

[54] **SANITARY PAD AND METHOD OF MANUFACTURE**

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

[58] Field of Search **128/284, 286, 287, 290, 128/296; 19/144-144.5; 156/213, 216, 196**

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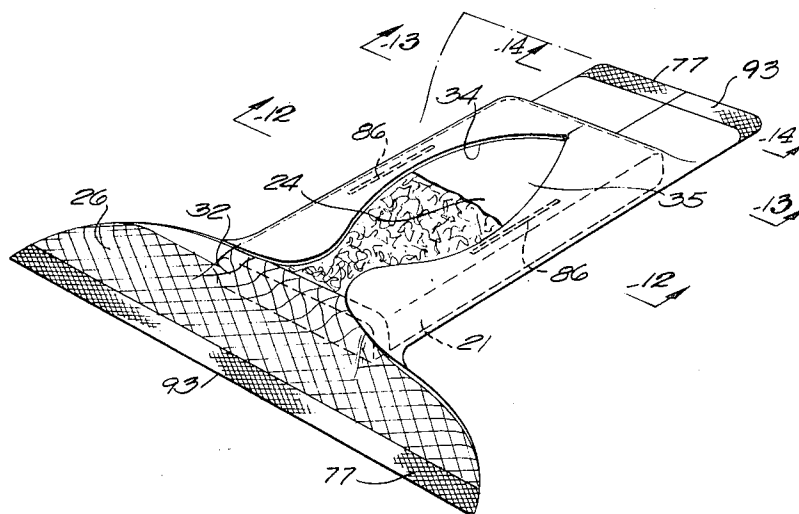
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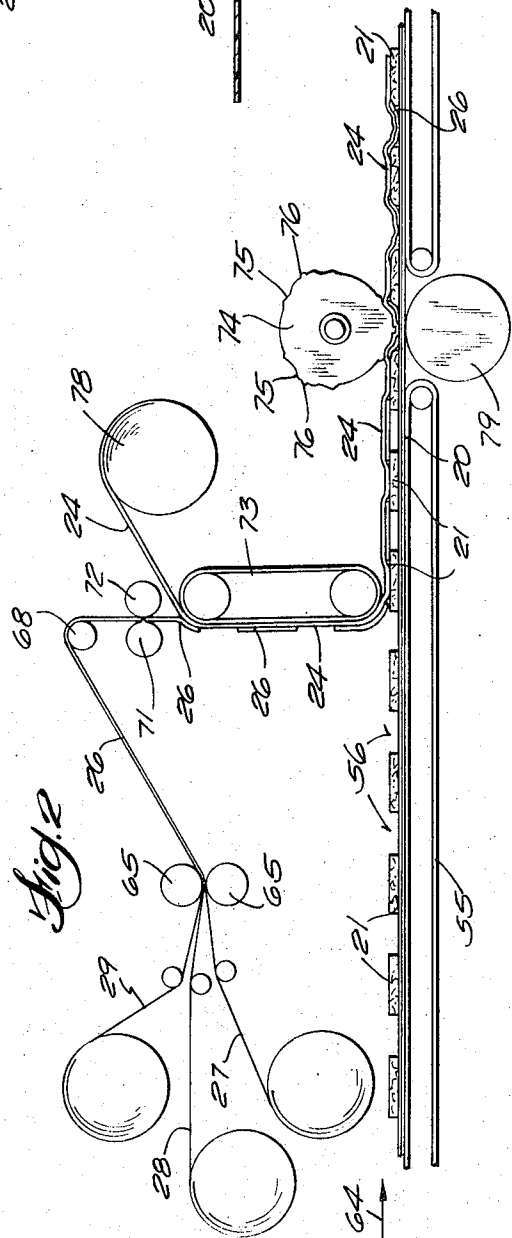
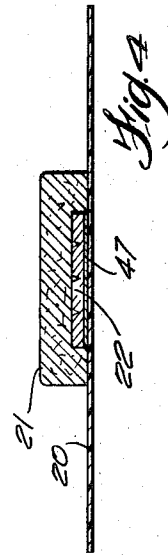
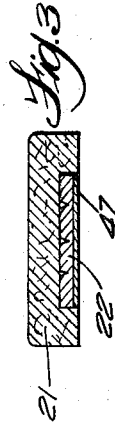
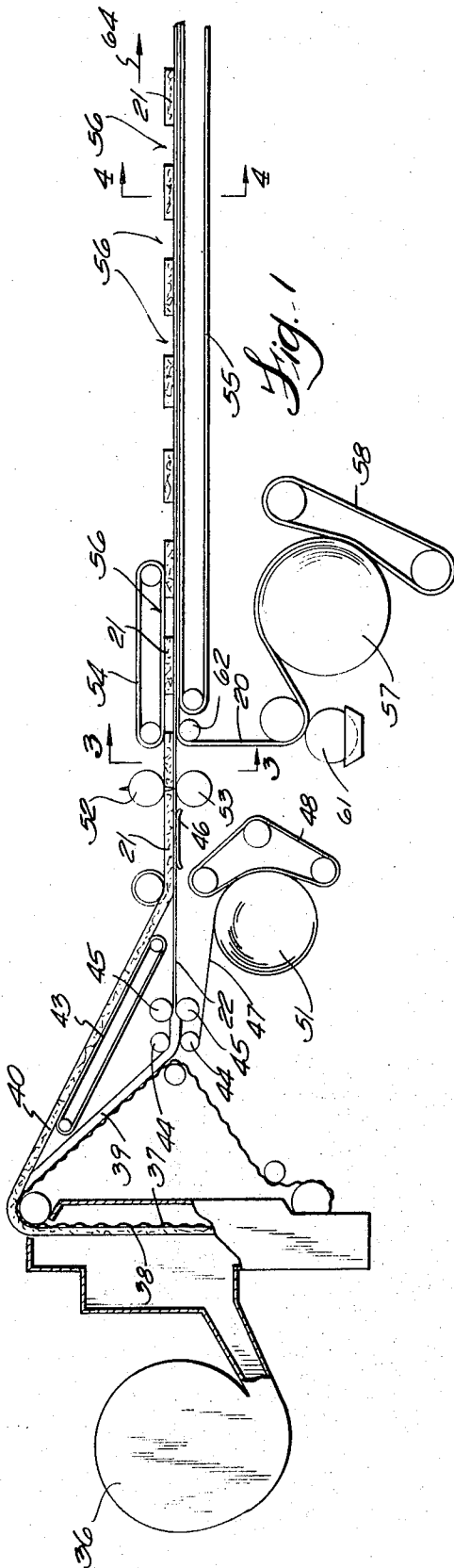
Primary Examiner—Charles F. Rosenbaum
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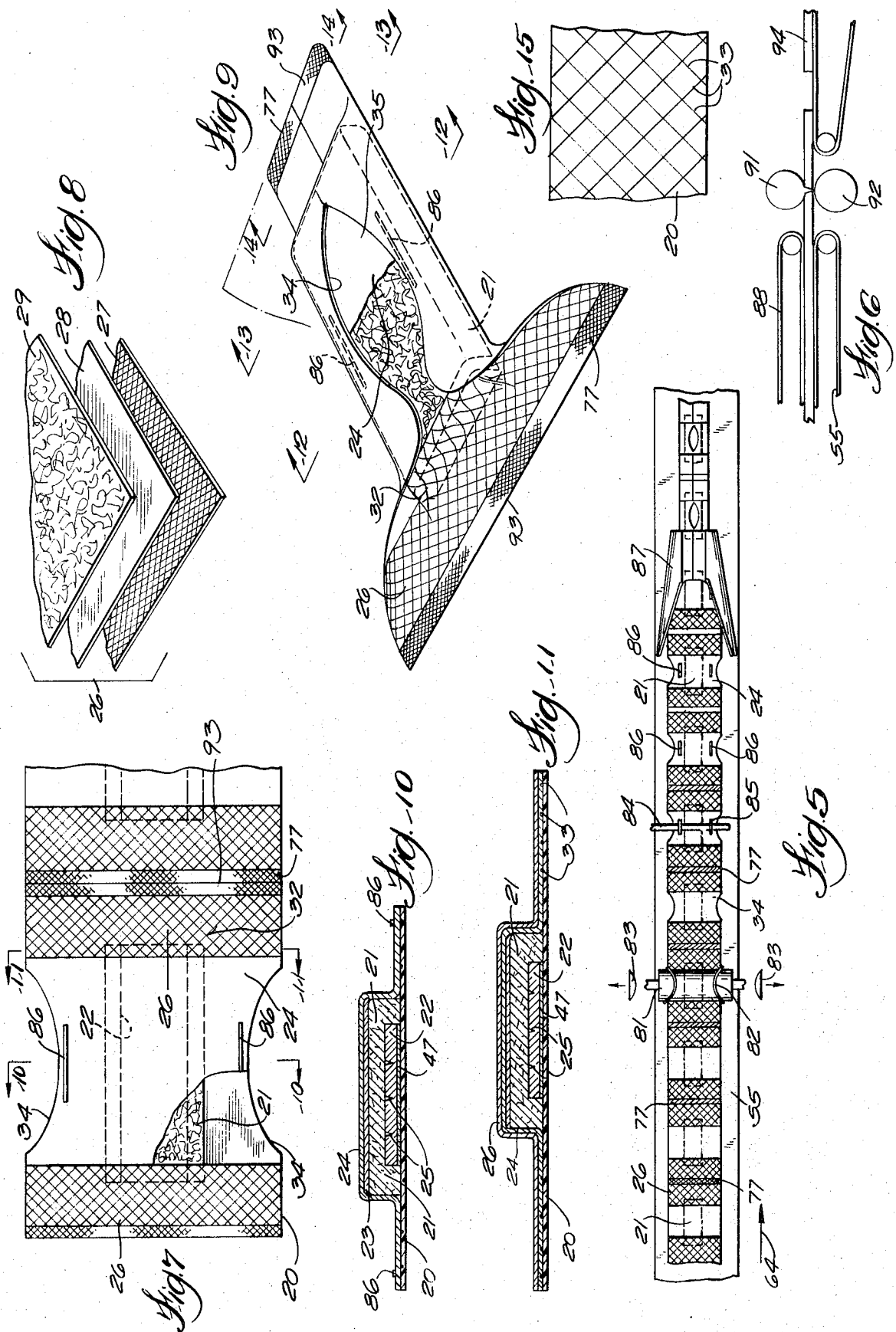
[57] **ABSTRACT**

