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L. G. LOVEKIN
DISPOSABLE DIAPER

2,696,819

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Fig. 1.

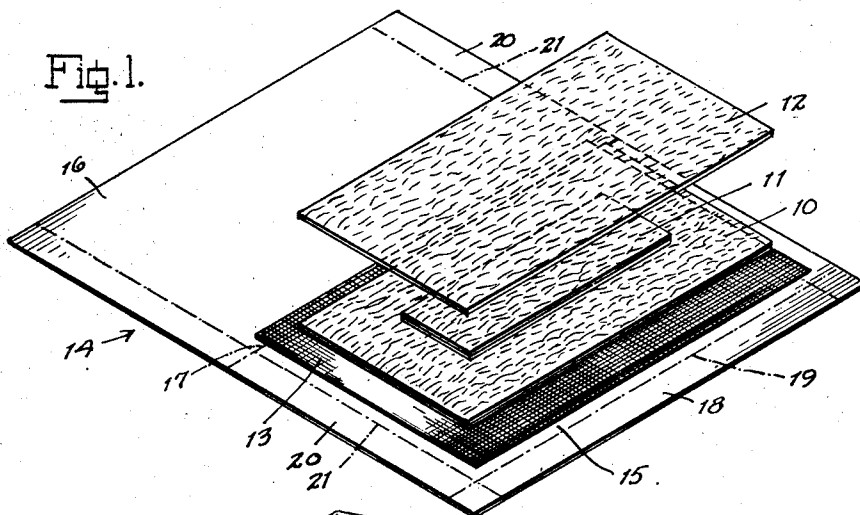


Fig. 2.

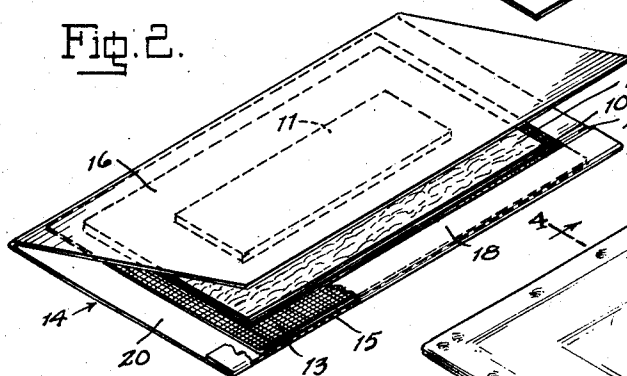


Fig. 3.

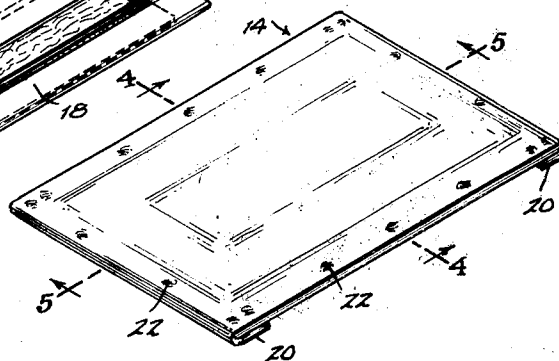


Fig. 4.

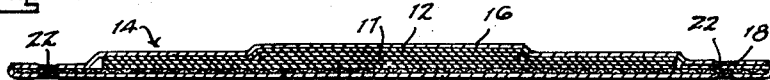


Fig. 5.

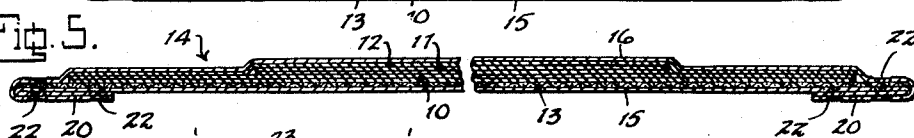
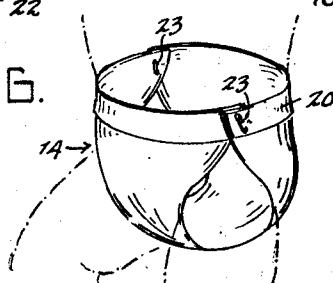


Fig. 6.



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2,696,819

DISPOSABLE DIAPER

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9 Claims. (Cl. 128—284)

The present invention relates to a disposable diaper, and is a continuation-in-part of my application for Disposable Diaper, Ser. No. 249,649 filed October 4, 1951, and upon which Patent No. 2,667,168 was granted on January 26, 1954.

