# United States Patent

[11] 3,602,224



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[54] **PREFOLDED AND SEWN DIAPER AND FABRIC THEREFOR HAVING IMPROVED WEAR-RESISTANCE AND MOISTURE-HOLDING CHARACTERISTICS**
**4 Claims, 5 Drawing Figs.**


[52] **U.S. Cl.** ..... **128/284**
[51] **Int. Cl.** ..... **A61f 13/16**
[50] **Field of Search** ..... 128/284



[56] **References Cited**

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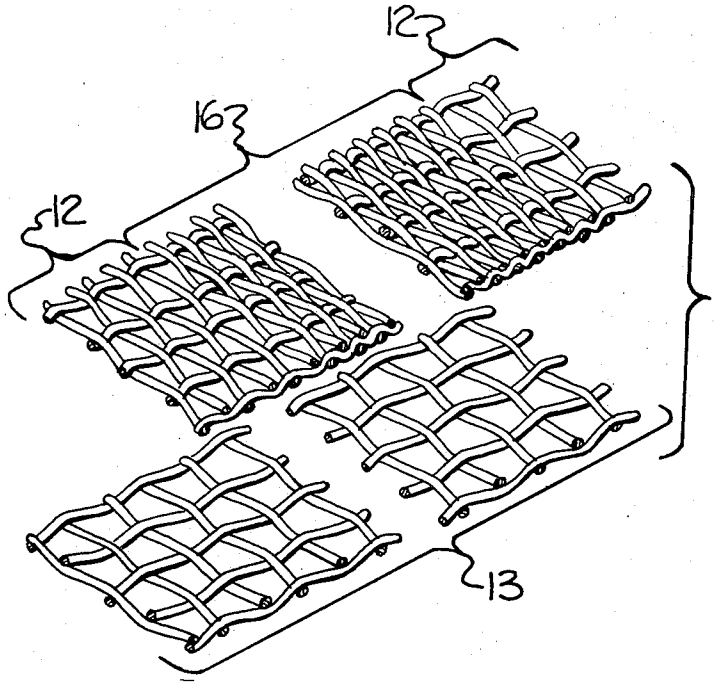
**ABSTRACT:** A prefolded and sewn diaper and fabric therefor comprising at least two plies of material characterized by providing increased fabric density and a less open construction than conventional gauze diaper material for increased wear resistance in a first one of the plies and providing less fabric density and a more open construction than conventional gauze diaper material for increased moisture-holding characteristics in a second one of the plies. The diaper and fabric therefor preferably includes two spaced-apart warpwise extending strips in the first ply of material which have a greater fabric density and a less open construction for increased wear resistance than the remaining portion of the first ply and are so located as to form the outside folded edges of the prefolded and sewn diaper for combating wear therealong.

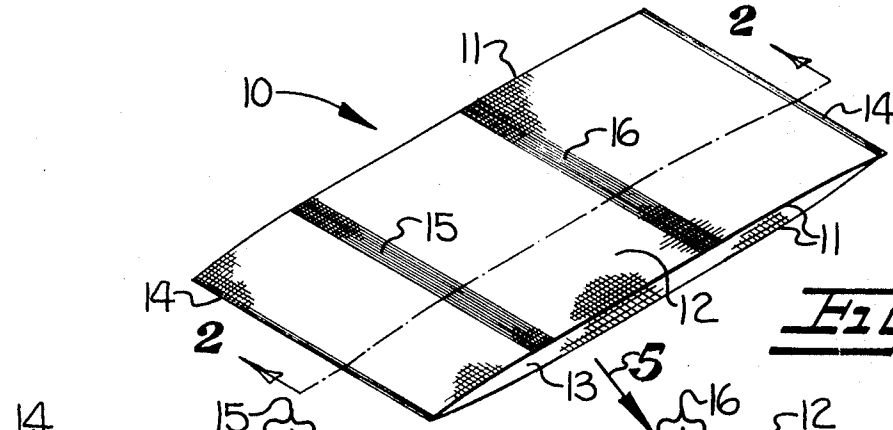



Fig-1


Fig-2

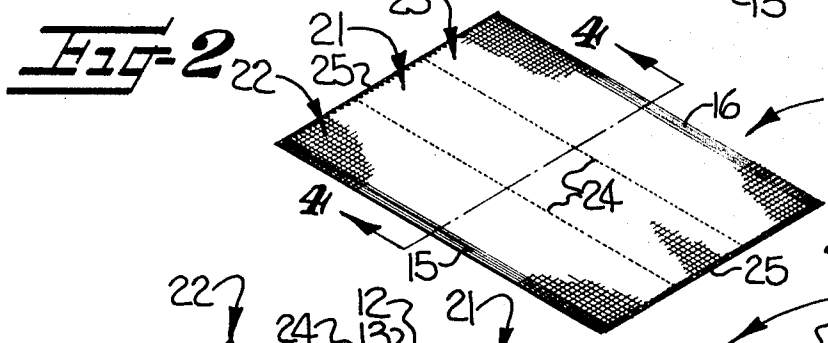



Fig-3

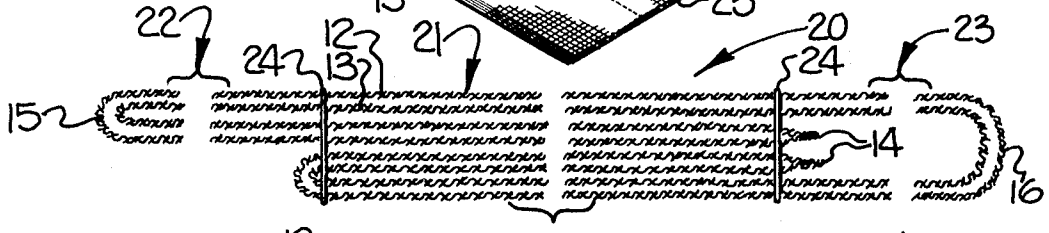



Fig-4

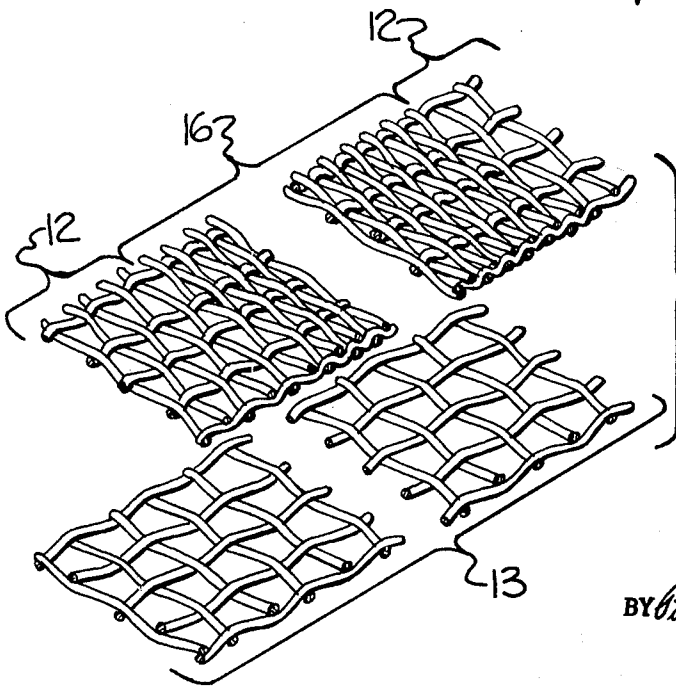



Fig-5

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# PREFOLDED AND SEWN DIAPER AND FABRIC THEREFOR HAVING IMPROVED WEAR-RESISTANCE AND MOISTURE-HOLDING CHARACTERISTICS

This invention relates to improved prefolded and sewn diapers and the fabric therefor which comprises two plies of material in which one of the plies provides increased wear resistance and the other of the plies provides increased moisture-holding characteristics.

In the commercial laundry or diaper service trade, prefolded diapers are normally preferred and may be of varying constructions. Usually, these prefolded diapers are formed of gauze diaper fabric of multi-ply construction and are cut transversely to the desired size and folded to form a generally rectangular diaper with a multilayer center panel and side panels thereon. These folded diapers are secured in the folded condition by stitching extending longitudinally of the folded diapers and overedge stitching is normally utilized along the cut edges of the folded diaper to prevent the same from raveling.

While these prefolded diapers have enjoyed considerable success, certain problems of wear resistance along the outside surface thereof and moisture-holding qualities in the internal layers thereof have been presented. Heretofore, attempts have been made to overcome these problems by providing a diaper fabric having varying density portions in each ply of the diaper fabric in an attempt to provide increased wear resistance in certain portions of the diaper along with increased moisture-holding characteristics in other portions of the diaper.

However, these attempts have not been entirely satisfactory inasmuch as the weave patterns for these diapers have been extremely complicated and the diapers were necessarily difficult and more expensive to manufacture. Also, these constructions did not provide the desirable wear resistance throughout the outside surface of the prefolded and sewn diapers.

Accordingly, it is the object of this invention to provide a prefolded and sewn multi-ply diaper and the fabric therefor in which the wear resistance throughout the outside surface of the prefolded and sewn diaper and the moisture-holding characteristics of the internal layers of the prefolded and sewn diaper are greatly enhanced, while providing a simple, uncomplicated construction for the diaper fabric.

According to this invention, the above object has been accomplished by providing a diaper fabric adapted to be cut, prefolded and sewn to form diapers having a multilayer center panel and side panels on each side thereof, wherein the diaper fabric comprises a multi-ply material having common selvage edges at each end thereof joining the plies of material together. A first one of the plies of material has a greater fabric density and a less open construction throughout than conventional gauze diaper material for providing increased wear resistance. A second one of the plies has less fabric density and a more open construction throughout than conventional gauze diaper material for providing increased moisture-holding characteristics. The first ply of material is adapted to form the outside layer of the prefolded and sewn diaper for combating wear during normal use thereof and the second ply is adapted to form inside layers of the prefolded and sewn diaper for providing moisture-holding characteristics internally of the diaper.

The above characteristics of the two plies of material in the diaper are preferably obtained by utilizing for the greige goods a warp end count in the first ply of material which is greater than a conventional range of 37–39 and desirably within the range of about 40–64, and a warp end count in the second ply of material which is less than a conventional range of 37–39 and desirably within the range of 16–36. Also, preferably, the first ply of material in the diaper fabric includes two spaced-apart warpwise extending strips therein having a greater fabric density and a less open construction for increased wear resistance than the remaining portions of the first ply and desirably within the range of 66–90. These strips are so located as to form the outside folded edges of the prefolded and sewn diaper for combating wear therealong.

It is also preferred in the above-described diaper construction that the increased fabric density and less open construction in the first ply and less fabric density and more open construction in the second ply be obtained while retaining a combined fabric density, weight, warp end count and filling pick count along with yarn sizes, etc., for both plies within the ranges of conventional gauze diapers.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of the improved multi-ply woven gauze diaper material of this invention cut from a continuous web of such material;

FIG. 2 is an enlarged cross-sectional view of the diaper material of FIG. 1 taken substantially along the line 2—2 of FIG. 1;

FIG. 3 is a perspective view of a prefolded and sewn diaper formed from the diaper material of FIG. 1;

FIG. 4 is an enlarged cross-sectional of the prefolded and sewn diaper of FIG. 3 taken substantially along the line 4—4 of FIG. 3; and

FIG. 5 is an enlarged partial perspective detail of one end of the fabric of FIG. 2 and taken substantially at the arrow 5 in FIG. 2.

Referring now to the drawings, there is shown in FIGS. 1 and 2 diaper material or a diaper blank 10 constructed according to this invention and which has been cut in a desired length from a continuous web of such material along opposed cut edges 11. This diaper material 10 comprises two plies 12 and 13 of plain woven gauze diaper material which are interwoven at opposed selvage edges 14.

The first ply of material 12 preferably includes two spaced-apart warpwise extending wear strips 15 and 16 therein, the construction of which and the purpose of which will be described more fully hereinafter.

The diaper material 10 is folded ad secured to form the prefolded and secured diaper 20, shown in FIGS. 3 and 4. The specific type of fold utilized in the drawings to form the prefolded diaper 20 may be seen clearly in FIG. 4 and inasmuch as the fold constitutes a conventional fold utilized in prefolded diapers, further explanation herein is deemed unnecessary.

As may be seen in FIGS. 3 and 4, the prefolded and secured diaper 20 defines a multilayer center panel 21 and side panels 22 and 23 on each side thereof. The prefolded diaper is secured in place by longitudinal lines of stitching 24, as indicated in FIGS. 3 and 4. Normally, overedge stitching 25 is utilized along the cut edges 11 of the prefolded and sewn diaper to prevent raveling therealong. As will be noted in FIGS. 3 and 4, the wear strips 15 and 16 are so located in the diaper material 10 as to form the outside folded edges of the prefolded and sewn diaper 20 for combating wear therealong, as will be explained more fully hereinafter.

While the above folded and sewn diaper is exemplary of a suitable fold utilized in forming prefolded and sewn diapers, it is to be understood that other folds could also be utilized and this invention is not intended to be limited by the specific fold shown in the drawings.

The diaper material or unfolded diaper blank 10 of this invention is specifically characterized by providing increased fabric density and a less open construction than conventional gauze diaper material in the first ply of material 12 for increased wear resistance in that ply, and providing less fabric density and a more open construction than conventional gauze diaper material in the second ply of material 13 for increased moisture-holding characteristics in that ply. The above characteristics are obtained while retaining a combined fabric density, weight, warp end count and filling pick count for both of the plies of material 12 and 13 within the ranges of conventional gauze diapers.

Conventional gauze diaper material is generally constructed of a plain weave construction and in the greige goods has a warp end count within a range of about 37–39, a filling pick count within a range of about 18–44 and yarn numbers of about 20–40 in the warp and about 20–40 in the filling, resulting in a fabric weight within a range of about 3.00–4.50 yards per pound. Prefolded diapers formed from the above conventional gauze diaper material and from the improved fabric of this invention usually have a standard width of about 40 inches and a standard length of 21 inches prior to being folded and a width of about 14.50 inches and a length of about 21 inches after being prefolded and sewn.

However, the characteristics of increased fabric density and less open construction for the first ply **12** and the less fabric density and more open construction for the second ply **13** are obtained in this invention by varying the warp end count in each of these two plies. Surprisingly, it has been found that if the warp end count for the first ply of material **12** is within a range of 40–64 and preferably about 48, which is above the conventional warp end count of 37–39 for gauze diaper material, the resulting ply **12** will have an increased fabric density and a less open construction throughout than conventional diaper material which will provide increased wear resistance for that ply. Also, if the second ply of material **13** has a warp end count withing the range of 16–36 and preferably about 26, which is below the conventional range of 37–39 for gauze diaper material, the resulting ply **13** will have less fabric density and a more open construction throughout than conventional gauze diaper material for providing increased moisture-holding characteristics.

These increased moisture-holding characteristics are provided by having less yarns or fibers per unit volume warp material allowing space for the moisture to be held within the more open, less dense fabric. This increased moisture holding acts much like a screen when water is sprayed thereon and drops or puddles of water are retained within the interstices between the screen.

