MULTILAYER ONE-PIECE DISPOSABLE DIAPERS

Inventors: Walter Herman Breyer, Wallingford; Nathan Allen Edelson, Bala Cynwyd, both of Pa.; Barbara Faye Gilliland, Blackwood, N.J.; Clarence Henry Schatz, West Chester, Pa.


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Field of Search ...... 128/284, 287, 285, 290 P, 128/290 R, 288; 161/49

References Cited

UNITED STATES PATENTS

3,072,123 1/1963 Davis ....... 128/284
3,196,874 7/1965 Hrubecy .............. 128/287
3,369,547 2/1968 Sack et al. ......... 128/296
3,563,243 2/1971 Lindquist ......... 128/287
3,613,687 10/1971 Kennedy ............... 128/288
3,768,480 10/1973 Mesek .................. 128/287

ABSTRACT

Multilayer, one-piece, disposable diapers including a moisture-pervious facing layer adapted to be positioned in engagement with a wearer; a fibrous absorbent core disposed beneath the facing layer for absorbing body fluids which pass through the facing layer; an elastomeric, wet-stable foam layer beneath the absorbent core for confining and maintaining the absorbent core in close conformity with the perineal region of the wearer, and having sufficient longitudinal and transverse dimensions for providing elasticity in regions of the diaper that are disposed about the thighs and front and back of the wearer; a moisture-impervious backing sheet beneath the foam layer for preventing fluids from striking through the diaper; and bonding means for retaining the layers of each diaper in an assembled, one-piece construction.

43 Claims, 5 Drawing Figures
1 MULTILAYER ONE-PIECE DISPOSABLE DIAPERS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to disposable diapers, and more specifically to multilayer, one-piece, disposable diapers.

2. Description of the Prior Art

Disposable diapers have become exceedingly popular in recent years. Commercially, the most successful diapers have been of a multilayer, one-piece construction, including a facing layer which is pervious to body fluids, an intermediate absorbent core for absorbing and retaining body fluids which pass through the facing layer, and a moisture-impervious backing sheet beneath the absorbent core for preventing body fluids from striking through the diaper. The absorbent cores in the most popular one-piece disposable diapers include a loosely compacted batt of wood pulp fibers.

It is well known that disposable diapers should be constructed to retain body fluids without leakage therefrom. In an effort to prevent, or minimize leakage, prior art disposable diapers include fluff cores having a weight of hydrophilic fibers that, based on theoretical calculations, is sufficient to absorb the volume of body fluids which is discharged under the specific conditions of use for which the diaper is designed, e.g., daytime, overnight, infant, toddler, geriatric etc. However, when these fluff cores become wet they become considerably weakened, and the stresses imposed on them by normal body movements of a wearer cause them to break up into clumps or rope-like elements. This breaking up of the absorbent cores causes the diapers to lose much of their fluid-retaining capability; thereby resulting in leakage of body fluids from within the confines of the diapers.

To avoid the problem of the absorbent core breaking up it has been suggested in U.S. Pat. No. 3,563,243, issued to Lindquist, to utilize a hydrophilic polymer foam layer as the primary absorbent component in place of a fibrous absorbent core. For uses in which the diaper is required to absorb a large volume of body fluids (e.g. toddler or overnight uses) a relatively heavy polymer layer is required. Such a heavy polymer layer is quite expensive, and therefore is not desirably utilized in single use products, such as disposable diapers. Moreover, the hydrophilic foams contemplated for use by Lindquist become plasticized by absorbed body fluids and this adversely affects the elastic properties of the diaper during use. This adverse affect on the elastic properties of the diaper can cause the diaper to lose its close conformity with a wearer’s torso to create gaps through which body fluids can easily escape.

Several approaches have been suggested to compensate for the loss in the fluid-retaining capability of the prior art disposable diapers which results from the inadequate conformity of the diapers to a wearer and the breaking up of the fluff cores. One approach which has been suggested, and which actually is employed in commercially available diapers, is to provide a specialty fold construction in the diaper to act as a dam for body fluids impinged within the confines thereof. This approach is illustrated in U.S. Pat. No. Re 26,151, issued to Duncan et al, and U.S. Pat. No. 3,196,874, issued to Hrubec. Another approach which has been suggested is to include foam strips on the surface of the diaper to form a gasket-like seal with the body of a wearer. This approach is illustrated in U.S. Pat. No. 3,572,342, issued to Lindquist et al. Still another approach is to include multiple tape fasteners on the diaper, at least one of the fasteners being adjacent the thigh-encircling regions of the diaper to establish a tight fit about the thighs. This approach is illustrated in U.S. Pat. No. 3,221,738.

