Aug. 19, 1969 P. H. FOOTE 3,461,871

DISPOSABLE DIAPER

Filed July 25, 1966

FIG. 1.

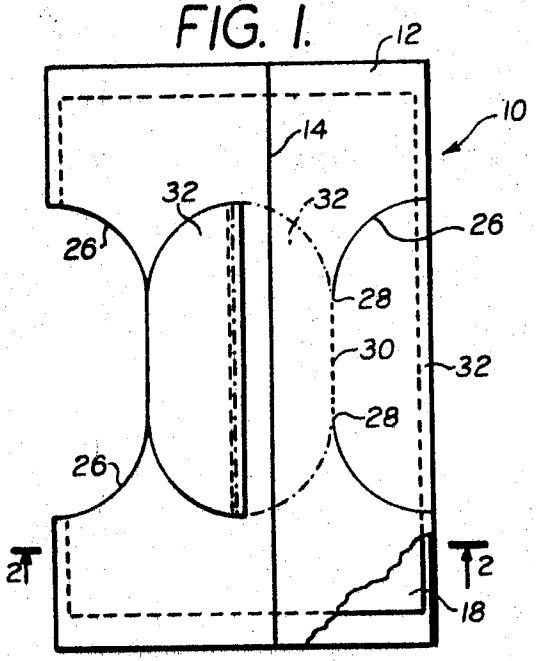


FIG. 3.

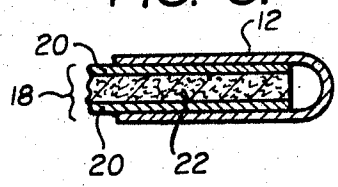


FIG. 2.

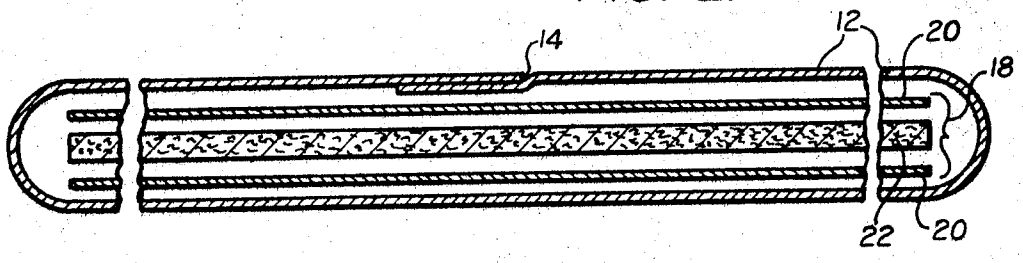


FIG. 4.

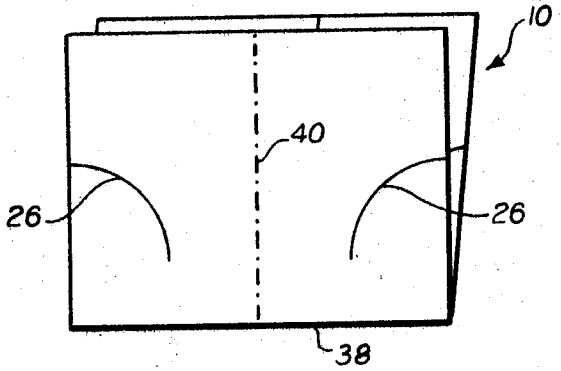
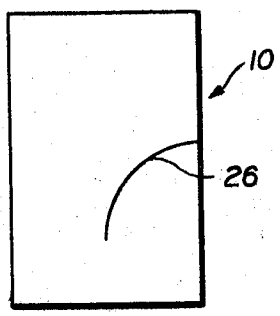


FIG. 5.



INVENTOR
Philip H. Foote
BY Dunbar, Neill, Hewitt & Widerman.

ATTORNEYS.

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DISPOSABLE DIAPER

Philip H. Foote, Brielle, N.J., assignor to Blessings, Inc., Bound Brook, N.J., a corporation of Delaware

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U.S. Cl. 128—284 8 Claims

ABSTRACT OF THE DISCLOSURE

A disposable diaper having a flattened tube as an outer cover and an absorbent pad originally extending across most of the width of the diaper. Cuts extending inward from both sides through the cover and the pad form panels which are folded over to make the absorbent filler of double thickness at the mid-section of the diaper.

BRIEF DESCRIPTION OF THE INVENTION

This invention relates to disposable diapers.

It is an object of the invention to provide an improved disposable diaper which is suitable for use as a liner, but which is strong enough to be used alone as a diaper held in place by pins. One feature of the invention relates to a construction which makes the diaper easier to put on and more comfortable to wear.

Another object is to provide an improved construction for disposable diapers which is more economical to manufacture and which can be sold at a price which makes the use of disposable diapers practical.

Features of the invention relate to the correlation of parts of which the diaper is constructed and to a relation which makes it possible to fold portions of the diaper into position to obtain greater thickness and greater moisture-absorption capacity at the middle of the diaper where it is most needed.

Other objects, features and advantages of the invention will appear or be pointed out as the description proceeds.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing, forming a part hereof, in which like reference characters indicate corresponding parts in all the views:

FIGURE 1 is a vew of a diaper made in accordance with this invention, one side being shown in a folded position;

FIGURE 2 is a greatly enlarged sectional view, taken on the line 2—2 of FIGURE 1, but having the different layers of material exaggerated in thickness and separated from one another for clearer illustration;

FIGURE 3 is a fragmentary view showing one side of the diaper shown in FIGURES 1 and 2, and with the thickness of the sections still exaggerated, but with the different layers of material in contact with one another as in the actual construction of the diaper; and

FIGURES 4 and 5 show one way in which the diaper of FIGURE 1 can be folded for stacking prior to use.

DESCRIPTION OF PREFERRED EMBODIMENT

FIGURE 1 shows a diaper **10** having a flattened tubular outside cover **12** with a longitudinally extending lap seam **14**. The outside cover **12** is preferably made of soft tissue paper, or other nonwoven fabric which is absorbent but of relatively high wet strength so that the diaper does not pull apart easily when wet. This may be a long fibreboard and is one which is soft enough to be comfortable in contact with a baby's skin.

The outside cover **12** contains a filler **18** which preferably consists of three layers of material. The upper layer is a highly porous and thin paper **20**. This paper may be slightly creped, if desired. The filler contains an

intermediate layer **22** consisting of cellulose pad which is approximately between a sixteenth and one-eighth inch in thickness and this cellulose pad provides the principal moisture-absorbing capacity of the diaper. Under the pad **22** there is another layer of paper **20** which is preferably identical with the top layer **20**.

All of the edges of the paper layers **20** and the pad **22** are raw edges such as are left by cutting successive fillers **18** from a web or large sheet in which the layer of cellulose is covered top and bottom by the sheets of paper in the relation in which they are used in the diaper.

This construction of the filler facilitates manufacture and keeps the cost of the filler to a minimum. Another feature which saves cost is that the filler **18** is made thinner and less absorbent than is actually necessary at the center region of the diaper and the necessary additional absorption capacity is provided by doubling the thickness of the pad in the center region by means of the construction shown in FIGURE 1.

There are curved cuts **26** extending inward from opposite sides of the diaper for a distance of approximately one quarter of the width of the diaper. These cuts, on each side of the diaper, terminate at location **28** which are spaced from one another lengthwise of the diaper so as to leave a hinge line **30** along which the part of the diaper between the cuts **26** can be folded over into the position shown in dotted lines on the right half of the diaper of FIGURE 1. This portion of the diaper that folds inward along the hinge line **30** forms a panel **32**. FIGURE 1 shows the panel **32**, on the left-hand side of the diaper, folded inward, and shows the panel **32** on the right-hand side of the diaper in full lines in the position it occupies before being folded, and in dotted lines in its folded position.

By having the width of each of the panels **32** one quarter of the width of the diaper, these panels cover the entire area of the center region of the diaper between the leg openings which are left in the diaper by the folding inward of the panels **32**.

In the construction illustrated, the lap seam **14** is located off center but not far enough off to be within the cuts **26** and one of the panels **32** folds over the seam **14**. This is an advantageous construction in that it makes it unnecessary to have the lap seam a continuous connection and it is sufficient that the lapping edges of the seam **14** be secured together by adhesive at spaced regions close enough together so that there are a plurality of such connections within the length of each diaper. Continuous connections can, of course, be used if desired, and the advantages of discontinuous connections depend on the process by which the diaper is constructed. However, the illustrated construction makes the use of discontinuous seams practical.

The filler **18** does not extend across the full width of the flattened tubular outside cover **12**. This reduces the amount of filler material necessary while still leaving the cover **12** with ample width for convenient pinning; and it also leaves the panels **32** with their free end portions extending slightly beyond the filler material. The panels **32** can, therefore, be made to overlap slightly, as extra protection against leakage without forming a ridge down the middle of the diaper.

In the construction illustrated, the filler **18** is also somewhat shorter than the outside cover. This also saves on the amount of filler required for each diaper but the advantage of this feature depends to some extent upon the process by which the diapers are constructed. The length of the diaper is approximately one and one-half times the width and the distance betwen the cuts **26**, along the edges of the diaper, is slightly more than half of the length of the side edges, and is shown symmetrically

located between the ends of the diaper. The arcs of the cuts **26** may approximate 90° but are preferably somewhat less than 90° since this facilitates the cutting. The panels **32** are shown symmetrically located with respect to the ends of the diaper but need not be so located. These correlations and features of the preferred embodiment can be used in different combinations, if desired.

When the panels **32** are in their original positions, flush with the remainder of the diaper, the combined thickness of the various layers is small enough to permit convenient folding along a middle line **38**, as shown in FIGURE 4. The diaper can then be folded along a middle longitudinal line **40** into the condition shown in FIGURE 5. This reduces the overall size of the diaper to one quarter of its fully extended area and provides a handy size for stacking and for removing one diaper at a time from a stack prior to use. The diapers are unfolded easily since the tissue paper does not stick to itself and the construction, although soft and flexible, is not limp like a cloth diaper which is difficult to spread with one hand.

As each of the panels **32** is folded into its center position along its hinge line **30**, it can be pressed firmly on the hinge line and this creases the paper so that the panels **32** remain flat against the part of the diaper over which they are folded.

The preferred embodiment of the invention has been illustrated and described, and the invention is defined in the appended claims.

What is claimed is:

1. A disposable diaper including in combination an outer cover comprising a soft paper flattened tube, a filler including an absorbent pad enclosed within the paper tube and originally extending across most of the width of the diaper, each side edge of the diaper having two cuts extending into both the outer cover and the absorbent filler at locations spaced from one another and spaced from the ends of the diaper to form a panel at each side of the diaper that is folded inward toward the center of the diaper and at least part way over the mid-section of the diaper, each of the cuts extending inward for a distance of approximately ¼ of the width of the diaper whereby the folded panels cooperate with the remainder of the diaper to form a mid-section in which the absorbent filler is of double thickness.

2. The disposable diaper described in claim **1** characterized by the absorbent pad being an unwoven cellulose pad of substantially the same width as the flattened tube.

3. The disposable diaper described in claim **2** characterized by the pad including also absorbent sheets of thin paper over and under the cellulose pad.

4. The disposable diaper described in claim **3** characterized by the pad extending for substantially the full length of the outer cover as well as across substantially the full width thereof.

5. The disposable diaper described in claim **1** characterized by the pad being slightly narrower than the width of the tubular cover and being held by the folded panels against shifting in any direction with respect to said cover.

6. The disposable diaper described in claim **1** characterized by the pad terminating slightly short of the folds at opposite sides of the flattened tubular cover, and the portions of the pad in the panels terminating slightly short of the free edges of the panels.

7. The disposable diaper described in claim **1** characterized by the diaper having a length-to-width ratio of approximately 3:2, the cuts in the sides of the diaper being spaced from the ends by a distance equal to at least approximately ¼ of the width, and the cuts on each side being spaced from one another at the edges of the diaper by a distance equal to approximately ½ the width of the diaper, said cuts extending inwardly along the curved lines that approach one another.

8. The disposable diaper described in claim **1** characterized by the outer cover having a lap seam with its edges secured together by adhesive along at least a part of the length of the seam, and said seam being offset from the longitudinal center line of the diaper.

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CHARLES F. ROSENBAUM, Primary Examiner