An object of the invention is to provide a diaper of simple construction and formed of inexpensive materials, enabling it to be produced and sold at a price commensurate with its intended single-use disposable character. To this end it is proposed to employ as the main body of the diaper layers of highly moisture-absorbent material, such for instance as cellulose in the form of a relatively large number of superimposed crinkly, soft-textured paper layers, this material also having a high degree of air permeability and the capability of rapid evaporation of moisture therefrom.

It is a further object to provide a specific arrangement of absorbent layers whereby a central front to rear area of the absorbent body gives extra absorption where most needed, it being particularly proposed to provide such area of increased thickness, yet so arranged that it will not act as the top of a pyramid with a tendency to make the diaper spill. To this end I propose to provide a rectangular-shaped sandwich of layers in which relatively wide absorbent layers are provided above and below a central strip of relatively narrow absorbent layers, the upper layers, which are preferably relatively thin, providing a retaining covering for the central strip, protecting it against displacement and the passage of solid matter beneath it, and the lower layers, which are preferably relatively thick, providing support for the central strip having a high degree of resistance to disintegration and breakage.

A further object is to provide a retaining envelope or enclosure for the absorbent layers which will provide a high degree of tensile and wet strength at the inner and outer sides of the diaper as well as a non-irritating skin-engaging surface at the inner side. To this end it is proposed to provide a single sheet of fabric material, as cotton gauze, at the outer side of the absorbent layers extending beyond its four edges, and to enclose the absorbent layers and the gauze layer in a wrapping consisting of a thin sheet of soft pliable moisture pervious paper or non-woven fabric having a high degree of tensile and wet strength, so folded and overlapped as to provide a single layer of such paper sheet beneath the gauze layer and a single layer above the absorbent layers. It is also proposed that such envelope be such as not to interfere with air circulation, so that rapid external evaporation of moisture may take place, thus protecting the infant's skin from the irritating and mascerating effects of too-long contact with entrapped moisture, and such as takes place in diapers heretofore proposed having a moisture impervious layer interposed between the inner and outer sides. The paper sheet wrapping does not disintegrate when wet and holds soiled material satisfactorily. It also acts as a barrier between the cellulose filler and the baby's skin, preventing the filler from adhering thereto.

Another object is to provide a diaper having relatively thin longitudinal marginal portions free from the absorbent layers, so as to provide better fit and less bulk where the diaper engages about the legs, and further to provide outwardly disposed end folds having thin end portions for overlapping and pinning, and which constitute an encircling belt at the upper edge, having a high degree of resistance to stretching, thus making for reli-

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able securing of the diaper with greater comfort to the infant, and increased protection against soiling of outer garments.

With the above and other objects in view an embodiment of the invention is shown in the accompanying drawings, and this embodiment will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

In the drawings:

Fig. 1 is a perspective view showing the several components of the diaper in superimposed relation, the dot-and-dash lines indicating fold lines;

Fig. 2 is a perspective view showing the envelope partially folded about the moisture absorbent layers, the inner side being at the top;

Fig. 3 is a perspective view showing the completed diaper with the ends of the envelope folded and secured in place;

Fig. 4 is an enlarged transverse sectional view, taken along the line 4—4 of Fig. 3;

Fig. 5 is an enlarged longitudinal sectional view, taken along the line 5—5 of Fig. 3; and

Fig. 6 is a perspective view showing the diaper as worn by an infant.

Similar reference characters indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, the main absorbent body of the diaper, according to the illustrated exemplary embodiment of the invention shown herein, comprises a sandwich of absorbent layers consisting of absorbent cellulosic paper-like material, for instance, cellulose sulphite, this material being in the form of a plurality of paper-like sheets or films having a relatively soft, loose, crinkly texture. Such material has heretofore been used for similar purposes, as shown for instance in the patents to MacKenzie, No. 1,674,600 dated June 19, 1928, and King No. 2,062,978 dated December 1, 1936. A layer of such material, as commercially produced, usually consists of a number of thin sheets or films of cellulosic paper-like material, for instance 8 sheets, which due to their soft crinkly texture tend to cling to each other to form a substantially homogeneous layer of soft, loose texture having substantial thickness, for instance about $\frac{1}{8}$ of an inch, and which is highly absorbent, has a high degree of wet strength, and provided for air circulation and rapid evaporation of moisture. For the purpose of the present disclosure the reference herein to a layer of absorbent material contemplates such a superimposed number of sheets.