A sanitary pad, such as a baby diaper, and method for its fabrication. The pad comprises a base panel with an exposed outermost waterproof backing. A central filler pad of multiple layer absorbent material, one of which is highly compressed, is located on the base panel in inwardly spaced relation to the side and end edges of the base panel. Reinforcing strips are overlaid at the ends of the base panel and are laminated thereto. Portions of the strips adjacent the ends of the filler pad are formed into pockets into which the ends of the filler pad fit to anchor the filler in its central location. The reinforcing strips include a plastic ply to provide a barrier to prevent leakage endwise from the pad and function as attaching bands to hold pins, tape, etc., by which the pad is secured in place on the body. The strips also serve to provide a media to make an effective end seal between the several layers of material at the ends of the pad.

6 Claims, 15 Drawing Figures







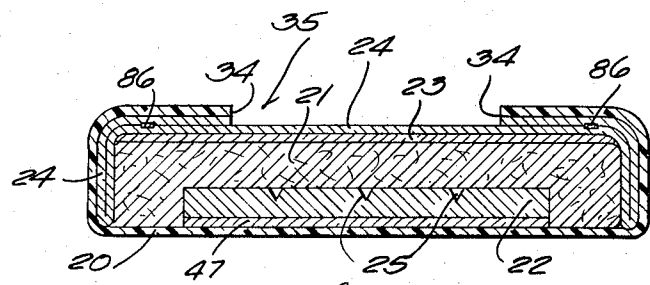


Fig. 12

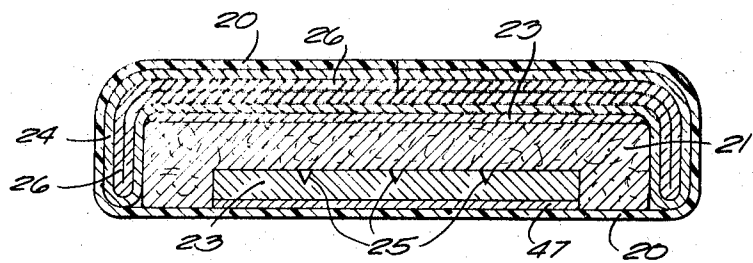


Fig. 13

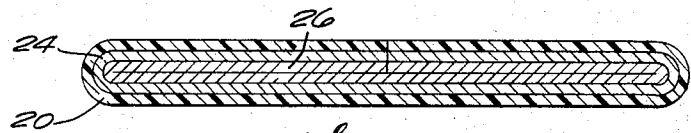


Fig. 14

SANITARY PAD AND METHOD OF MANUFACTURE

SUMMARY OF THE INVENTION

In accordance with the present invention, a sanitary pad, such as a baby diaper, is provided in which the great bulk of absorbent material is located at the central portion of the pad where it is most advantageously located for maximum utility. Side margin pad portions about the central portion are folded inwardly about the central pad. When unfolded, these constitute attaching and handling bands.

An important feature of the pad relates to the provision for reinforcing strips which are disposed crosswise at the ends of the base panel to reinforce the attaching bands and provide a strong base for pins or tape. Portions of the strips adjacent the ends of the filler pad comprise pockets into which the ends of the filler pad fits, thus to help locate and anchor the filler pad in position and prevent endwise leakage.

The filler pad desirably comprises fluffed pulp or like absorbent material and includes a mat of densified or compressed pulp at the side of the pad away from the body. This mat functions to enhance the flow of liquids longitudinally of the pad and also draws the liquids away from the side of the pad which is toward the body, thus to keep the pad portions in body contact relatively dry, until the pad becomes completely soaked. This densified mat layer is somewhat stiffer than the fluffed pulp ply. Accordingly, it is desirably provided with longitudinal grooves to render it flexible.

The method of fabricating the pad includes the steps of depositing the filler pads in end-to-end spaced relation on a continuous strip of base panel material, thus to leave gaps therebetween. The reinforcing strips are then deposited crosswise in the gaps between the filler pads and in overlapping relation to the ends of the adjacent filler pads to form pockets for the filler pad ends. The reinforcing strips are heat sealed or are similarly secured to the base panel to anchor all parts in assembled relationship.

Other objects, features and advantages of the invention will appear from the following disclosure.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary and diagrammatic side view of apparatus for performing the method of the invention and to produce pads embodying the invention.

FIG. 2 is a continuation of the apparatus shown in FIG. 1.

FIG. 3 is a cross section through the line 3—3 of FIG. 1.

FIG. 4 is a cross section taken through the line 4—4 of FIG. 1.

FIG. 5 is a diagrammatic and fragmentary plan view of a continuation of the apparatus shown in FIG. 2.

FIG. 6 is a diagrammatic and fragmentary side elevation of a continuation of the apparatus shown in FIG. 5.

FIG. 7 is a fragmentary plan view of interconnected pads during an intermediate step of their fabrication. This view shows the pads between shaft 84 and plows 87 of FIG. 5.

FIG. 8 is an exploded fragmentary perspective view showing the three plies of one embodiment of reinforcing strip.

FIG. 9 is a perspective view of a completed pad embodying the invention, one end of the pad being flared out preparatory to its application to a baby, the broken lines at the other end of the pad indicating the manner in which the other end is similarly flared out.

FIG. 10 is a cross section taken along the line 10—10 of FIG. 7.

FIG. 11 is a cross section taken along the line 11—11 of FIG. 7.

FIG. 12 is a cross section taken along the line 12—12 of FIG. 9.

FIG. 13 is a cross section taken along the line 13—13 of FIG. 9.

FIG. 14 is a cross section taken along the line 14—14 of FIG. 9.

FIG. 15 is a fragmentary plan view of the base panel web to which a pattern of glue lines has been applied by the apparatus of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structure. The scope of the invention is defined in the claims appended hereto.

FIGS. 7 and 9 and the cross sections therethrough best illustrate the pad which is primarily designed for use as a baby diaper. In an intermediate stage of the fabrication illustrated in FIG. 7, the pad comprises a base panel 20 which consists of a waterproof sheet material backing such as a plastic film of polyethylene or the like. Located centrally over the base panel 20 is an absorbent filler assembly, including a pad 21 and mat 22 with a tissue carrier 47. Pad 21 is uppermost, to be closest the body when the diaper is worn and is made up of a soft fluffy material such as fluffed pulp, although other pad material such as layers of creped wadding could also be used. Mat 22 is lowermost to be remote from the body. It also desirably comprises fluffed pulp, but mat 22 has been precompressed or densified prior to incorporation in the filler assembly, thus to function as a liquid reservoir and distributor. In one embodiment mat 22 has been precompressed to give it a weight of approximately 45–60 grams per square foot at a caliper thickness of approximately 1/8 inch. This somewhat stiffens the ply 22. To render it more flexible, its top surface is provided with longitudinal grooves 25. Pad 21 is overlaid with a single ply of tissue 23 and the entire assembly as thus far described is further overlaid with a panel 24 of a relatively strong porous hydrophobic non-woven fabric.

Over the respective ends of the pad as thus formed, two crosswise strips 26 of reinforcing material are laid from side to side of the pad and in overlapping relation to the ends of the central absorbent pad 21. In one embodiment of the invention the strips 26 comprise a scrim laminate of three plies of material. As illustrated in FIG. 8, there is a bottommost woven gauze ply 27 of 12 × 14 thread count, for example, an intermediate single ply of thin (1/2 to 3/4 mil thick, for example) clear plastic film material 28, such as polyethylene, and an uppermost ply of single ply tissue 29. If desired, plies 28, 29 can be combined in the form of a tissue ply which has been precoated with polyethylene. A reinforced strip 26 may also consist of any scrim material

that has longitudinal and transverse threads or lines that possess tensile strength and pinning strength.

Reinforcing strips 26 have several purposes. One purpose is to provide strong reinforcing bands 26 at both ends of the diaper. These bands 26 encircle the baby's waist and provide good anchorage for fastening pins or attaching tapes. Another purpose for the strips 26 is to provide pockets 32 (FIG. 9) for the ends of the filler pads 21, thus to help anchor the filler pads 21 in central position in which they are spaced both from the ends and from the sides of base panel 20. Inasmuch as the strips 26 are waterproof, they also prevent leakage through the ends of the pad. Another purpose for strips 26 is to be the media for heat sealing the diaper ends.

As best shown in FIG. 15, base panel 20 is desirably provided with a pattern of adhesive lines 33, prior to its being overlaid with pad portions 21, 22 and 47 and the non-woven cover sheet 24, thus to firmly anchor these parts together when they are assembled. Lines 33 can be cold or hot melt and of any pattern.

In the course of fabricating the pad the side margins of the laminated base panel 20 and cover sheet 24 are notched or cut away at 34. Accordingly, when the base panel 20 and overlying cover sheet 24 are folded over the absorbent pad 21, as shown in FIG. 9, this leaves an opening 35 through which the filler pad is directly exposed to the body to receive waste. The side margins of the pad 21, however, are enclosed by the plastic backing film 20, thus to prevent wicking of fluids through the edges of the diaper.

The pad is fabricated in accordance with the method diagrammatically illustrated in FIGS. 1, 2, 5, and 6. As shown in FIG. 1, defiberizing apparatus 36, such as is shown in U.S. Pat. Nos. 3,538,551 and 3,268,954, is utilized to produce a layer of fluffed pulp in the form of a batt or mat 38 on an upwardly moving screen belt 37. The batt 38 is divided into two lanes 39, 40, as shown in the copending U.S. application Ser. No. 850,482 of Curt G. Joa filed Aug. 15, 1969, now U.S. Pat. No. 3,666,611 granted May 30, 1972. Lane 40 is somewhat wider than lane 29. Lane 40 remains relatively light and fluffy and proceeds on belt 43 to become the wide filler pad 21. Lane 39, however, is diverted to pass between guide rollers 44 and compression rollers 45 to be compressed and densified to make up the narrower densified mat 22. Just ahead of rolls 44 a web of absorbent carrier tissue 47 drawn from supply roll 51 is fed beneath lane 39 by a belt 48. Tissue web 47 is subject to the densifying pressure of rolls 45.

Lanes 40 and 39 (now pad 21 and mat 22, 47) are recombined over an apron 46. The combined pads 21, 22 and carrier tissue 47 pass between a rotary cutoff knife 52 and complementary platen roller 53 which cuts the continuous strips into discrete pad portions and feeds the same between upper and lower traveling belts 54, 55. Belts 54, 55 travel somewhat faster than the feed of pads 21, 22 so that at the entrance of belts 54, 55 the discrete combined pads are separated and are fed in spaced relationship with intervening gaps 56 onto a plastic web 20 which is concurrently fed onto belt 55 and which becomes the base panel 20 of the diaper. Web 20 is fed from a parent roll 57 by a feed belt 58. The plastic web 20 is rolled over a patterned glue roller 61 which has a series of surface ribs which imprints upon the upper surface of web 20 the glue line pattern 33 shown in FIG. 15. Any comparable means for apply-

ing hot or cold adhesive can be utilized. The spaced filler pads are carried on the plastic web 20 by the conveyor belt 55 in the direction of arrow 64 to the apparatus diagrammatically illustrated in FIG. 2.

FIG. 2 illustrates the addition of the reinforcing strips 26. From respective parent rolls the tissue 29, plastic film 28 and gauze ply 27 are unwound and are assembled between combining rollers 65. Film ply 28 is very thin (.50-.75 mils) so that heat and pressure will quickly melt it. The melted plastic will act as an adhesive to seal and fuse the non-woven fabric layer 24 and plastic base layer 20 at a later point in the fabrication of the pad. As hereinbefore stated, the filler pads 21 on belt 55 have been spaced apart to leave gaps 56 therebetween. The apparatus in FIG. 2 deposits discrete cut-off strips of the scrim laminate 26 in the gaps 56 and overlapping the ends of the filler pads 21. For this purpose the scrim laminate 26 passes over a guide roller 68 and between a rotary cutoff knife 71 and its rotary platen 72, thus to cut the scrim laminate 26 into discrete strip portions 26. These are picked up on a vacuum belt 73 which also draws a web of non-woven fabric 24 from its supply roll 78. Belt 73 is timed in relation to the travel of conveyor belt 55 to deposit the strips 26 over the gaps 56 and in overlapping relationship with the ends of the pads 21, as shown in FIG. 2. Concurrently, cover sheet 24 is laid over the pad.

Beyond the vacuum belt 73 a heated embossing roller 74 and platen roller 79 are provided. Roller 74 has embossing lobes 75 which form the scrim laminate strips 26 into the gaps 56 between the adjacent ends of successive pads 21 and exert heat and embossing pressure on the scrim laminate and against the underlying plastic base web 20.

Roller 74 is desirably heated for the purpose of heat sealing the scrim laminate to the base ply 20. The roll 74 exerts general pressure to weld all parts together. Moreover, roller 74 has knurling bars 76 which function to produce cross sealed and knurled zones 77 on the defined portions of the laminated plies 20, 24, 26 at the transverse center line of gaps 56.

A continuation of FIG. 2 is shown in FIG. 5 in which the belt 55 continues to convey the partially formed diaper in the direction of arrow 64. In this apparatus the side margins of the superposed base panel 20 and cover ply 24 are notched out at 34 by the roller 81 which has curved surface knives 82 formed on its periphery, thus to cut out and reject waste portions 83 as diagrammatically illustrated in FIG. 5.

Beyond roller 81 is a rotating glue wheel shaft 84 with glue applying wheels 85 which lay short glue lines 86 on the upper exposed surface of the cover sheet 24. Lines 86 are about 3 or 4 inches long, to correspond to the length of the crotch in a diaper. Lines 86 can also be applied by a hot melt nozzle.

Downstream of the glue wheel shaft 84 the pad is passed into a plow or blade-type folder 87 which folds the projecting side margins or wings of the pad upwardly along the sides of the pad filler 21 and over the top of the pad filler 21 into the condition illustrated in full lines at the right-hand side of FIG. 9, and which is also shown in the several cross sections of FIGS. 12, 13, and 14. The glue line 86 will adhere or tack the overlapped side margins of the base panel 20 to that part of the cover sheet 24 which is exposed at the top of the pad between notches 34.

FIG. 6 illustrates further progress of the conveyor belt 55 in the direction of arrow 64. A top belt 88 assists belt 55 in drawing the series connected line of pads through the apparatus. The discharge end of the belts 55, 88 delivers the series connected pads to a rotary knife 91 and coacting rotary platen 92 which will sever the pads apart through the end seals 77 on the severing lines 93 (FIGS. 7, 9) to create discrete pads 94 ready for packaging.

Prior to application of the pad to the baby, end portions of the infolded wing or marginal portions of the pad may be unfolded, as suggested in FIG. 9, thus to open the reinforcing strips or bands 26 for encirclement of the baby's waist and for ready application of pins, tape, etc. The glue tacks 86 will, however, maintain the narrow width of the mid-portion of the pad in the crotch area and hold the mid-portions of the plastic base panel 20 in enclosing relation to the edges of the filler pad 21.

While dimensions may vary, typical baby diapers embodying the invention, when unfolded, are about 14 to 18 inches long and about 12 to 14 inches wide. When folded the diaper will be about 4 to 6 inches wide.

I claim:

1. A sanitary pad comprising a moisture resistant base panel, a central filler spaced inwardly from the side and end edges of the base panel, a cover sheet of moisture transmitting fabric over the top of the filler, longitudinally spaced reinforcing scrim strips at the ends of the base panel, portions of said strips overlapping the ends of said filler comprising pockets into which said filler ends are received, filler and cover portions intermediate their ends being exposed between said strips and portions of said strips spaced from the ends of said filler comprising continuous sealed zones at the ends of the pad, said base panel having side margins wrapped around the filler, said margins having

centrally located notches through which the intermediate portions of the top of the cover and filler are exposed and means adhering central portions of said side margins to pad portions therebeneath, leaving end portions wrapped but unattached whereby the central portions of said margins remain wrapped about the filler when end portions of the margins are unwrapped.

2. The pad of claim 1 in which said filler comprises a mat of densified filler material adjacent the base panel and a pad of less densely packed filler material thereover.

3. The pad of claim 2 in which the densified mat has longitudinally extending grooves therein.

4. The pad of claim 1 in which the reinforcing strips comprise laminates of gauze, tissue and plastic.

5. The method of fabricating a sanitary pad having a base panel, a central filler spaced inwardly from the side and end edges of the base panel and reinforcing strips at the ends of the base panel, portions of said strips adjacent the ends of said filler comprising pockets into which said filler ends are received, said method comprising the steps of depositing a series of fillers in end-to-end spaced relation with gaps therebetween on a continuous strip of base panel material, depositing said reinforcing strips in the gaps between said fillers and in overlapping relation to the ends of adjacent fillers to form pockets for said ends and attaching said reinforcing strips to the base panel, plus the step of folding the side margins of the base panel over the top of the filler and concurrently folding the reinforcing strip over itself and over the pocketed ends of the filler.

6. The method of claim 5 plus the subsequent step of severing the continuous strip of base panel material and the reinforcing strip through the gap between spaced fillers, thus to create separate discrete sanitary pads.

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