Although some of the above-discussed approaches may be beneficial in reducing leakage, there is still a need for further improvement.

SUMMARY OF THE INVENTION

Multilayer, one-piece, disposable diapers according to this invention each include a moisture-pervious facing layer adapted to be positioned in engagement with a wearer; a fibrous absorbent core disposed beneath the facing layer for absorbing and retaining body fluids which pass through said facing layer to form an elastomeric, wet-stable foam layer disposed beneath the fibrous absorbent core for confining and maintaining said core in the peripheral region of the wearer, said foam layer having sufficient longitudinal and transverse dimensions for providing elasticity in regions of the diaper that are disposed about the thighs and front and back of the wearer; a moisture-impervious backing sheet beneath said foam layer for preventing body fluids from striking through the diaper; and bonding means for retaining the layers of each diaper in an assembled, one-piece construction.

The term “one-piece”, as used throughout this application to characterize a diaper, refers to a diaper having separate layers which are integrated into a single unit by suitable bonding means, and, with the possible exception of fastening means for retaining the diaper about a wearer’s torso, does not require the inclusion or attachment of additional components to render it usable. The bonding means for retaining the layers in a one-piece construction need not bond each layer to an adjacent layer.

The term “disposable”, as used throughout this application to characterize diapers, refers to diapers which are adapted for a single use, i.e., they are not capable of being washed and reused.

The term “elastomeric”, as used throughout this application to describe the foam layer, refers to a flexible, resilient foam layer, a 1 inch wide sample of which has the ability, at room temperature, to recover to at least 80%, and preferably to over 90%, of its original length after being gripped in opposed jaws of an Instron tensile tester which are initially spaced 2 inches apart, stretched to twice its original length (4 inches) at a jaw speed of 10 inches per minute, held in its stretched condition for 1 minute and allowed to recover for 10 minutes.

The term “wet-stable”, as used throughout this application to describe the foam layer, refers to the ability of the foam layer, after being submerged in water for twelve hours, to exhibit the above-described elastomeric property and to retain substantially the same dimensions it had when dry. For purposes of this invention the wet foam layer is considered to retain substantially the same dimensions as the dry foam layer if the length and width of the wet foam layer is less than 15% greater than the corresponding dimensions of the dry foam layer.

A multilayer, one-piece, disposable diaper of this invention is positioned about the torso of a wearer with
the foam layer thereof in a stretched, elastic condition, and the diaper is retained in this stretched, elastic condition by suitable fastening means, such as conventional tape fasteners adhered to the moisture-impervious backing sheet of said diaper. This stretched, elastic condition of the foam layer aids in establishing close elastic conformity of the diaper about the thighs and waist region of a wearer, and this close conformity will be maintained when the diaper is wet due to the wettable property of the foam layer. Establishing and maintaining this close conformity aids in preventing leakage of body fluids from the diaper during usage thereof.

The elastomeric, wet-stable foam layer, by virtue of being positioned beneath the fibrous absorbent core, will confine the absorbent core in close conformity with the perineal region of a wearer when the diaper is positioned about its torso in a stretched, elastic condition, and will function to maintain the absorbent core in its position of close conformity with the perineal region during normal usage of the diaper. In this position, the absorbent core can best receive and contain body fluids.

In a preferred embodiment of this invention the absorbent core includes a loosely compacted fibrous batt and the foam layer is wider and longer than said batt. Therefore, the foam layer confines the complete fibrous batt during usage of the diaper. This arrangement provides the best conformity of the batt within the perineal region of a wearer to thereby enhance the fluid-retaining capability of the diaper. Most preferably the foam layer has a width which is greater than one-half the width of the diaper, and a length substantially equal to the length of the diaper.

In the most preferred embodiment of the invention the fibrous batt is shaped so that a central region thereof has a lesser transverse dimension than forward and rearward regions, respectively. This shaped construction permits the batt to conform in a most optimum manner to the perineal region of a wearer. When the fibrous batt closely conforms in shape to the perineal region of a wearer it is less likely to encounter excessive stresses resulting from normal body movements. Excessive stresses imposed on the batt can cause the batt to excessively break up, and thereby lose a significant portion of its fluid-retaining capability. This loss in fluid-retaining capability results in undesirable leakage from the diaper.

