections intermediate said crotch and waistband portions; and
- a pair of tape strips, with each of said strips being generally aligned with a connecting side and spaced from the side after placement of the diaper,

said strips being located in the region of the diaper which surrounds the infant's legs after placement of the diaper to secure a tuck in the diaper adjacent the infant's legs.

12. The diaper of claim 11 wherein said diaper includes lateral edges extending between said end edges, said lateral edges being folded inwardly in at least said crotch portion with the folds defining at least a portion of said connecting sides.

13. The diaper of claim 11 including lateral edges extending between said end edges, with said lateral edges defining the connecting sides.

14. A diaper of claim 11 folded into a generally rectangular shape and having a central trapezoidal region of multiple thickness and a pair of generally right-triangular regions of multiple thickness each having a hypotenuse in close proximity to and generally aligned with a non-parallel side of said trapezoidal region.

15. The diaper of claim 11 wherein said diaper is a disposable diaper having an absorbent pad and a water

impervious backing sheet overlying the back of the absorbent pad.

16. The diaper of claim 11 including adhering means located on at least one of said body-covering sections and positioned intermediate one of said waistband portions and the crotch portion of the diaper, whereby said adhering means may be adhered to the other body-covering portion intermediate the waistband and crotch portions after placement of the diaper.

17. The diaper of claim 16 wherein said adhering means extend beyond said connecting sides.

18. The diaper of claim 17 wherein said adhering means is secured to the back body-covering section and is adhered to the front body-covering section after placement of the diaper.

19. The diaper of claim 17 wherein said adhering means are spaced a distance from the center of the diaper approximately equal to one-half the circumference around the thighs of an average-sized infant.

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