

[54] **DISPOSABLE DIAPER WITH
PERMANENTLY ATTACHED ADHESIVE
TABS AND PERMANENTLY ATTACHED
COVER STRIPS**

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[58] Field of Search **128/153-157,
128/284, 286-287, 289, 290 R, 290 H, 292,
293, 296; 24/DIG. 11; 117/122 P; 161/39, 406**

[56] **References Cited**

UNITED STATES PATENTS

2,714,889	8/1955	Chambers	128/284 X
3,620,217	11/1971	Gellert	128/287
3,642,001	2/1972	Sabec	128/287
3,848,594	11/1974	Buell	128/284
3,848,597	11/1974	Endres	128/287

Primary Examiner—Richard A. Gaudet

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[57] **ABSTRACT**

A disposable diaper adhesive closure in which an adhesive tab permanently attached to the diaper has a releasable cover strip on its adhesive surface and the cover strip remains permanently attached to the diaper, thus eliminating the need for disposal of the cover strip by the consumer when the diaper is applied. In one embodiment, the cover strip is attached to the plastic film backing sheet of the diaper. In a second embodiment, the cover strip is attached permanently to the terminal portion of the adhesive tab end attached to the backing sheet. With either embodiment, the cover strip forms a loop into which the user can place his finger and pull to remove the cover strip from the adhesive surface of the tab which is to be pressed against a juxtaposed region of the diaper backing sheet so as to secure the diaper about the baby in conventional fashion. The cover strip remains secured to the diaper.