The loosely compacted batt has excellent fluid-retaining capacities; however, due to the relatively large capillaries associated with the batt, it does not enhance the fluid transmission rate by readily wicking body fluids along either the transverse or longitudinal extent thereof. For some applications the enhancement of fluid transmission is not necessary, and the loosely compacted batt can constitute the entire absorbent core.

For applications wherein a likelihood of overflooding exists the absorbent core also includes a wicking layer, which may be in the form of a fibrous sheet having a greater density than the fibrous batt, disposed in engagement with the lower surface of said batt. In this embodiment urine which passes through the fibrous batt will be received and distributed by the wicking layer. If the wicking layer becomes over saturated the fluid will pass either into dry portions of the batt to effectively utilize the absorbent capacity of the batt, or into the foam layer. The foam layer is of a relatively low density having large void areas, and does not function effectively to wick body fluids which pass into it. However, the void areas do have the ability to retain some amount of urine therein, and the moisture-impervious backing layer prevents this urine from striking through the backside of the diaper.

If desired, a wicking layer can also be positioned adjacent the lower surface of the foam layer, between the foam layer and the moisture-impervious backing sheet. This wicking layer functions to wick urine which may pass through the foam layer to distribute the urine within the diaper. In the event that this wicking layer becomes over saturated the urine will be forced back through the foam layer (by virtue of its high void, low density construction) wherein it is either retained, or from where it moves into the absorbent fluff batt.

Other objects and advantages of this invention will become apparent by reading the detailed description which follows taken in conjunction with the drawings.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a partially exploded isometric view of a multilayer, one-piece, disposable diaper according to this invention;

FIG. 2, shows the diaper of FIG. 1 in an assembled and folded condition;

FIG. 3, is a sectional view along line 3—3 of FIG. 2;

FIG. 4, is a sectional view similar to FIG. 3, but showing a second embodiment of a multilayer, one-piece, disposable diaper according to this invention; and

FIG. 5 is a sectional view similar to FIG. 3, but showing a third embodiment of a multilayer, one-piece, disposable diaper according to this invention. In this Figure the sectional view terminates short of the edges so that the folded side sections of the diaper are not shown.

**DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring to FIG. 1, a preferred embodiment of a multilayer, one-piece, disposable diaper 10 of this invention includes a moisture-pervious facing layer 12; an absorbent core 14 including a loosely compacted fibrous batt 15 and a fibrous wicking layer 16 having a greater density than said fibrous batt 15; an elastomeric, wet-stable foam layer 18; and a moisture-impervious backing sheet 20.

The moisture-pervious facing layer 12 can be of any construction which permits body fluids initially impinged thereon to pass into the internal absorbent core 14. Representative facing layers which can be employed in this invention are carded rayon webs, water-wettable bonded webs of mixed long and short fibers, slitt plastic webs and laminates of paper and textile fibers. The specific construction of the facing layer 12 is not intended to be a limitation on the broadest aspects of the instant invention.

In the preferred embodiment the absorbent core 14 is the primary absorbent component i.e. it is the heaviest hydrophilic component of the diaper 10. Preferably the absorbent core 14 includes a loosely compacted fibrous batt 15 containing cellulosic fibers of a papermaking length less than one-fourth inch. The batt also can contain some longer fibers to enhance its integrity. In addition, the batt can contain various additives, as desired. For example, insoluble hydrophilic homopolymers and copolymers which form a gel upon absorption of water can be added.
Most preferably, the fibrous batt 15 is formed from 100% wood pulp fibers by directing a pulp lap, in roll or sheet form, through a fiberizer which separates the fibers from the lap, and by directing the separated fibers onto a carrier as a loosely compacted batt. One fiberizer which is commonly employed to form such a loosely compacted batt is the Joa fiberizer manufactured by Joa, Inc. of North Wales, Fla.