The wear strips **15** and **16** in the first ply **12** of material preferably have a warp end count within the range of 66–90 and desirably about 78 so that these wear strips will have an even greater density and less open construction than the remaining portions of the first ply **12** or the second ply **13** so as to provide even more wear resistance in these strips which will form the outer folded edges of the prefolded and sewn diaper **20**, as discussed above.

These wear strips **15** and **16** are preferably about 2 inches in width and provide the further advantage of hiding any differential shrinkage which may occur between the first and second plies **12** and **13** in the prefolded and sewn diaper **20** due to the varying densities and constructions of each ply and inasmuch as the density and less open construction of these wear strips will prevent observation of the greater shrinkage which might occur in the less dense, more open ply **13** and provide increased thickness at the folded edges. These varying densities and varying openness of construction may be clearly seen in FIG. **5**.

Thus, it may be seen that by this invention a simple weave construction for a multi-ply diaper fabric has been utilized which will provide increased wear resistance throughout the outside surface of a prefolded and sewn diaper constructed from such material and will provide increased moisture-holding characteristics for the internal layers of the diaper. This is clearly shown in FIG. **4** wherein the first ply of material **12** is shown as forming all of the outside surfaces of the prefolded and sewn diaper **20**, whereas the second ply of material **13** is shown as forming internal layers of the diaper only.

In the drawings and specification, there has been set forth a preferred embodiment of this invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

We claim:

**1.** A woven prefolded and sewn diaper having a multilayer center panel and side panels on each side thereof and being formed from an unfolded diaper blank comprising two plies of material superimposed on each other and extending throughout the length and width of said diaper blank and having opposed selvage edges joining said plies together and opposed cut edges, said unfolded diaper blank being characterized by providing increased fabric density and a less open construction than conventional gauze diaper material in a first one of said plies for increased wear resistance and providing less fabric density and a more open construction than conventional gauze diaper material in the second of said plies for increased moisture-holding characteristics while retaining a combined fabric density, weight, warp end count and filling pick count for both said plies within the ranges of conventional gauze diapers, said first ply of material having a warp end count throughout greater than a conventional range of 37–39 for providing the aforesaid characteristics, said second ply of material having a warp end count throughout less than a conventional range of 37–39 for providing the aforesaid characteristics, and said diaper blank being folded in such a manner so that said first ply of material forms the entire outside surface of said prefolded and sewn diaper for combating wear therealong and said second ply of material forms inside layers of said prefolded and sewn diaper for providing greater moisture-holding characteristics internally thereof.

**2.** A woven prefolded and sewn diaper, as set forth in claim **1**, in which said first ply of material has a warp end count within a range of 40–64 and said second ply of material has a warp end count within a range of 16–36.

**3.** A woven prefolded and sewn diaper, as set forth in claim **1**, in which said first ply of material includes two spaced-apart warpwise extending strips therein having a greater fabric density and a less open construction for increased wear resistance than the remaining portion of said first ply, said strips being so located as to form outside folded edges of said prefolded and sewn diaper for combating wear therealong.

**4.** A woven prefolded and sewn diaper, as set forth in claim **3**, in which said first ply of material has a warp end count within a range of 40–64, said second ply of material has a warp end count within a range of 16–36, and said strips in said first ply have a warp end count within a range of 66–90.

# UNITED STATES PATENT OFFICE
# CERTIFICATE OF CORRECTION

Patent No. 3,602,224 Dated August 31, 1971

Inventor(s) Donald M. Abee and Arther M. Pressley

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

As the printed numbers do not correspond with actual line count, we have used and the following line numbers refer to actual lines in the columns of the patent.

Column 1, line 59 .. after "diaper" insert --fabric--
Column 2, line 23 .. after "sectional" insert --view--
line 39 .. "ad" should be --and--
Column 3, line 25 .. "withing" should be --within--
line 32 .. after volume, delete "warp" and insert --of--.

Signed and sealed this 22nd day of February 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

SGLjr:bjd
1553/145
10-5-1971



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