

[54] **DISPOSABLE DIAPER WITH SEMIELASTIC STRIP FASTENERS**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 142,688, May 12, 1971, abandoned.

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

[51] Int. Cl. **A41b 13/02**

[58] Field of Search 128/284, 286, 287, 291

References Cited

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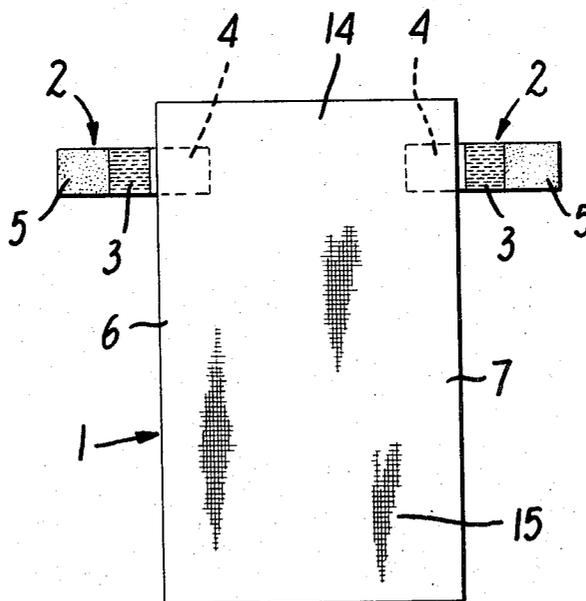
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Attorney, Agent, or Firm—Brumbaugh, Graves, Donohue & Raymond

[57] **ABSTRACT**

A disposable diaper is provided with semielastic strip fasteners having a freely extensible elastic central segment and two nonextensible inelastic terminal segments, which fasteners serve to bond together strongly the front and rear panels of the diaper when the diaper is worn and provide comfortable elastic extensible side waistbands.

9 Claims, 6 Drawing Figures



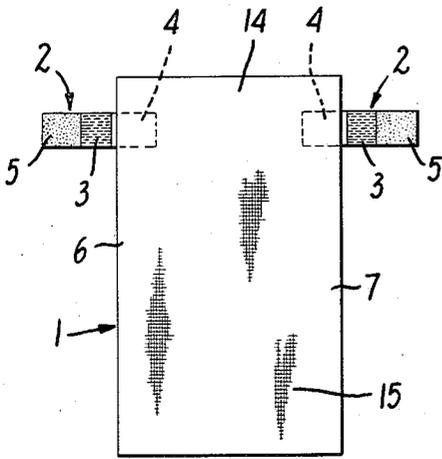


FIG. 1

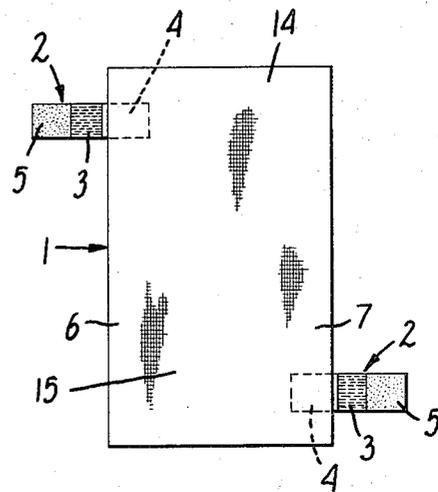


FIG. 2

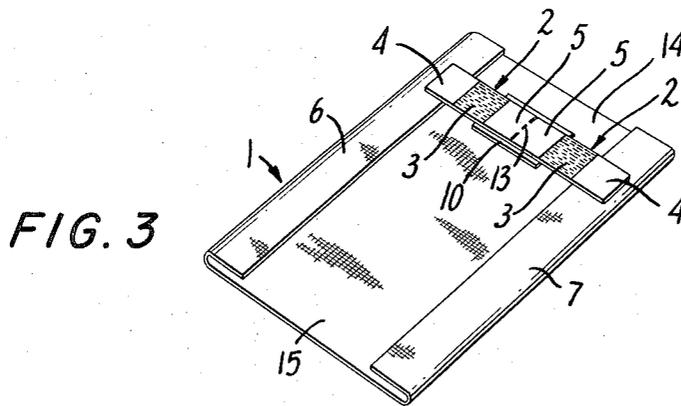


FIG. 3

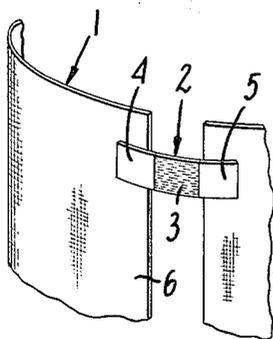


FIG. 4

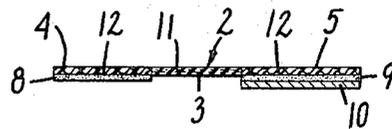


FIG. 5

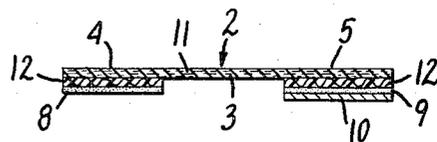


FIG. 6

DISPOSABLE DIAPER WITH SEMIELASTIC STRIP FASTENERS

This application is a continuation-in-part application of my copending U.S. Pat. application Ser. No. 142,688, filed May 12, 1971, now abandoned.

The present invention relates to disposable diapers of substantially rectangular or triangular shape having a novel fastening means for attaching the back panel of the diaper to the front panel of the diaper at the waist of the wearer.

Disposable diapers conventionally are multiply pads with an inner filling of absorbent cellulose sandwiched between outer layers of nonwoven fabric. An outermost layer of waterproof plastic is often used for containment of liquid waste inside the diaper.

These disposable diapers lack the conforming ability and flexibility of the reusable woven fabric diapers, usually made of cotton. They are generally affixed in position at the waist with the aid of pins or entirely elastic or inelastic fasteners. Since the disposable diaper lacks the stretchability of the conventional woven diaper, it will cause great discomfort to the wearer by reason of the use of unyielding or inelastic waist attachments. The constriction is apparent at every indrawn breath of the wearer. While entirely elastic fasteners have been proposed, if such fasteners are in adhesive strip or tape form, they loosen or creep away from the diaper under low stress and hence provide an insecure union of the front and rear diaper panels.

The disposable diaper of the present invention has at least one semielastic strip, tape or band fastener. The semielastic strip fastener has a freely extensible elastic central segment and two nonextensible inelastic terminal segments. One of the terminal segments is anchored or attached on a side margin of the diaper at the waist portion thereof and the other of the terminal segments is substantially free of the diaper and has a pressure-sensitive adhesive coating thereon.

The substantially free terminal segment of the semielastic strip fastener preferably has a release liner superimposed upon the pressure-sensitive adhesive coating thereon.

The semielastic strip fastener can be formed of an extensible elastic material in the central segment thereof and a nonextensible inelastic material in the two terminal segments thereof. Alternatively, the semielastic strip fastener can be formed entirely of an extensible elastic material and the two terminal segments thereof are then rendered nonextensible and inelastic, for example, by having a nonextensible inelastic material or coating laminated or coated thereon or by selectively indurating the elastic material. As a further alternative, the anchored or attached terminal segment, if formed of a heat-sealable extensible elastic material, can be rendered nonextensible and inelastic by heat sealing it onto a side margin of the disposable diaper.

One of the semielastic strip fasteners can be on each of two side margins of the diaper at the waist portion thereof and preferably they are directly opposite one another. In the later case, the substantially free terminal segments of the strip fasteners can be unitary with one another and severable from one another by central lateral perforations therebetween.

The disposable diaper of the present invention will be further illustrated by reference to the accompanying drawing wherein;

FIG. 1 is a plan view of one embodiment of the disposable diaper;

FIG. 2 is a plan view of another embodiment of the disposable diaper;

FIG. 3 is a perspective view of a further embodiment of the disposable diaper;

FIG. 4 is a partial side elevational view of the disposable diaper of FIGS. 1, 2 or 3 after the diaper has been fastened at the wearer's waist;

FIG. 5 is a nonproportioned side sectional view of a semielastic strip fastener for the disposable diaper; and

FIG. 6 is a nonproportioned side sectional view of another semielastic strip fastener for the disposable diaper.

Referring now to FIGS. 1, 2 and 3 the disposable diaper 1, which can have the conventional structure described above or any other suitable structure, is provided with one or more semielastic strip fasteners 2. The semielastic strip fastener has a freely extensible elastic central segment 3 and two nonextensible inelastic terminal segments 4 and 5. One terminal segment 4 is anchored or attached perpendicularly on a side margin 6 and/or 7 of the diaper 1 at the waist portion or adjacent an end thereof, for example, by a pressure-sensitive adhesive coating 8 underneath that segment or by heat sealing when the semielastic strip fastener 2 is made of heat-sealable material. The other terminal segment 5 is substantially free of (i.e., either not attached to or only temporarily attached to and easily separable from) the diaper and has a pressure-sensitive adhesive coating 9 underneath thereon. Such temporary attachment to the diaper of the substantially free terminal segment 5 of the semielastic strip fastener 2 would serve to prevent damage to the fastener during manufacturing and packaging of the diaper and render the diaper more aesthetic. The terminal segment 5 can also be rendered substantially free of the diaper by the embodiment shown in FIG. 3 discussed below.

The substantially free terminal segment 5 of the strip fastener 2 preferably has a removable protective release liner 10 superimposed upon the pressure-sensitive adhesive coating 9.

The semielastic strip fastener 2 can be formed of an extensible elastic material 11 in the central segment 3 and a nonextensible inelastic material 12 in the two terminal segments 4 and 5, as shown in FIG. 5. As an alternative, the semielastic strip fastener 2 can be formed entirely of an extensible elastic material 11 and the two terminal segments 4 and 5 are then rendered nonextensible and inelastic, for example, by having a nonextensible inelastic material 12 laminated or coated thereon, as shown in FIG. 6, or by selectively indurating the elastic material. As an additional variant, the anchored or attached terminal segment 4, if formed of a heat-sealable extensible elastic material, can be rendered nonextensible and inelastic by heat sealing it onto a side margin 6 or 7 of the disposable diaper 1.

One of the strip fasteners 2 can be on each of two side margins 6 and 7 of the diaper 1 at the waist portion thereof, as shown in FIGS. 1, 2 and 3, and preferably they are directly opposite one another as shown in FIGS. 1 and 3. In the later case, the substantially free terminal segments 5 of the strip fasteners 2 can be unitary with one another and severable from one another by central lateral perforations 13 therebetween, as

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shown in FIG. 3. The perforations 13 may extend through the release liner 10.

The extensible elastic material 11 may be, e.g., elastic banding or woven elastic braid, and may be made from any elastomer, notably rubber or polyurethane ("Lycra," E.I. du Pont Company), or a heat-sealable elastomer such as butadiene-styrene block polymer sold as "Kraton" by the Shell Chemical Company, or a plasticized plastic having elongation and retraction characteristics, or a stretchable fabric such as "Banlon" of Indian Head Inc. which may or may not have elastomeric or plastic materials included therein.

The nonextensible inelastic material 12 may be, e.g., cotton or synthetic fabrics or plastic sheeting.

The pressure-sensitive adhesive coatings 8 and 9 are made from pressure-sensitive adhesives known in the art. It is preferred that the adhesives used shall have good tack, good cohesive strength, good urine resistance and cosmetic elegance, being neither dermatitic nor staining, and good resistance to aging. Representative examples of suitable pressure-sensitive adhesives include "Emplastrum Adhaesivum" identified in the U.S. Pharmacopeia, Tenth Edition, page 128, as a mixture of natural or synthetic rubber, zinc oxide and resins; natural or synthetic rubber or resin latex; acrylic tacky polymer or copolymer dispersed in water, e.g., B.F. Goodrich Co. acrylic latex "Hycar" 2,600 x 146; and the like.

The release liner 10 is available in great variety commercially, with preference herein for the material known as "Holland Cloth."

The strip fasteners 2 shown for the waist portion of the diaper 1 can be duplicated along the side margins 6 and/or 7 to provide elastic containment of the diaper in the region of the wearer's thigh.

In use, the wearer or baby is placed lengthwise along the diaper 1 with the strip fastener bearing end or rear panel 14 of the diaper of FIGS. 1 or 3 generally at the wearer's waist level and behind the wearer. In regard to the diaper of FIG. 3, severance is made at perforations 13 and the side margins 6 and 7 unfolded and extended outwardly beforehand. The front panel 15 is then folded upwardly about the wearer's stomach and the substantially free terminal segments 5 of the strip fasteners 2 are adhesively fastened by pressure, after removal of the release liner 10, adjacent the same side margins 6 and 7 of the front panel 15 at the wearer's waist, as shown in FIG. 4.

Hence, in use, one semielastic strip fastener 2 is on the left side and one on the right side of the wearer's waist, thus adjustably securing the diaper in place to accommodate the waist size of the wearer. The freely extensible elastic central segments 3 of the semielastic strip fasteners 2 act as elastic extensible side waistbands in an otherwise inelastic disposable diaper which will expand and contract to comfortably accommodate the wearer's every breathing action. Moreover, since

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the terminal segments 4 and 5 of the semielastic strip fasteners 2 are inelastic and nonextensible, rather than being elastic and extensible, they are strongly bonded in use to the side margins 6 and 7 and do not loosen or creep or pull free when a low stress is applied thereto due to breathing or other normal movement of the wearer.

Modifications of the herein disclosed invention may be made by those skilled in the art without departing from the spirit or essence of the invention and such modifications are accordingly included within the scope of the appended claims.

What is claimed is:

1. A disposable diaper having at least one semielastic strip fastener, said semielastic strip fastener having a freely extensible elastic central segment and two nonextensible inelastic terminal segments, one of said terminal segments being anchored on a side margin of the diaper at the waist portion thereof and the other of said terminal segments being substantially free of the diaper and having a pressure-sensitive adhesive coating thereon.

2. The disposable diaper defined by claim 1 wherein the substantially free terminal segment of the semielastic strip fastener has a release liner superimposed upon the pressure-sensitive adhesive coating thereon.

3. The disposable diaper defined by claim 1 wherein the semielastic strip fastener is entirely formed of an extensible elastic material and the two terminal segments thereof are rendered nonextensible and inelastic.

4. The disposable diaper defined by claim 3 wherein the two terminal segments of the semielastic strip fastener have a nonextensible inelastic material laminated thereon.

5. The disposable diaper defined by claim 3 wherein the anchored terminal segment of the semielastic strip fastener is heat sealed on a side margin of the diaper at the waist portion thereof.

6. The disposable diaper defined by claim 1 wherein the semielastic strip fastener is formed of an extensible elastic material in the central segment thereof and a nonextensible inelastic material in the two terminal segments thereof.

7. The disposable diaper defined by claim 1 wherein one of said semielastic strip fasteners is on each of two side margins of the diaper at the waist portion thereof.

8. The disposable diaper defined by claim 7 wherein said semielastic fasteners are directly opposite one another.

9. The disposable diaper defined by claim 8 wherein the substantially free terminal segments of the semielastic strip fasteners are unitary with one another and severable from one another by central lateral perforations therebetween.

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