In the most preferred embodiment of this invention the fibrous batt 15 is shaped so that a central region 22 has a narrower transverse dimension than a forward region 24 and a rearward region 26 thereof. In the embodiment shown in FIG. 1 the fibrous batt 15 has an hour-glass shape with continuous, concavely curved side margins 28; however, other shaped configurations can be employed. The shaped fibrous batt 15 can be manufactured by employing apparatus of the type disclosed in U.S. patent application Ser. No. 237,963, filed Mar. 24, 1972, and assigned to Scott Paper Company. The subject matter relating to the formation of a shaped pad is incorporated by reference into the instant application.

The wicking layer 16 of the absorbent core 14 can be of many different constructions, such as a layer or layers of wet-formed or dry formed fibrous webs. The specific construction of the wicking layer 16 is not intended to be a limitation on the broadest aspects of the instant invention; however, the wicking layer 16 must have a sufficiently small pore size to perform its wicking function. Accordingly, in the preferred embodiment of this invention in which the fibrous batt 15 is a loosely compacted assemblage of cellulosic fibers, the wicking layer 16 has a greater density than said fibrous batt.

The elastomeric, wet-stable foam layer 18 must be sufficiently thick to retain its cellular structure; however, it should not be so thick as to impart an undesirable bulkiness to the diaper. If the foam layer is too thick, the excessive bulk in the diaper will result in an uncomfortable structure for a wearer, and also will prevent the desired conformability of the diaper to a wearer's torso. Also, the upper thickness limitation of the foam layer 18 is dictated by economic considerations. Specifically, a thick foam layer includes a greater weight of material than a thin foam layer of the same density, and accordingly is most costly to manufacture.

The elastomeric, wet-stable foam layer 18 employed in the disposable diaper 10 of this invention has a thickness in the range of from about 0.015 inches to about 0.250 inches, and more preferably, in the range of from about 0.005 inches to about 0.080 inches. The foam layer 18 has a density in the range of from about 0.5 lbs. per cubic ft. to about 10 lbs. per cubic ft., and more preferably in the range of from about 1 lb. per cubic ft. to about 2.5 lbs. per cubic ft. The lower the density of the foam layer 18, the less material that is required to form a layer of a given thickness. Accordingly, a low density foam layer contributes favorably to the economics of the disposable diapers of this invention.

The foam layer 18 must be of a cellular construction having the elastomeric, wet-stable properties described earlier in this application. Representative foams which may be employed in this invention are synthetic and natural rubber foams, vinyl foams, polyvinyl chloride foams and polyurethane foams of both the polyester and polyether type.

The preferred elastomeric, wet-stable foam layer 18 employed in this invention is formed from polyester of polyether polyurethane foam. The polyurethane foams can be either hydrophobic or hydrophilic, the only requirement being that they be both elastomeric and wet-stable. The hydrophilic polyurethane foams are most preferred because they are less expensive than the hydrophobic polyurethane foams.

The moisture-impervious backing sheet 20 can be formed of any of the well known materials employed as backing sheets in disposable diapers. For example, the moisture-impervious sheet 20 can be a relatively thin sheet having a thickness of approximately 0.001 inches to about 0.002 inches, and formed from suitable plastics such as polyethylene or polypropylene. The specific material from which the backing sheet 20 is formed is not intended to be a limitation on the broadest aspects of the instant invention; however, the backing sheet 20 should be moisture-impervious to prevent body fluids from striking through the diaper.

Referring to FIGS. 1 and 3, the absorbent core 14 is disposed in overlying relationship with the elastomeric, wet-stable foam layer 18. Preferably, the foam layer 18 has side margins 30 which extend beyond the side margins 28 of the fibrous batt 15 of the absorbent core 14 to completely confine said fibrous batt when the diaper 10 is placed about the torso of a wearer.

Referring to FIG. 3, the moisture-impervious backing sheet 20 is adhered to both the foam layer 18 and the infolded side panels 12 of the facing layer 12 along spaced longitudinally extending adhesive lines 32. In this manner the components of the diaper 10 are retained in an assembled one-piece construction. When the disposable diaper 10 is stretched about the torso of a wearer, by engaging pressure sensitive adhesive tapes 34 (FIGS. 1 and 2) which are attached to the backing sheet 20, the stretching forces imposed on said moisture-impervious backing sheet will be transmitted to the foam layer 18 through the adhesive lines 32 and the frictional engagement between the backing sheet and the foam layer to thereby stretch the foam layer 18. In this manner the multilayer, one-piece, disposable diaper 10 is placed about the torso of a wearer with the foam layer 18 in a stretched, elastic condition. The foam layer 18, by virtue of being elastomeric, has a memory for its unstretched condition, and accordingly, will conform to the thigh and waist regions of a wearer to provide a well fitting garment about its torso. Moreover, due to the elastomeric property of the foam layer 18, the diaper 10 will readily conform to the perineal region of the wearer, and thereby confine the fibrous batt 15 of the absorbent core 14 in close conformity with the perineal region so that it will be in proper position for receiving body fluids as they pass through the facing layer 12.