6 Claims, 6 Drawing Figures

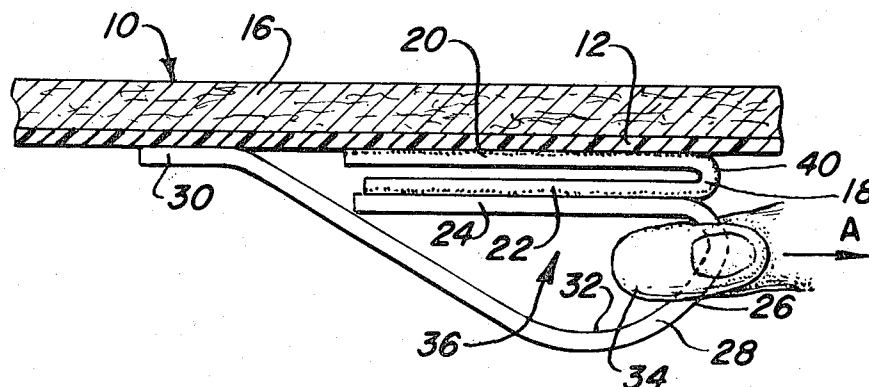


FIG. 1

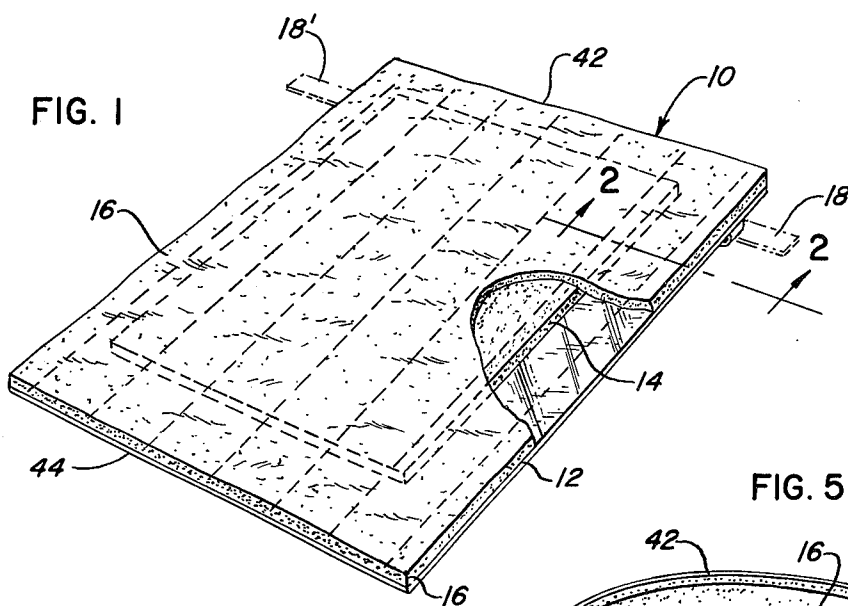


FIG. 5

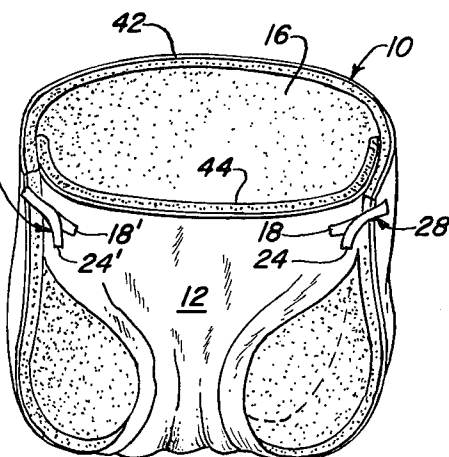


FIG. 2

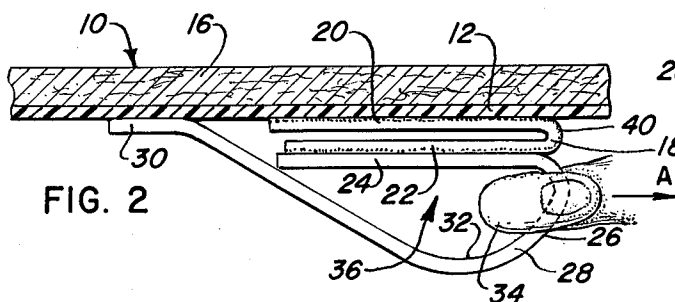


FIG. 3

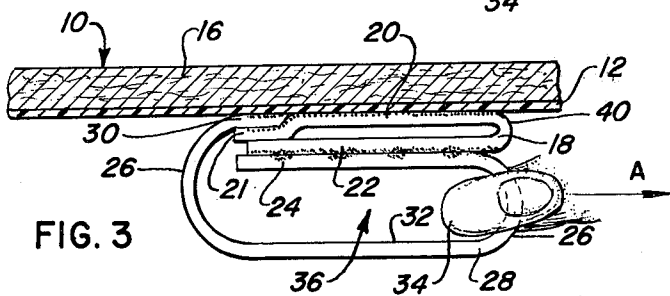


FIG. 6

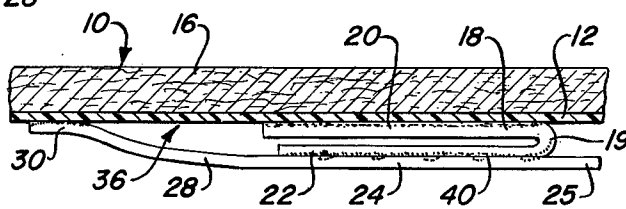
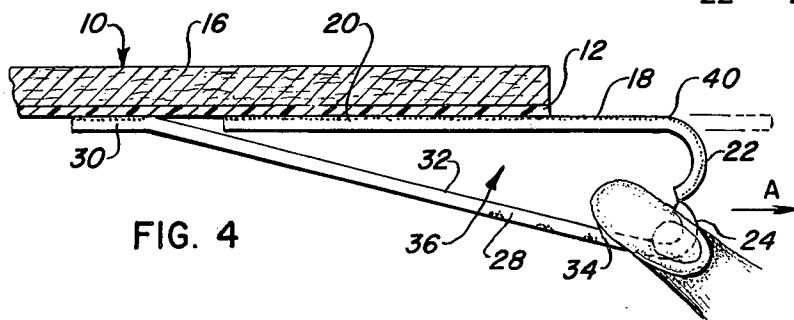


FIG. 4



DISPOSABLE DIAPER WITH PERMANENTLY ATTACHED ADHESIVE TABS AND PERMANENTLY ATTACHED COVER STRIPS

BACKGROUND OF THE INVENTION

Disposable diapers provide substantial advantages in convenience over diapers intended to be laundered and reused, particularly when they are used away from home. In recent years, many different disposable diapers have been proposed and some have been successful in the marketplace. Typical disposable diaper structures comprise a facing material to be brought into contact with the infant's skin, an absorption layer of high liquid-holding capacity and a water-impervious backing layer, generally made of a plastic film such as a polyethylene film. Typical disposable diaper structures are shown in Mesek et al. U.S. Pat. No. 3,612,055, and in Duncan et al. U.S. Pat. No. 3,180,335.

As may be seen from the above-cited patents, it is desirable to obviate the problems that are inherent in closure systems which utilize extraneous fasteners such as safety pins, snaps and zippers. To this end adhesive closure systems have presented acceptable solutions.

