

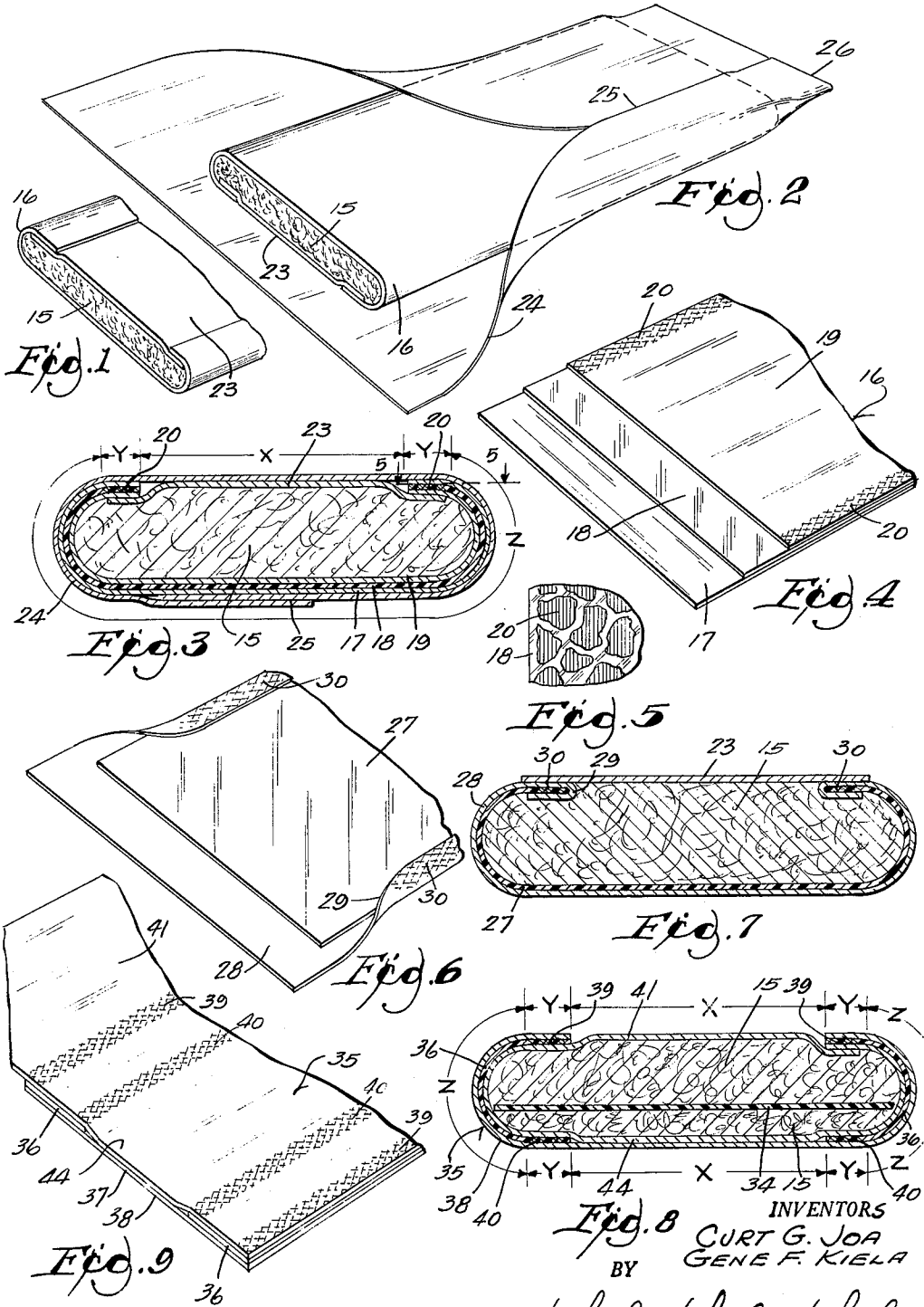
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SANITARY NAPKIN

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**SANITARY NAPKIN**

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This invention relates to an improved sanitary napkin. It is conventional, for example, as shown in United States Patent 2,721,554, to provide a sanitary napkin with moisture repellent edge strips to prevent leakage of fluids through the edges of the napkin. It is also conventional to provide a napkin with a moisture barrier at its side worn away from the body or intermediate its sides. In conventional napkins known to me, however, edge strips and moisture barrier sheets have been provided separately, and it is difficult to assemble these into the napkin on high speed machinery.

According to the present invention, edge strips and the moisture barrier are prefabricated by laminating one or more plies of cellulose wadding to a ply of moisture repellent film. This prefabricated laminated sheet is then formed in a channel shape in an envelope around the pulp filler of the napkin. Marginal portions of the envelope at the side of the napkin worn toward the body are laterally spaced apart to expose therebetween the absorbent part of the napkin to the body.

An important feature of the sanitary napkin of the present invention relates to the initial heat sealing of the marginal portions of the prefabricated laminated structure. The heat sealing will impair the moisture resistance of the film in longitudinally extending bands at the side margins. Accordingly, in the final napkin product there will be zones or bands of differential moisture absorbency across the side of the napkin worn toward the body. These include:

- (1) A medial zone of relatively high moisture absorbency,
- (2) marginal zones (where the film has received no heat sealing treatment) of substantially no absorbency, and
- (3) zones or bands intermediate said medial and marginal zones of intermediate moisture absorbency.

In another embodiment of the invention, both sides of the napkin are provided with zones of differential absorbency and there is a moisture barrier within the pulp filler. Accordingly, either side of the napkin can be worn against the body.

Another feature of the invention involves the incorporation of plies of cellulose wadding to bridge the gap between the heat sealed margins of the envelope, thus to prevent loss of pulp and also to distribute flow longitudinally of the napkin by reason of the longitudinally extending grain of the wadding.

Another advantageous feature relates to the construction of the envelope in which a ply of cellulose wadding is just inside the moisture repellent film, thus to distribute flow longitudinally of the napkin, within the napkin and along its side worn away from the body.

Other objects, features and advantages of the invention will appear from the following disclosure in which:

FIGURE 1 is a fragmentary perspective view of a napkin pad embodying the invention, prior to wrapping it in the outer wrapper.

FIGURE 2 is a view similar to that shown in FIGURE 1 but showing the napkin pad inverted and in the course of applying the outer wrapper thereto.

FIGURE 3 is a transverse cross section taken through a napkin embodying the present invention.

FIGURE 4 is a developed perspective view of the prefabricated laminated envelope.

FIGURE 5 is an enlarged diagrammatic cross section taken along the line 5—5 of FIGURE 3.

FIGURE 6 is a developed perspective of a modified form of the envelope shown in FIGURE 4.

FIGURE 7 is a transverse cross section taken through a modified napkin pad embodying the invention and in which the envelope of FIGURE 6 is incorporated therein.

FIGURE 8 is a transverse cross section taken through a still further modified embodiment of the napkin pad and in which either side of the napkin may be worn against the body.

FIGURE 9 is a developed perspective view of the envelope used in the fabrication of the napkin pad of FIGURE 8.

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.

The filler component of the napkin is generally immaterial but typically consists of fluffed up cellulose pulp 15 which is inexpensive and has good moisture absorbency and retention characteristics. In one embodiment of the invention the pulp filler 15 is partially surrounded by a multi-ply, prefabricated laminated envelope 16, best shown in FIGURE 4. The envelope 16 consists of an outer single ply thickness of cellulose wadding 17 or any comparable paper-like tissue having adequate wet strength. For this purpose it may be treated with a moisture resistant resin which only slightly impairs its moisture absorbency. Adjacent ply 17 is a coextensive ply 18 of moisture resistant film, such as polyethylene film or the like. The next ply 19 may be cellulose wadding similar to ply 17.

Ply 17 is desirably dyed with a perceptible color so that in the final napkin product the side to be worn away from the body will have a distinctively different appearance from the side to be worn against the body.

The margins of the envelope 16 are adhered by heat sealing as indicated by the marginal heat sealed bands or zones 20. The resins of the moisture resistant ply 18 and the adhesive binders in the tissue plies 17, 19 are thermoplastic. This holds the plies in a laminated assembly which greatly facilitates subsequent processing and incorporation into the final napkin product.

As diagrammatically indicated in FIGURE 5, the heat sealing operation causes reticulation of the film 18 in the bands 20 to impair the moisture resistance thereof. The film will shrink thus leaving substantial pores through which moisture may be absorbed into the pulp filler 15 through the marginal bands 20.

Accordingly when the prefabricated laminated envelope 16 is formed into its channel-shaped configuration shown in FIGURE 3, thus to partially contain the pulp filler 15, there will be zones of differential moisture absorbency across the width of the napkin. The napkin will have greatest moisture absorbency in the medial zone or band "X." It will have substantially no absorbency in the zone "Z" and will have an intermediate or partial absorbency in the zones "Y" which correspond to the bands 20.

To bridge the gap between the laterally spaced marginal bands 20 in the completed napkin, a sheet or ply of cellulose wadding 23, similar to ply 17, is provided. This ply precludes loss of the pulp fibers from the filler 15 and also functions as a fluid distributor. For this purpose its grain is desirably aligned longitudinally of the napkin. Ply 23 has wet strength and accordingly is slightly less

absorbent than the pulp filler 15. As shown in FIGURE 3, its lateral margins may be disposed beneath bands 20 of the envelope 16.

The pad thus created is wrapped in an outer wrapper 24, desirably of non-woven material of suitable softness and strength, or gauze. The overlapped seam 25 of the wrapper 24 is desirably made at the side of the napkin to be worn away from the body and is fastened with adhesive.

End portions of the wrapper 24 may be extended beyond the ends of each pad to constitute fastening straps. If extraneous fastening means are to be provided, the ends may be cut off closely adjacent to the pad as shown at 26 in FIGURE 2.

As shown in FIGURES 6 and 7, modifications can be made both in the form of the envelope 16 and in the positioning of the bridging tissue 23. As shown at FIGURE 6 the prefabricated laminated envelope may have its moisture resistant ply 27 at one side of the laminated structure. One or more plies of cellulose wadding 23 or the like may be disposed at the other side of the laminated structure. Plies 28 are made wider than ply 27 and are folded over the margins of ply 27 at 29. The multi-ply margins thus formed are heat sealed together in bands 30. As aforesaid, this results in partial destruction of the moisture resistance of the film 27.

The envelope construction shown in FIGURE 4 is preferable from a standpoint that the innermost ply 19 of cellulose wadding will lie between the pulp filler 15 and the moisture resistant ply 18, thus to act as a moisture distributor at the side of the napkin away from the body.

FIGURE 7 also shows the application of the marginal portions of the bridging ply 33 over the bands 30, as distinguished from the construction shown in FIGURE 3 where the margins of the bridging ply 23 are beneath the bands 20. An over wrapper 24 (not shown) but similar to that shown in FIGURES 2 and 3 is then applied to the pad of FIGURE 7.

FIGURES 8 and 9 illustrate an embodiment of the invention in which differential zones of absorbency are provided at both sides of the napkin so that the napkin can be worn with either side toward the body. In this case, the pulp filler 15 is subdivided by a sheet of moisture resistant film 34 which is within the pulp filler 15 but which is offset toward the side of the napkin worn away from the body.

The envelope 35 for the pad shown in FIGURE 8 is desirably similar to the one shown in FIGURE 4 except that the water resistant film of polyethylene, etc. is formed in two marginal bands or strips 36 laterally spaced apart to leave the medial portion 37 of the bottom layer of absorbent cellulose wadding 38 uncovered by any moisture barrier. Strips 36 are heat sealed to the wadding 38 along narrow marginal bands 39, 40.

There is a top ply 44 of cellulose wadding which may be coextensive in area with bottom ply 38, or which may be extended laterally to form a flap 41, as shown in FIGURE 9. The lateral extension of the top wadding ply is also optional in the previously described embodiments. For example, in FIGURE 4 ply 19 could be extended laterally to form a flap similar to that shown at 41 in FIGURE 9.

Accordingly, the pad as shown in FIGURE 8 will have only its edges and extreme margin portions of both sides of the napkin covered by the water resistant film 36 and in the zone "Z" shown therein. Zones "Y" are characterized by the reticulated nature of the plastic film as shown in FIGURE 5, and will be partially moisture absorbent. Zones "X" on both sides of the napkin will have relatively high absorbency. The pad of FIGURE 8 will also be covered with a wrapper (not shown) similar to that shown in FIGURE 2.

Because of the offset of the sheet 34 toward the side of the pad worn away from the body, the pad will have

greater capacity when worn with its side having sheet 41 toward the body. However, if the pad is inverted it will still function because of the absorbency of that portion of the pulp filler 15 between the moisture barrier 34 and the back of the pad.

When the flap 41 is formed as aforesaid, it functions to close the gap "X" on the side of the pad to be worn toward the body. In the absence of flap 41 a separate closing sheet, such as sheet 23 shown in FIGURE 3 or sheet 33 shown in FIGURE 7 would be used. As aforesaid, ply 19 of the FIGURES 3 and 4 embodiment could be provided with a flap similar to flap 41, in lieu of closing sheet 23. Alternatively ply 38 of the FIGURES 8 and 9 embodiment and ply 17 of the FIGURES 3 and 4 embodiment could be extended laterally to form such flaps.

What is claimed is:

1. A sanitary napkin having at its side intended to be worn toward the body, zones of differential absorbency across its width, including:

- (a) a medial zone of relatively high absorbency,
- (b) marginal zones of substantially no absorbency,
- (c) and zones intermediate said medial and marginal zones of intermediate absorbency,

said napkin further comprising a pad having:

- (d) a pulp filler,
- (e) an envelope about the pulp filler, said envelope comprising in face relation:

- (1) a ply of cellulose wadding
- (2) and a ply of moisture resistant film

(3) the facing margins of said plies being heat sealed to hold said plies together, said ply of moisture resistant film being reticulated at said margins to impair the moisture resistance of said film at said margins

- (f) said envelope being disposed in channel configuration about said pulp filler with the heat sealed margins of the envelope at said side of the napkin and intermediate the margins thereof and its center, thus to provide said zones of intermediate absorbency,
- (g) and a bridging ply closing the gap between said margins.

2. The sanitary napkin of claim 1 in which said envelope further comprises a second ply of cellulose wadding, said film ply being disposed between said cellulose wadding plies.

3. The sanitary napkin of claim 1 in which said bridging ply comprises a sheet of cellulose wadding bridging between the heat sealed margins of said envelope.

4. The sanitary napkin of claim 1 in which said envelope further comprises a second ply of cellulose wadding, said film ply being disposed between said cellulose wadding plies, one of said plies of cellulose wadding being extended laterally to form a flap to constitute said bridging ply.

5. The sanitary napkin of claim 1 in which said pad further comprises an outer wrapper about said envelope.

6. A sanitary napkin having at both its sides zones of differential absorbency including:

- (a) medial zones of relatively high absorbency,
- (b) marginal zones of substantially no absorbency
- (c) and zones intermediate said medial and marginal zones of intermediate absorbency

said napkin further comprising:

- (d) a pulp filler,
- (e) an envelope about the pulp filler, said envelope comprising:

- (1) a wide ply of cellulose wadding
- (2) two laterally spaced apart narrow plies of moisture resistant film at the margins of the ply of cellulose wadding and in face relation thereto,

- (3) heat seal bands attaching the margins but not the central medial portions of said moisture resistant film plies to said ply of cellulose wadding, thus to hold said plies together, said plies

5

of moisture resistant film being reticulated at said bands to impair the moisture resistance of said film at said bands,

(f) said envelope being disposed in channel configuration about said pulp filler with:

(1) the central medial portions of said moisture resistant film plies covering the edges of the napkin and the extreme marginal portions of both sides of the napkin to provide said marginal zones of substantially no absorbency

(2) the heat seal bands intermediate the said extreme marginal portion of the napkin and its center, thus to provide said zones of intermediate absorbency

(g) a moisture resistant film within the pulp filler intermediate its said sides,

(h) and a bridging ply closing the gap between said margins.

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7. The sanitary napkin of claim 6 in which said wide ply of cellulose wadding is extended laterally to form a flap to constitute said bridging ply.

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