In the most preferred embodiment of this invention, as indicated earlier in this application, the fibrous batt 15 is of a reduced width as compared to the width of the diaper 10, and is shaped to provide a central region 22 which is narrower than forward and rearward regions 24 and 26, respectively. This construction of the fibrous batt 15 has been found to be most suitable for conforming to the perineal region of a wearer without encountering excessive stresses during use of the diaper which could cause the fibrous batt to excessively break up into clumps, or rope-like elements, and thereby lose a significant amount of its fluid-retaining capability.

Referring to FIGS. 1 and 3, the foam layer 18 extends for substantially the full longitudinal and transverse extents of the disposable diaper 10. Accordingly, when
the diaper 10 is double-pleat folded at opposed side margins along fold lines 36, 38, 40 and 42, the foam layer is included in the inner panels 44 and 46, and in the outer panels 48 and 50 of said folds. Both the inner and outer panels are adapted to encircle the thighs of a wearer, and accordingly, the stretched foam layer aids in maintaining the diaper 10 in close conformity with the thighs. In addition, the foam layer 18 will circumscribe the waist region of the wearer in a stretched condition to establish excellent elastic conformity therewith.

Referring to FIG. 4, a second embodiment of a multi-layer, one-piece, disposable diaper 10A is shown in which an elastomeric foam layer 18A, is identical to foam layer 18, but terminates short of the transverse ends of the diaper. In this embodiment the foam layer 18 is included only in the inner panels 44 and 46 of the double-pleat folds; however, these inner panels are adapted to encircle the thigh regions of wearer, and accordingly, the foam layer 18A has a sufficient transverse dimension for closely conforming to the thighs of a wearer. In all other respects the disposable diaper 10A is identical to the disposable diaper 10 disclosed in FIGS. 1–3.

Referring to FIG. 5, a third embodiment of a multi-layer, one-piece, disposable diaper 10B is shown. The diaper 10B includes a wicking layer 60 disposed between the foam layer 18 and the backing sheet 20. This wicking layer 60 functions to distribute the urine which may pass into it through the absorbent core 14, the wicking layer 16 and the foam layer 18. In the event that the lower wicking layer 60 becomes over saturated the urine will be forced upwardly into the capillary structure of the foam layer 18, wherein the urine can be retained. The urine is confined against passage through the backing sheet 20 due to its moisture-impermeable property.

The backing sheet 20 in the disposable diaper 10B is connected to the foam layer 18 by adhesive lines 32B. The adhesive lines 32B underlying the wicking layer 60 can strike through the wicking layer to adhere to the foam layer 18; however, this construction is optional. Several modifications of the disposable diapers described above are considered to be within the scope of this invention. First, it is within the scope of the invention to omit one or both of the wicking layers 16 and 60. In some uses of a disposable diaper the ultimate absorptive capacity of the diaper may be more important than its rate of absorption. For such uses it may be desired to include a greater weight of loosely compacted fibrous material in the fluff batt 15 to replace the weight of fibers contributed by the wicking layer(s). In an overnight diaper for a very small infant, for example, the total discharge of several voidings may make added absorptive capacity desirable while the rate of discharge in any one voiding may not be so great as to tax the absorption rate of the loosely compacted batt. Accordingly, for such a use it is not necessary to include a wicking layer to aid in distributing the flow of urine.

Secondly, although the densified wicking layers 16 and 60 are shown as extending for less than the full transverse extent of the diaper, it is within the scope of this invention to employ wicking layer(s) of a larger transverse dimension. However, when wicking layer 16 is employed as part of the absorbent core 14 it should underlie the entire fibrous batt 15 to both aid in supporting the batt and in distributing the urine. When the wicking layer 16 extends to the side and/or end margins of the diaper, said wicking layer should be of a capillary structure which will not wick an excessive quantity of urine to the boundaries of the diaper to create a leakage problem.