One of the most convenient adhesive systems that has been developed to date is the system, shown in the above-cited patents, in which adhesive tabs are adhered to the backing sheet extending outwardly from opposite sides of the diaper at one end thereof, and in which the exposed areas of the adhesive strips are provided with readily separable cover strips which protect the exposed areas until ready for use. However, disposable diapers using an adhesive closure system of this general type have the disadvantage that the consumer has to dispose of the cover strips when they are separated from the adhesive tabs. This is an inconvenience to the consumer who is placing the diaper on a baby at about the same time.

An illustrative prior art adhesive system having cover strips permanently attached to the diaper is disclosed in Gellert U.S. Pat. No. 3,646,937. The Gellert arrangement has the disadvantage of having a release film on the inside of the diaper, where it can possibly come into contact with a baby's tender skin. The closure system illustrated in the Gellert patent also has the disadvantage that it requires the use of two hands to peel back the releasable end of the adhesive tape. Additional disadvantages are the complexities and expense which are added to the manufacturing process by requiring each adhesive closure to be manipulated on the front side, around the edge, and on to the back side of the diaper, instead of handling the adhesive closure on one side only.

SUMMARY OF THE INVENTION

In this invention, the adhesive tab which is used to secure the diaper on a baby is attached at one end thereof to the plastic backing sheet of the diaper while the other end of the tab, the free working end, is folded back over the attached end, presenting a tacky surface which is releasably covered by a release-coated surface of a cover strip which, in turn, is permanently attached to the diaper.

In one embodiment, one end of the cover strip is adhered to the plastic film backing of the diaper. In a second embodiment, the cover strip is attached permanently to the terminal portion of the adhesive tab end

which is attached to the diaper, i.e., the tab anchoring end. With either embodiment, the cover strip forms with the folded-back working end a loop such that the consumer can separate the cover strip from the adhesive tab by inserting a finger into the loop and pulling the cover strip away from the tab, thereby exposing the adhesive surface on the working end of the tab. In this invention, the tab can be separated from the release film by using only one hand, thus leaving the other hand free for other purposes.

In accordance with this invention, the cover strip is on only the outside portion of the diaper, where it will not come in contact with a baby's tender skin.

In both of the above-described arrangements, the cover strip can also be made to serve a secondary function after it is separated from the adhesive tab. The releasably secured ends of the cover strips can be attached to the baby's garments, or can be made long enough for tying to each other as a secondary tightness adjustment of the diaper about the baby's waist.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated by the drawings, in which:

FIG. 1 is a perspective view, partly broken away to show interior detail, of an open unfolded diaper in accordance with one embodiment of the invention and including a phantom showing of the adhesive tabs in extended position;

FIG. 2 is a fragmentary cross-sectional view of the diaper of FIG. 1 taken along plane 2—2;

FIG. 3 is a fragmentary cross-sectional view similar to FIG. 2, illustrating an alternate embodiment of the invention;

FIG. 4 is a fragmentary cross-sectional view of the diaper of FIG. 1 taken along plane 2—2, illustrating the embodiment of FIG. 2 as it is about to reach the point of readiness for use and showing in phantom the position of the adhesive tab when ready for use;

FIG. 5 is a perspective view on a reduced scale of the diaper of FIGS. 1, 2 and 4 in its configuration after being placed about the infant; and

FIG. 6 is a fragmentary cross-sectional view similar to FIG. 2 and illustrating yet another embodiment of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail preferred embodiments of the invention, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiments illustrated. The scope of the invention will be pointed out in the appended claims.

Referring to the drawings, diaper assembly 10, when fully opened and laid out flat as illustrated in FIG. 1, comprises a lowermost moisture-impervious plastic backing sheet 12 which is rectangular in shape, and an overlying porous facing layer 16 of absorbent fibrous material which is substantially coextensive with the impervious sheet. While not critical to the present invention, diaper 10 also preferably includes a highly moisture-absorbent fibrous pad or batt 14, which is also rectangular in shape, but smaller than the facing and backing layers and is centrally disposed therebetween.

Batt 14 may be formed in accordance with the teachings set forth in commonly assigned Mesek et al. U.S. Pat. No. 3,612,055.

Moisture impervious sheet 12 may be formed of polyethylene having a thickness of approximately 0.001 inch. The sheet may be smooth, or may be embossed to improve its drape and feel. Other suitable flexible moisture-impervious sheets may be used in accordance with the invention such as, for example, polyethylene terephthalate sheets having a thickness of about 0.0005 inch.

The present invention contemplates that several different types of facing layers may be used. For example, the facing layer 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 Liloia et al. U.S. Pat. No. 3,663,348.

Facing layers suitable for use in this invention have fabric weights in the range of 1 to 5 oz./yd.² and densities less than 0.15 gm./cc., generally in the range between 0.05 and 0.10 gm./cc. The dry strength of the facing layer, 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 0.10 lbs./in. of width in the cross direction. The fabrics have unusually good elongation, loft, softness, and drape characteristics in comparison to prior products incorporating any substantial amount of short fibers.

Facing layer 16 may also be an apertured nonwoven fabric formed, for example, in accordance with the teachings in 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 understood 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 understood by those skilled in the art. The fabric can be made of naturally occurring fibers, synthetic fibers or blends thereof. Typical facing layers made of a polyester material may have a weight of $\frac{3}{4}$ oz./yd.².

It should also be understood that the facing layer may be formed of nonapertured material, such as a nonwoven isotropic web, sponge, or the like. In all of the aforementioned facings, the materials should be relatively hydrophobic so as to retard wicking within the facing layer.

In this invention, adhesive tabs 18 and 18' made from polyethylene tape stock, polypropylene tape stock, or the like, are used to secure the diaper on the baby and each has permanently attached anchoring end 20, free working end 22 folded back over anchoring end 20, and tacky surface 40 substantially coextensive with one surface of tab 18. Cover strip 28 is provided with permanently attached fixed end 30, releasably secured end 24, release-coated surface 26 on one side thereof, and uncoated surface 32 on the other side thereof. Anchoring end 20 of adhesive tab 18 is permanently attached, e.g., by means of an adhesive or fusion to moisture-impervious backing sheet 12 of diaper 10 at a marginal location thereon, and working end 22 is folded back

against anchoring end 20 and is initially releasably adhered to release-coated surface 26 of cover strip 28 along end 24. Fixed end 30 of cover strip 28 is permanently attached directly to plastic backing sheet 12 of diaper 10.

This invention contemplates various embodiments by which cover strip 28 can be permanently attached to diaper 10. In the embodiment illustrated in FIG. 2, fixed end 30 of the cover strip 28 is permanently affixed along uncoated surface 32 to plastic film backing 12 by bonding surface 32 directly to the outside surface of plastic film backing 12. In a second embodiment, illustrated in FIG. 3, cover strip 28 is permanently affixed to plastic film backing 12 by interposing end 30 of the cover strip 28 between adhesive tab 18 and plastic backing sheet 12 and attaching end 30 to terminal portion 21 of anchoring end 20. End 30 is folded over on itself such that release-coated surface 26 faces backing sheet 12. In this second embodiment, cover strip 28 is affixed to plastic backing sheet 12, by way of permanent attachment to anchoring end 20 of adhesive tab 18 which, in turn, is permanently attached by adhesion to plastic backing sheet 12.

As illustrated in FIGS. 2 and 3, cover strip 28 is folded over upon itself to provide finger-receiving loop 36 which enables cover strip 28 to be easily separated from adhesive tab 18. Separation of cover strip 28 from tab 18 is effected by inserting finger 34 into loop 36 and pulling cover strip 28 apart from working end 22 of tab 18 by moving finger 34 in the direction indicated by arrows A. FIG. 4 illustrates the embodiment of FIG. 2 as cover strip 28 is about to become totally separated from the tab 18, exposing tacky surface 40 and thereby making diaper 10 ready to be applied about the infant.

Alternatively, loop 36 can be formed by cover strip 28 releasably attached to tab working end 22 without cover strip 28 being folded over on itself by merely releasably securing end 24 over the tacky surface of folded back working end 22 so that grippable portion 25 of end 24 extends beyond crease 19 in tab 18 as shown in FIG. 6. In this particular embodiment, the user inserts the middle finger of one hand in loop 36 and by gripping grippable portion 25 between the thumb and forefinger peels back cover strip end 24, thereby exposing tacky surface 40 on tab working end 22 for securing diaper 10.