The absorbent sandwich comprises an outer part 10, consisting of a plurality of layers of absorbent material of generally rectangular shape, an intermediate part 11, also consisting of a plurality of layers of rectangular shape and substantially narrower and shorter than the outer part 10, and an inner part 12, relatively thinner than the outer and intermediate parts, and preferably consisting of a single layer of material and of corresponding size and shape to the outer part 10. These parts are placed in superimposed sandwich form, as shown in Fig. 2, with the intermediate part 11 centered between the parts 10 and 12.

The terms outer and inner with reference to the parts 10 and 12 is to be understood as referring to the outward and inward disposition of these parts when the diaper is being worn. While the dimensions of the parts making up the absorbent body may vary, it has been found that satisfactory dimensions for the outer and inner parts are 8 inches by 18 inches, and for the intermediate part 3 inches by 12 inches, so that the edges of the intermediate part are substantially spaced from the edges of the outer and inner parts.

At the underside of the absorbent sandwich, that is, the outer side when the diaper is being worn, there is provided a rectangular layer of woven material 13 having a relatively open mesh weave, such for instance, as surgical gauze, this layer being longer and wider than the absorbent sandwich so that it projects beyond the four edges thereof. In practice, the projection along the longitudinal edges is about $1\frac{1}{2}$ inches and the projection at the ends is about $\frac{3}{4}$ of an inch.

The absorbent sandwich and the layer of woven material 13 are enclosed within a covering or envelope 14 consisting of a single rectangular piece of paper or non-woven fabric material, this material being of a suitable type which is soft and flexible, has a relatively high degree of tensile and wet strength, and is moisture pervious while at the same time being highly resistant to disintegration when wet. The covering 14 comprises rectangular portions 15 and 16 substantially corresponding in size to the woven gauze layer 13, and which are foldable upon each other along the longitudinal fold line 17, so that the portion 15 is below or at the outer side of the woven gauze layer 13 and the portion 16 is at the upper or inner side of the absorbent sandwich.

Along the longitudinal edge of the portion 15 opposite the fold line 17 there is provided a marginal portion 18 substantially corresponding in width to the margin of the woven layer 13 projecting beyond the edge of the absorbent sandwich, and which is foldable along the longitudinal fold line 19 over the projecting margin of the woven layer, as shown clearly in Fig. 2, being thereupon superimposed by the marginal edge portion of the portion 16. Along the transverse edges of the covering 14, there are provided transverse marginal portions 20—20 which, when the portions 18 and 16 are folded upon the portion 15 to enclose the woven gauze layer 13 and the absorbent sandwich, are folded along the fold lines 21 upon the outer side, as shown in Fig. 3. The width of the marginal portions 20 is substantially greater than the projection of the woven layer 13 with respect to the ends of the absorbent sandwich, so that in the folded condition, as seen in Fig. 5, the folded under portions 20 overlap the end portions of the absorbent sandwich for a purpose to be presently more fully pointed out.

At spaced points along the marginal portions of the diaper beyond the edges of the absorbent sandwich, the marginal portions of the woven gauze layer 13 and the covering material are adhesively tacked together by a suitable water-proof adhesive, as at 22, the folded end portions 20 being suitably secured in folded relation. The spaced adhesive tacking holds the parts of the diaper together, while it is being handled, without imparting stiffness to the marginal portions.

The diaper is fitted upon the infant, as shown in Fig. 6, being secured by safety pins 23 which are engaged in the overlapped corners of the folded over portions 20. These folded over portions provide a waist band effect which, due to the projection beyond the edge of the absorbent sandwich, provides a relatively thin portion to engage around the waist, the end edges of the absorbent sandwich at the same time being pressed beneath the overlapped parts of the marginal portions 20 so that it is effectually retained against shifting. It will be observed that the pinning takes place in the corner portions of the diaper which are free from the absorbent sandwich, so that the overlapped pinning portions are not excessively bulky and the pins may be easily engaged therethrough. As the pins extend through the marginal portions of the woven gauze layer 13, this layer is thus supported at its four corners so that it, in turn, effectually supports the absorbent sandwich. Also it is pointed out that the enclosing of the projecting marginal portions of the woven gauze layer 13 in the paper or non-woven fabric covering 15, outwardly of the four edges of the absorbent sandwich, provides, about the four sides of the diaper, a relatively thin margin having a high degree of stability. Also, the thin marginal portions along the longitudinal sides of the diaper permit it to fit more snugly about the legs of the infant with a substantial reduction in bulk.

What is claimed is:

1. A diaper comprising a moisture absorbent body having inner and outer sides and consisting of cellulose material of substantially rectangular shape, said absorbent body comprising substantially rectangular inner and outer layers and an intermediate substantially rectangular layer having its side and end edges spaced inwardly from the side and end edges of said inner and outer layers, a substantially rectangular layer of moisture pervious woven gauze material covering the outer side of said absorbent body, and a covering consisting of a folded rectangular sheet of moisture pervious material having relatively high tensile and wet strength covering the inner side of

said absorbent body and in contact with and covering the outer side of said layer of woven gauze material.

2. The invention as defined in claim 1, further characterized in that said outer layer is substantially thicker than said inner layers.

3. The invention as defined in claim 1, further characterized in that said outer layer and said intermediate layer each is substantially thicker than said inner layer.

4. A diaper comprising a moisture absorbent body having inner and outer sides and consisting of cellulose material of substantially rectangular shape, a substantially rectangular layer of moisture pervious woven gauze material covering the outer side of said absorbent body, and a covering consisting of a folded rectangular sheet of moisture pervious material having relatively high tensile and wet strength covering the inner side of said absorbent body and in contact with and covering the outer side of said layer of woven gauze material, said woven gauze layer having longitudinal marginal edge portions outwardly of the longitudinal edges of said absorbent body.

5. A diaper comprising a moisture absorbent body having inner and outer sides and consisting of cellulose material of substantially rectangular shape, a substantially rectangular layer of moisture pervious woven gauze material covering the outer side of said absorbent body, and a covering consisting of a folded rectangular sheet of moisture pervious material having relatively high tensile and wet strength covering the inner side of said absorbent body and in contact with and covering the outer side of said layer of woven gauze material, said woven gauze layer having its longitudinal and transverse marginal edge portions outwardly of the longitudinal and transverse edges of said absorbent body.

6. A diaper comprising a moisture absorbent body having inner and outer sides and consisting of cellulose material of substantially rectangular shape, a substantially rectangular layer of moisture pervious woven gauze material covering the outer side of said absorbent body, and a covering consisting of a folded rectangular sheet of moisture pervious material having relatively high tensile and wet strength covering the inner side of said absorbent body and in contact with and covering the outer side of said layer of woven gauze material, said woven gauze layer having longitudinal marginal edge portions outwardly of the longitudinal edges of said absorbent body, said marginal edge portions being adhered to said covering at longitudinally spaced points.

7. A diaper comprising a moisture absorbent body having inner and outer sides and consisting of cellulose material of substantially rectangular shape, a substantially rectangular layer of moisture pervious woven gauze material covering the outer side of said absorbent body, and a covering consisting of a folded rectangular sheet of moisture pervious material having relatively high tensile and wet strength covering the inner side of said absorbent body and in contact with and covering the outer side of said layer of woven gauze material, said covering including marginal portions folded parallel to the transverse edges of said absorbent body upon the outer side to provide waist band portions.

8. A diaper comprising a moisture absorbent body having inner and outer sides and consisting of cellulose material of substantially rectangular shape, a substantially rectangular layer of moisture pervious woven gauze material covering the outer side of said absorbent body, and a covering consisting of a folded rectangular sheet of moisture pervious material having relatively high tensile and wet strength covering the inner side of said absorbent body and in contact with and covering the outer side of said layer of woven gauze material, said woven gauze layer having transverse marginal edge portions outwardly of the transverse edges of said absorbent body, and said covering including marginal portions folded parallel to the transverse edges of said layers of gauze material upon the outer side and of a width to overlap the transverse marginal edge portions of said absorbent body to provide waist band portions.

9. A diaper comprising a moisture absorbent body having inner and outer sides and consisting of cellulose material of substantially rectangular shape, a substantially rectangular layer of moisture pervious woven gauze material covering the outer side of said absorbent body, and a covering consisting of a folded rectangular sheet of moisture pervious material having relatively high

tensile and wet strength covering the inner side of said absorbent body and in contact with and covering the outer side of said layer of woven gauze material, said woven gauze layer having longitudinal marginal edge portions outwardly of the longitudinal edges of said absorbent body, and said covering including marginal portions folded parallel to the transverse edges of said absorbent body upon the outer side to provide waist band portions.

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