The particular manner in which the diaper is folded is not considered to be a critical limitation on the broadest aspects of this invention; however, combining the structural elements of this invention with the double-pleat folds described earlier is considered to be most desirable. It is contemplated that the diaper could be sold without the side margins thereof being folded in any manner.

Although less preferred, it is within the scope of this invention to provide an absorbent core 14 including a loosely compacted fibrous batt which is substantially rectangular, and which extends for the full transverse extent of the unstretched, elastomeric, wet-stable foam layer 18. Even in this construction the stretching of the diaper, including the foam layer 18 therein, about the torso of an infant tends to confine the fibrous batt in the perineal region of the wearer by virtue of the elastomeric property of the foam and the natural pleating of the diaper which takes place in the perineal region. However, a substantially rectangular fibrous batt, as described above, may be subjected to excessive forces resulting from the normal body movements of a wearer to thereby cause the batt to excessively break up into clumps or rope-like elements, and thereby lose a significant portion of its fluid-retaining ability.

The particular dimensions of the multilayer, one-piece, disposable diapers of this invention will vary depending upon the intended use of the diaper, i.e., infant, toddler, daytime, overnight, geriatric, etc. However, by way of illustration, a representative multilayer, one-piece, disposable diaper according to this invention, and intended for daytime use, has a transverse dimension of 12½ inches and a longitudinal dimension of 17 inches. The moisture-impermeable backing sheet 20 has the same dimensions as the diaper, and the moisture-impermeable facing layer 12 has a slightly greater transverse dimension so that end margins 12' thereof can be folded inwardly between the foam layer 18 and the moisture-impermeable backing sheet 20 and bonded to the backing sheet (FIG. 1). The foam layer 18 has the same dimensions as the diaper, and is positioned in engagement with the moisture-impermeable backing sheet 20, except for the transverse ends thereof which are separated from the backing sheet 20 by the end margins of the folded end portions 12' of the moisture-permeable facing layer 12. The absorbent core 14 includes a loosely compacted fibrous batt 15 which has a substantially hour-glass shape in which the central region is 4 inches wide and the forward and rearward end regions are 6½ inches wide. The fibrous batt 15 is 13 inches long, and is positioned in the center of the disposable diaper on top of a wicking layer 16 having the same transverse and longitudinal dimensions as the diaper. The diaper is double-pleat folded as shown in FIGS. 2–4 along fold lines 38 and 40 which are 4 inches inwardly of the side margins of the diaper, and along fold lines 36 and 42 which are 2 inches inwardly from the side margins of the diaper. Accordingly, each of the panels of each of the double-pleat folds is approximately 2 inches wide, and the central, unfolded region of the diaper is approximately 4½ inches wide.

The diaper described in the preceding paragraph can include the following weights of components:
Preferably the fibrous batt 15 of the absorbent core 14 is the heaviest hydrophilic component of the diaper.

Having described our invention we claim the following:

I. A multilayer, one-piece, disposable diaper including:
A. a moisture-pervious facing layer adapted to be positioned in engagement with a wearer;
B. an absorbent core containing hydrophilic fibers disposed beneath said facing layer for absorbing and retaining body fluids which pass through said facing layer;
C. an elastomeric, wet-stable foam layer beneath said absorbent core for confining and maintaining the absorbent core in the perineal region of the wearer, said foam layer having sufficient longitudinal and transverse dimensions for providing elasticity in regions of the diaper that are disposed about the thighs and front and back of the wearer;
D. a moisture-impervious backing sheet beneath said foam layer; and
E. bonding means for retaining the components of the disposable diaper in an assembled, one-piece construction.

2. The disposable diaper according to claim 1, wherein the absorbent core is the heaviest hydrophilic component.

3. The disposable diaper according to claim 1, including double-pleat folds at each side margin thereof.

4. The disposable diaper according to claim 1, wherein said bonding means includes adhesive bonds adhering the backing sheet to the foam layer in spaced apart regions.

5. The disposable diaper according to claim 4, including pressure sensitive adhesive tabs secured to the backing sheet for use in retaining the diaper about the torso of a wearer.

6. The disposable diaper according to claim 1, including a fibrous wicking layer disposed between the foam layer and backing sheet.

