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Cepuritis

[11] **3,921,639**

[45] **Nov. 25, 1975**

[54] **DISPOSABLE DIAPER HAVING FASTENING TABS TUCKED IN FACING SHEET THEREOF**

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[73] Assignee: **Johnson & Johnson,** New Brunswick, N.J.

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[52] **U.S. Cl.**..... **128/287;** 128/284; 128/290 R

[51] **Int. Cl.²**..... **A61F 13/16**

[58] **Field of Search**.... 128/284, 287, 290 R, 290 H, 128/289

[56] **References Cited**

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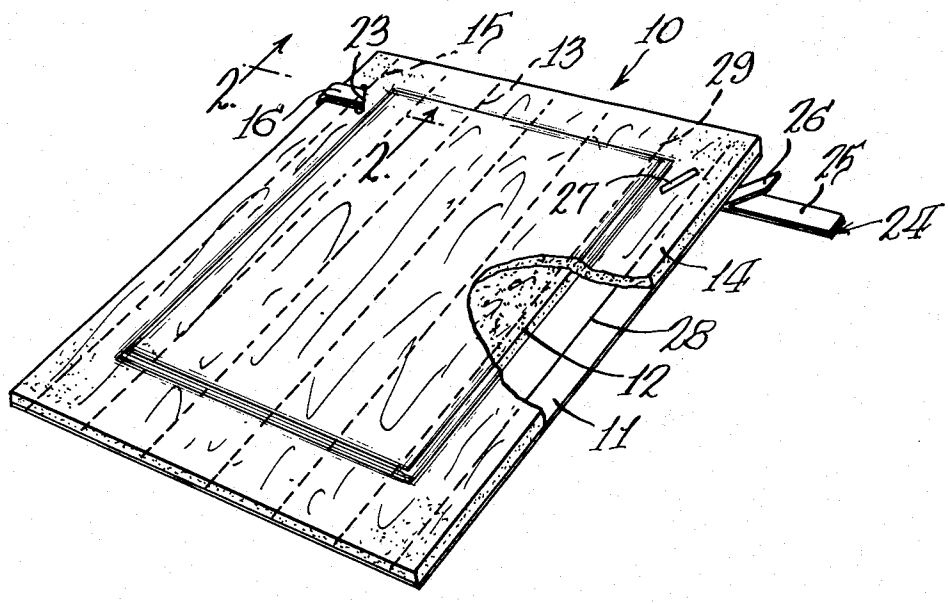
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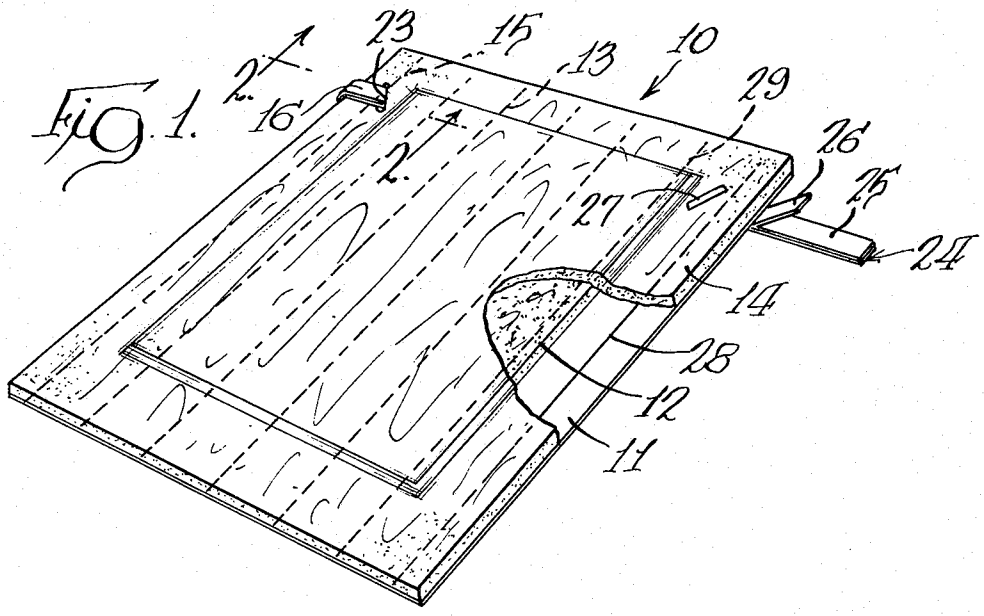
Primary Examiner—Aldrich F. Medbery

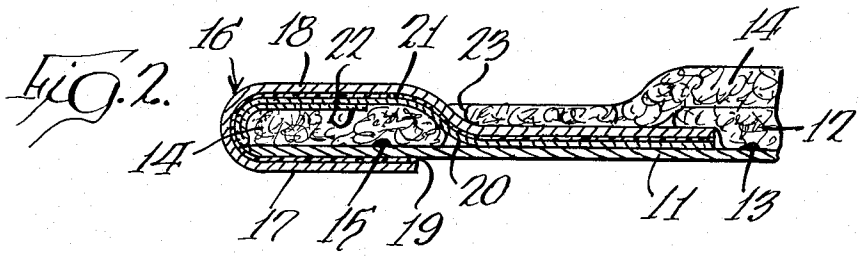
[57] **ABSTRACT**

A disposable diaper is provided with an adhesive tab having a relatively long free end which is removably tucked in a facing sheet of the diaper. The tab is attached to a diaper backing sheet on the outside surface of the diaper and at a marginal location thereof, and the free end, having a tacky surface covered with a release strip, is removably received in a slot provided for that purpose in the diaper facing sheet.

7 Claims, 4 Drawing Figures




Fig. 1.
23
15
13
10
29
26
25
24
27
16
14
28
12
11


Fig. 2.
16
18
22
21
23
14
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14
20
11
13
17
15
19

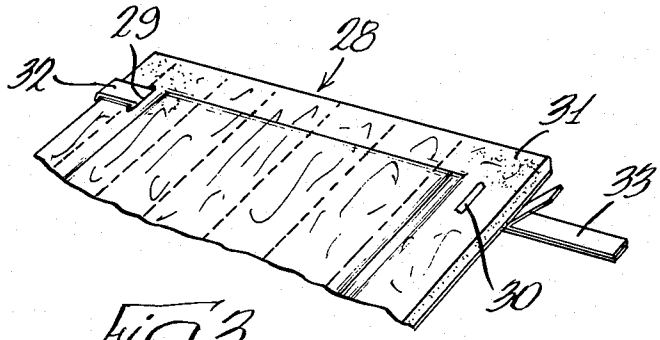
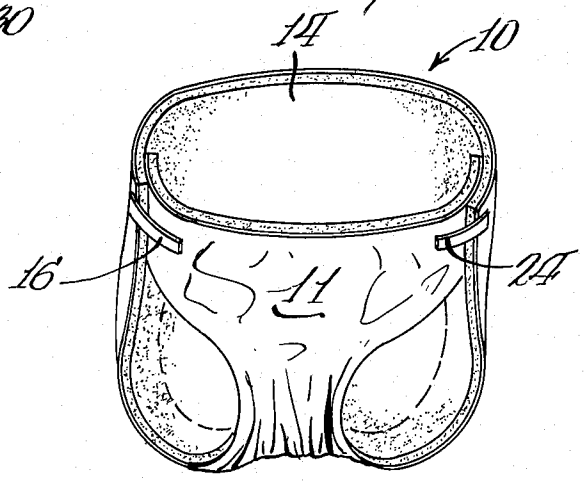

29
28
32
31
33
30

Fig. 3.

Fig. 4.


14
10
16
11
24

DISPOSABLE DIAPER HAVING FASTENING TABS TUCKED IN FACING SHEET THEREOF

BACKGROUND OF THE INVENTION

This invention relates to disposable diapers. More particularly, this invention relates to disposable diapers adapted to be secured in place by adhesive tabs.

Disposable diapers provide substantial advantages in convenience over conventional diapers and commonly have a generally quadrilateral configuration with straight or curvilinear longitudinal edges. Disposable diapers comprise a moisture-impermeable backing sheet and a moisture-retaining layer anchored thereto, and are conveniently secured about an infant by means of adhesive tape tabs which are affixed to the diaper along a longitudinal edge thereof, thus eliminating the need for extraneous fasteners, such as pins. In order to protect the adhesive surfaces of the tape tabs, usually a release sheet is applied over these adhesive surfaces for subsequent removal when the diaper is about to be used. However, such tabs usually project beyond the confines of the diaper to a considerable extent and interfere with the efficient manufacture and packaging of the diaper.

In an attempt to solve the foregoing problems, U.S. Pat. No. 3,776,234 to Hoey proposes to fold the tab over on itself at the diaper's edge and to adhesively attach a portion of the folded-over tab segment to the inside surface of the diaper in order to keep the tab from interfering with the manufacturing machinery and with the folding and packaging operations. This requires that the edge of the diaper backing sheet be folded over to present an attachment surface at the front or inside face of the diaper and a relatively involved tab design is necessary for this purpose. Also, undesirable tearing of the diaper facing fabric may result if such a tab is adhesively attached to the facing fabric of the diaper.

U.S. Pat. No. 3,646,937 to Gellert shows a fastening tab which is provided with a release surface which is permanently bonded to the inside surface of the diaper; however, such an arrangement is disadvantageous because the release surface may be placed in contact with the infant's skin when the diaper is used.

Additionally, for ease of application of the diaper about an infant, a relatively long free end for the adhesive tab is desirable, yet the longer the free end the more severe are the manufacturing and packaging problems.

SUMMARY OF THE INVENTION

The present invention contemplates a disposable diaper provided with an improved adhesive tab fastener having a relatively longer free end. The disposable diaper embodying the present invention comprises a thin, moisture-impervious backing sheet, a moisture-retaining layer attached to the backing sheet and which includes a pad of absorbent material superposed on the backing sheet and a facing sheet overlying the pad and substantially coextensive with the backing sheet, and an adhesive tab having a fixed end secured to the backing sheet on the outside surface of the diaper and at a marginal location thereof. The free end of the tab, preferably longer than the fixed end, provided with a tacky surface which faces in the same direction as the inside surface of the diaper, is folded over the inside surface of the diaper and is removably received in a slot in the facing sheet. A cover strip provided with a release coating on one surface thereof is releasably attached to and covers the tacky surface of the free end. Preferably, the cover strip extends longitudinally beyond the tacky surface of the free end.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing,

FIG. **1** is a perspective view of a disposable diaper embodying the present invention, parts of the diaper being broken away to show interior construction;

FIG. **2** is a fragmentary elevational view, on an enlarged scale, taken along plane **2—2** in FIG. **1**;

FIG. **3** is a fragmentary perspective view of a diaper illustrating another embodiment of the present invention; and

FIG. **4** is a perspective view showing the diaper of FIG. **1** in a configuration assumed when the diaper is applied about an infant.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. **1** and **2**, disposable diaper **10**, having a substantially quadrilateral configuration, is provided with moisture-impermeable backing sheet **11** which forms an outside surface for direction away from an infant and with an absorbent pad means **12** situated on backing sheet **11** and attached thereto by means of an adhesive bead such as bead **13**, or the like. Moisture-pervious facing sheet **14**, forming an inside surface for direction toward the infant, overlies absorbent pad **12** and is substantially coextensive with backing sheet **11**. Facing sheet **14** is similarly attached to backing sheet **11** by a plurality of adhesive beads, such as bead **15**, for example. Adhesive tab fastener **16** comprises fixed end **17** attached to the outer surface of backing sheet **11** at a marginal location of diaper **10** by adhesive layer **19** and free end **18** which extends beyond the longitudinal margin of diaper **10**. Free end **18** usually is longer than attached or fixed end **17** and is provided with a pressure-sensitive adhesive layer such as layer **21** which can be a continuation of adhesive layer **19**.

Cover strip **20** covers pressure-sensitive adhesive layer **21** and extends longitudinally beyond the tacky surface of layer **21** to provide grippable end portion **22** which facilitates the removal of cover strip **20** so as to expose adhesive layer **21** when tab **16** is prepared for use. Grippable end portion **22** is folded back against the main portion of cover strip **20** as shown in FIG. **2**.

For removable retention of tab fastener **16** against facing sheet **14** until such time when fastener **16** is about to be used, longitudinal slot **23** is provided in facing sheet **14** near a longitudinal margin of diaper **10** for receiving the terminal portion of tab fastener **16** therein. Preferably slot **23** is situated between consecutive adhesive beads on backing sheet **11**, e.g., adhesive beads **13** and **15** so that facing sheet **14** will lie relatively flat against backing sheet **11** after insertion of free end **18** in slot **23**. Longitudinal slot **23** can be substantially parallel to the longitudinal margin of diaper **10**; however, to facilitate insertion of free end **18** into slot **23** during manufacture, preferably slot **23** forms an acute angle with the longitudinal margin of diaper **10**, more preferably an acute angle of about 40 to about 50 degrees. Additionally, in some instances, and depending on the length of free end **18**, it may be desirable to select the size of absorbent pad **12** so that the terminal

portion of free end **18** also underlies pad **12** as illustrated in FIG. **2.**

Adhesive tab fastener **24** in FIG. **1** is shown after it has been pulled from longitudinal slot **27** which is situated in facing sheet **14** between adhesive beads **28** and **29.** Grippable end portion **26** of cover strip **25** extends upwardly and can be readily grasped and pulled away from tab fastener **24** to expose the underlying tacky surface thereof.

FIG. **3** illustrates disposable diaper **28** provided in facing sheet **31** with longitudinally-disposed slots **29** and **30** which run substantially parallel to the longitudinal edges of diaper **28.** Tab fastener **32** is shown lying flat against facing sheet **31** and tucked in slot **29** whereas tab fastener **33** is shown in a configuration assumed after being pulled out from slot **30.**

When diaper **10** is applied about an infant, it assumes the configuration shown in FIG. **4** with tab fasteners **16** and **24** being adhesively attached to diaper backing sheet **11** and holding diaper **10** in place.

The adhesive tab suitable for the purposes of the present invention can be made from a wide variety of materials. Particularly preferred materials for this purpose are polyalkylene webs such as polyethylene sheet, polypropylene sheet, and the like.

The pressure-sensitive adhesive layers such as layer **21** are provided by applying a coating of a pressure-sensitive adhesive composition known in the art to the appropriate surfaces of respective tab free ends such as free end **18.** The applied adhesive shall have good tack, good cohesive strength, good resistance to moisture and good resistance to aging. Illustrative of such adhesive compositions are mixtures of natural or synthetic rubber, zinc oxide, and various resins, also latices of natural or synthetic rubber, or water dispersions of acrylic tacky polymers or copolymers, and the like.

Cover strips **20** and **25** can be made from smooth plastic film having a relatively non-adhering surface, from paper coated with a silicone release compound, or similar materials.

Several different types of facing materials may be used for diaper facing sheet **14.** For example, facing sheet **14** may be made up of a mixture of fibers consisting predominantly of inexpensive short cellulosic fibers such as wood pulp fibers or cotton linters, in amounts of about 75% to about 98%, the balance being textile length fibers such as rayon as described in U.S. Pat. No. 3,663,348 to Liloia et al.

Facing sheet materials suitable for use in this invention can have fabric weights in the range of about 1 to 5 oz/yd^2 and densities of less than 0.15 g/cc, generally in the range between 0.05 and 0.1 g/cc. The dry strength of the facing sheet for a fabric having a weight of about 1.5 oz/yd^2 is at least 0.15 lbs/in of width in the machine direction and at least 0.1 lbs/in of width in the cross direction. Such fabrics have unusually good elongation, loft, softness, and drape characteristics in comparison to prior products incorporating any substantial amount of short fibers.

Facing sheet **14** may also be made of an apertured, nonwoven fabric which is formed, for example, in accordance with the teachings of commonly assigned U.S. Pat. Nos. 2,862,251; 3,081,514; and 3,081,515. Briefly, such fabrics are foraminous structures wherein groups or groupings of fibers have been rearranged from a fibrous nonwoven starting web into positions surrounding less dense fabric portions by passage of a fluid through the starting material. The fibers within the groupings are mechanically interlocked, and may be arranged into various patterns, as is well known by those skilled in the art. A suitable binder may be utilized to help retain the fibers in their rearranged locations, as is also well known by those skilled in the art. The fabric can be made of naturally occurring fibers, synthetic fibers, or blends thereof. Typical facing sheets made of a polyester type material can have a weight of about 0.75 oz/yd^2.

In addition, facing sheet **14** can be formed of a non-apertured material, such as a nonwoven isotropic web, or the like. In all of the aforementioned facing materials, the material should be relatively hydrophobic so as to retard wicking within the facing layer.

Highly moisture-absorbent fibrous pad or batt **12,** which usually is substantially rectangular in shape but smaller than the facing sheet and the backing sheet, is centrally disposed between facing sheet **14** and backing sheet **11.** Pad **12** is usually anchored to backing sheet **11** by means of an adhesive bead, heat sealing, or similar expedients. Pad **12** can be formed in accordance with the teachings of U.S. Pat. No. 3,612,055 to Mesek et al. If desired, a highly moisture-absorbent layer can be provided substantially coextensive with backing sheet **11** and facing sheet **14.**

A suitable backing sheet material for the diapers embodying the present invention can be an opaque polyethylene web about 0.001 inch thick. Another suitable material for this purpose is a polyethylene terephthalate web having a thickness of about 0.0005 inch. Typical disposable diapers which can be fitted with tab-type adhesive fasteners described hereinabove are shown in U.S. Pat. No. 3,612,055 to Mesek et al. and in U.S. Pat. No. 3,683,916 to Mesek et al. Other suitable disposable diaper structures which can be improved by the present tab-type fasteners are shown in U.S. Pat. Re. 26,151 to Duncan et al.

In use, a diaper equipped with the adhesive fasteners of the present invention is applied to the infant by laying out the diaper on a suitable flat surface and placing the infant thereon so that the waist-underlying end of the diaper is that having the fastener means. The other end of the diaper then extends downwardly between the infant's legs. Next, the downwardly-extending end of the diaper is brought up between the infant's legs to a position contiguous with the front of the infant's waist. The diaper is thereafter secured to the infant by placing the corners of the waist portion of the abdomen-covering end as far around the infant's waist as they will go and by bringing the corners of the underlying end of the diaper into an overlapping relationship with the aforementioned corners so that the diaper snugly encircles the infant's waist and provides a custom fit. The adhesive fasteners are then prepared for use by grasping cover strip terminal portions such as portion **22** (FIG. **2**) or portion **26** (FIG. **1**) and pulling the cover strip away from the adhesive surface on the free end of the adhesive tab. The tabs are then used to secure the diaper in the desired position by simply urging the pressure-sensitive adhesive surfaces in contact with the adjacent outer surface of the diaper.

The disposable diaper embodying the present invention can be manufactured in any convenient manner. For example, a backing sheet web and a facing sheet web can be fed simultaneously from appropriate web supply rolls and absorbent pads or panels positioned

therebetween to form a laminar composite which is subsequently severed into a plurality of segments to form the disposable diapers. As the backing sheet web is fed from the appropriate supply roll the web is lined with a plurality of adhesive beads. As the facing sheet web is fed from the corresponding supply roll, the web is perforated at predetermined intervals to form slots, such as slot **23** and slot **27** therein. The perforating means, e.g., a flat knife edge, can also serve as a guide for adhesive tape stock which can be fed into the formed slots at about the same time the perforations are made. The adhesive tape stock is, of course, covered with a suitable cover strip having a release-coated surface in contact with the tacky surface of the adhesive tape. Thereafter the adhesive tape stock is cut to provide individual segments which ultimately become the tab fasteners. The cover strips on the terminal portions of the cut segments which are not fed through the slots in the facing sheet web are then peeled off and folded back onto themselves while the underlying tape portion, presenting an exposed tacky surface is folded around the opposed marginal edges of the laminar composite and adhesively adhered to the backing sheet web to form the fixed ends of the tab fasteners. The foldedback portions of the cover strips form the aforementioned grippable end portions. Thereafter the produced laminar composite is cut into segments of predetermined size to form the disposable diapers.

The foregoing description and the drawing are illustrative but are not to be taken as limiting. Still other variations and modifications are possible without departing from the spirit and scope of the present invention.

I claim:

1. A disposable diaper, having an inside surface for direction toward an infant when the diaper is worn by that infant and an outside surface for direction away from said infant, which comprises a moisture-impervious backing sheet; a moisture-retaining layer attached to said backing sheet and including a pad of absorbent material superposed on said backing sheet and a facing sheet overlying said pad, substantially coextensive with the backing sheet, and having a slot provided in the facing sheet near a longitudinal margin of said diaper; and an adhesive tab fastener having a fixed end secured to said backing sheet on the outside surface of the diaper and at a marginal location thereof, and a free end provided with a tacky surface facing in the same direction as the inside surface of the diaper and releasably covered with a release-coated cover strip; said free end being removably received in said slot.

2. The disposable diaper in accordance with claim **1** wherein said free end is longer than said fixed end.

3. The disposable diaper in accordance with claim **1** wherein said moisture-retaining layer is attached to said backing sheet by a plurality of spaced adhesive beads, and wherein said slot is situated in said facing sheet between consecutive adhesive beads.

4. The disposable diaper in accordance with claim **1** wherein said slot forms an acute angle with a longitudinal margin of said diaper.

5. The disposable diaper in accordance with claim **4** wherein said acute angle is about 40 to about 50 degrees.

6. The disposable diaper in accordance with claim **1** wherein said slot is substantially parallel with a longitudinal margin of said diaper.

7. The disposable diaper in accordance with claim **1** wherein the terminal portion of said free end underlies said pad of absorbent material.

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