In accordance with this invention, after cover strip 28 is separated from tab 18, cover strip 28 does not have to be disposed of by the consumer because it remains permanently attached to diaper 10 as shown in FIG. 5. Another advantage is that cover strip 28 can be separated from tab 18 by using only one hand, thus leaving the other hand free for other purposes. Additionally, cover strip 28 is at all times only on the outside portion of the diaper, where it will not come in contact with a baby's tender skin. A further advantage is that releasably secured end 24 of cover strip 28 can serve a secondary fastening purpose after being separated from adhesive tab 18 through use in combination with similar end 24' of second cover strip 28' which is attached to plastic film backing 12 at an opposite marginal location. Respective ends 24 and 24' of cover strips 28 and 28' can be made long enough for attachment to the baby's garments, or ends 24 and 24' can be tied together as a secondary tightness adjustment of diaper 10 at the baby's waist.

A material suitable for use as a cover strip 28 is paper covered with silicone. When the cover strip is to be used for supplemental tying purpose, a smooth plastic film having a release surface may be used instead.

Each adhesive tab 18 includes a tacky adhesive coating material on one face 40 of the adhesive tab 18. As is clear from FIGS. 2 and 3, anchoring end 20 bearing tacky surface 40 of each tab 18 is permanently attached to plastic film backing sheet 12 at a marginal location. Adhesive tab 18 is folded back over upon itself such that the surfaces without the tacky material are juxtaposed. Cover strip 28 with release-coated surface 26 is releasably secured to working end 22 bearing a portion of tacky surface 40 and can be readily separated when diaper 10 is to be used, thereby exposing a portion of covered tacky surface 40 along end 22 for use in fastening diaper 10 about an infant.

Suitable pressure-sensitive adhesives for the present purposes are known in the art and possess good tack, good cohesive strength, good moisture resistance and good resistance to aging. Illustrative of such adhesive compositions are mixtures of natural or synthetic rubber with zinc oxide and various resins, natural or synthetic rubber or resin latices, tacky acrylic polymers or copolymers, and the like.

As illustrated in FIGS. 1 and 5, diaper 10 is applied to the infant by positioning ends 42 and 44 of diaper 10 around the waist of the infant with the intermediate portion of the diaper being disposed in the infant's crotch. Cover strips 28 and 28' are separated from adhesive tabs 18 and 18', respectively, and diaper ends 42 and 44 are pulled into tight fitting engagement with the infant's waist. The exposed portion of tacky surface 40 along working end 22 of each adhesive tab 18 is then pressed against the adjacent portions of plastic backing sheet 12 to secure the diaper about the infant. The final form assumed by diaper 10 is shown in perspective on a reduced scale in FIG. 5, and the diaper is held in this position by the adhesive closure system of the present invention.

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 this invention.

What is claimed is:

1. In combination with a disposable diaper having an absorbent layer and a moisture-impervious backing

sheet, the improvement comprising: an adhesive tab having one end permanently attached to said backing sheet at a marginal location thereon and a free end folded back over said attached end and presenting a tacky surface; a cover strip having a release coating on one surface thereof and being affixed at one end to said backing sheet and at the other end releasably secured to and covering said tacky surface on said free end; said cover strip forming with said folded back free end a finger-receiving loop which enables said cover strip to be easily separated from the adhesive tab thereby exposing said tacky surface for use in fastening said diaper about an infant.

2. The combination of claim 1 wherein said cover strip is permanently affixed to said backing sheet at said one end with said release coated surface facing said backing sheet and is folded over upon itself.

3. The combination of claim 1 wherein said cover strip is permanently attached directly to said backing sheet at said one end with a surface opposite said release coated surface facing said backing sheet and is folded over upon itself.

4. The combination of claim 1 wherein the releasably secured end of said cover strip is long enough to be used, after being separated from said adhesive tab, for secondary fastening purposes in combination with a similar end of a second cover strip attached to said backing sheet at an opposite marginal location thereon.

5. The combination of claim 1 wherein said cover strip is permanently attached directly to said backing sheet at said one end and is releasably attached to said tacky surface so that a grippable portion of the cover strip extends beyond said folded back free end.

6. In combination with a disposable diaper having an absorbent layer and a moisture-impervious backing sheet, the improvement comprising: an adhesive tab having one tacky surface, an anchoring end which is permanently adhered to said backing sheet at a marginal location thereon and a working end folded back over the anchoring end; a cover strip permanently attached to a terminal portion of the anchoring end and releasably attached to the tacky surface of the working end; said cover strip being folded upon itself to provide a finger-receiving loop which enables the cover strip to be easily separated from the tacky surface on said working end.

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