7. The disposable diaper according to claim 6, wherein said bonding means includes adhesive bonds adhering the backing sheet to the foam layer.

8. The disposable diaper according to claim 7, including pressure sensitive adhesive tabs secured to the backing sheet for use in retaining the diaper about the torso of a wearer.

9. The disposable diaper according to claim 1, wherein said foam layer has a thickness in the range of from about 0.015 inches to about 0.250 inches and a density in the range of from about 0.5 lbs. per cubic ft. to about 10 lbs. per cubic ft.

10. The disposable diaper according to claim 9, wherein said foam layer has a thickness in the range of from about 0.015 inches to about 0.080 inches and a density in the range of from about 1.0 lbs. per cubic ft. to about 2.5 lbs. per cubic ft.

11. The disposable diaper according to claim 1, wherein said absorbent core includes a loosely compacted fibrous batt and the foam layer is wider and longer than said batt.
31. The disposable diaper according to claim 29, wherein said bonding means includes adhesive bonds adhering the backing sheet to the foam layer in spaced apart regions.

32. The disposable diaper according to claim 31, including pressure sensitive adhesive tabs adhered to the backing sheet for use in retaining the diaper about the torso of a wearer.

33. The disposable diaper according to claim 32, wherein said absorbent core also includes a fibrous wicking layer having a greater density than said fibrous batt and disposed adjacent a bottom surface of said batt.

34. The disposable diaper according to claim 33, including a second fibrous wicking layer having a greater density than said fibrous batt disposed between the foam layer and the backing sheet.

35. A multilayer, one-piece, disposable diaper including:
   A. a moisture-pervious facing layer adapted to be positioned in engagement with a wearer;
   B. an absorbent core containing hydrophilic fibers disposed beneath said facing layer for absorbing and retaining body fluids which pass through said facing layer;
   C. an elastomeric, wet-stable foam layer beneath said absorbent core for confining and maintaining the absorbent core in the perineal region of the wearer, said foam layer being wider than said absorbent core and having sufficient longitudinal and transverse dimensions for providing elasticity in regions of the diaper that are disposed about the thighs and front and back of the wearer;
   D. a moisture-impervious backing sheet beneath said foam layer; and
   E. bonding means for retaining the components of the disposable diaper in an assembled, one-piece construction.

36. The disposable diaper according to claim 35, wherein said foam layer is hydrophobic.

37. The disposable diaper according to claim 35, wherein said absorbent core includes a loosely compacted batt of absorbent fibers and a fibrous wicking layer contiguous to a bottom surface of said batt and having a greater density than said batt.

38. The disposable diaper according to claim 37, wherein the loosely compacted batt is of a shaped construction having a central region which is narrower than forward and rearward regions thereof.

39. A multilayer, one-piece, disposable diaper including:
   A. a moisture-pervious facing layer adapted to be positioned in engagement with a wearer;
   B. an absorbent fibrous core predominately of hydrophilic fibers, said absorbent core being disposed beneath said facing layer for absorbing and retaining body fluids which pass through said facing layer;
   C. an elastomeric, wet-stable foam layer beneath said absorbent core for confining and maintaining the absorbent core in the perineal region of the wearer, said foam layer having sufficient longitudinal and transverse dimensions for providing elasticity in regions of the diaper that are disposed about the thighs and front and back of the wearer;
   D. a moisture-impervious backing sheet beneath said foam layer; and
   E. bonding means for retaining the components of the disposable diaper in an assembled, one-piece construction.

40. The disposable diaper according to claim 39, wherein said fibrous absorbent core has a narrower transverse dimension than that of the foam layer.

41. The disposable diaper according to claim 40, wherein said foam layer is hydrophobic.

42. The disposable diaper according to claim 41, wherein said absorbent core includes a loosely compacted batt of absorbent fibers and a fibrous wicking layer contiguous to a bottom surface of said batt and having a greater density than said batt.

43. The disposable diaper according to claim 42, wherein said loosely compacted batt is of a shaped construction having a central region which is narrower than forward and rearward regions thereof.

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UNIVERS STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,916,900 Dated November 4, 1975

Inventor(s) Walter Herman Breyer et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 22, "peripheral" should read --perineal--
Column 5, line 68, "of" should read --or--
Column 10, line 16, "claima" should read --claim--

Signed and Sealed this fourth Day of May 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks