

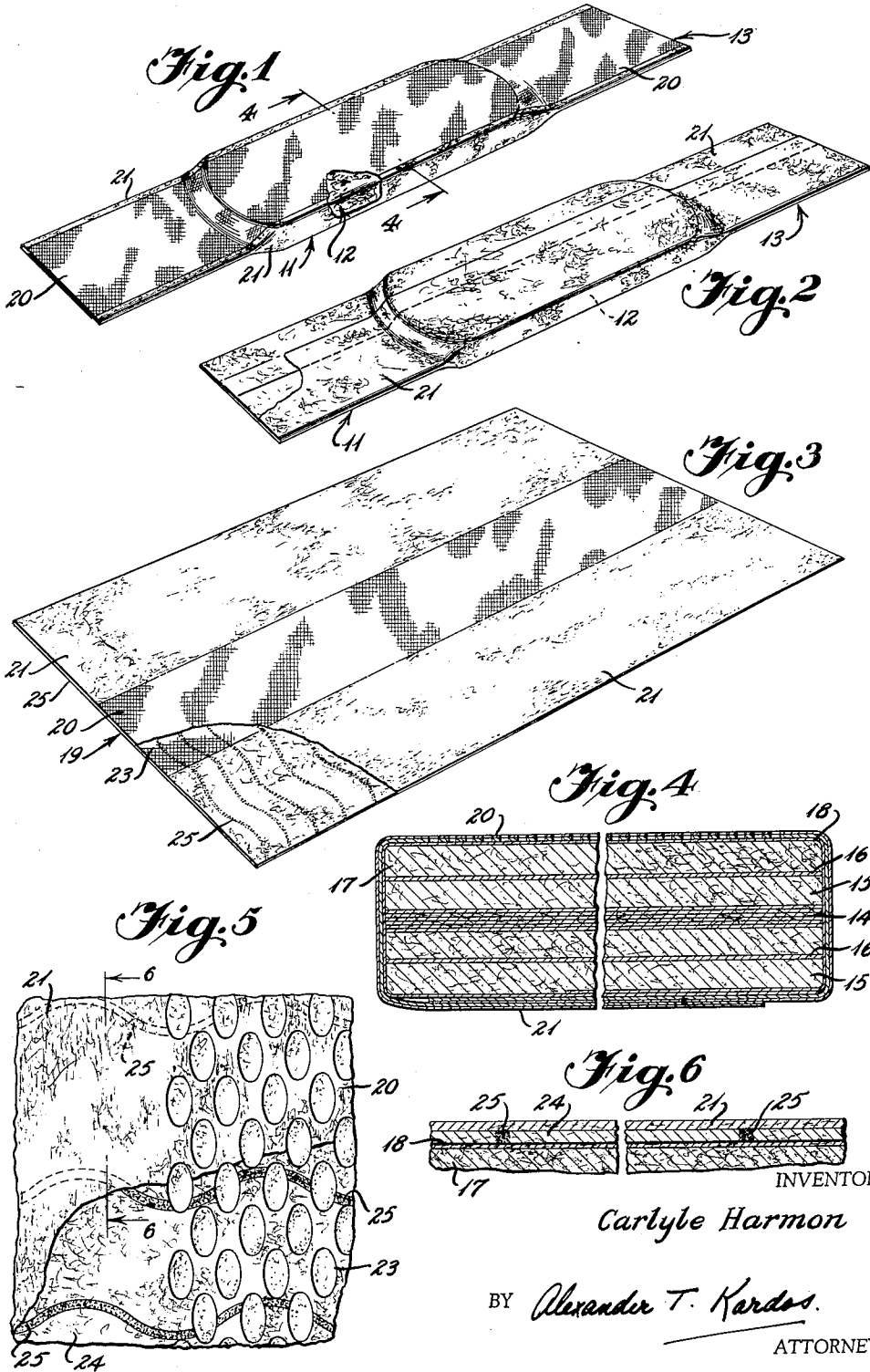
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SANITARY NAPKINS

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SANITARY NAPKINS

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1 Claim. (Cl. 128—290)

The present invention relates to absorbent dressings, particularly of the sanitary napkin type, which in use are worn next to the skin; in the case of sanitary napkins in sensitive areas of the human body. More specifically, this invention relates to an improved cover or wrapper for the absorbent core or pad of the dressing, which makes for improved softness, strength, comfort and absorptive effectiveness thereof.

While the covers of this invention may be employed for use in wrapping absorbent cores in all types of dressings, it will be described in connection with its use in sanitary napkins where it is particularly satisfactory and effective.

Sanitary napkins customarily have an absorbent pad or core surrounded by a pervious cover or sheath which serves the twofold purpose of holding the core together and providing supporting or pinning tabs by which the napkin is secured to a belt. The materials formerly available for covers for sanitary napkins have not been completely satisfactory for an effective and comfortable cover. The most generally used cover material has been a woven gauze. This is uncomfortable because, among other reasons, the gauze is rough, especially where folded over the edges of the core. It becomes even rougher when the core is folded, and so chafes the wearer.

Since perhaps the main requisite for the cover fabric of a sanitary napkin is softness, softer cover fabrics have long been sought. Material possessing the ultimate in softness is a nonwoven fabric consisting solely of loose fibers such as card web or a plurality of card webs. Although such a fabric is extremely soft, it does not have strength sufficient to be suitable for the cover of a sanitary napkin. In order to strengthen this fabric, there has been applied thereto a chemical bonding agent so as to cause the fibers of the fabric to be bonded together. However, this expedient was harmful to the softness of the fabric.

To bond the fibers in nonwoven fabrics to give the fabric sufficient strength and still maintain a high degree of softness so that the fabric would be satisfactory as a sanitary napkin cover, intermittent pattern bonding of the fibers of the nonwoven fabric has been resorted to. Intermittent pattern bonding expedients are exemplified in the Goldman Patent No. 2,309,312; the Johnson Patent No. 2,705,498; the Petterson et al. Patent No. 2,705,687 and the Ness et al. Patent No. 2,705,688. While the nonwoven fabrics of these patents were of improved strength and had a degree of softness, the softness thereof was not of the high degree most desirable in a sanitary napkin cover.

It is an important object of this invention to provide an improved cover for a sanitary napkin which will be free from the foregoing and other disadvantages and which will be especially effective in controlling the flow of fluid absorbed by the core of the sanitary napkin.

In its broadest aspect this invention contemplates a cover for a sanitary napkin of exceptional softness, which cover comprises a nonwoven fabric made from a plurality of fibrous webs with the outer or surface web composed of nonabsorbent fibers and the other webs composed of absorbent fibers, the webs being bonded together.

In accordance with this aspect the outer or surface web of the nonwoven fabric is made up of fibers of cellulose acetate, but other nonabsorbent cellulose ester fibers may

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be employed, such as fibers of cellulose propionate and cellulose butyrate. The absorbent fibers comprising the other webs of the nonwoven fabric are made up of cellulose fibers, e.g. cotton or regenerated cellulose (rayon) fibers. The fibrous webs are bonded together using the intermittent bonding techniques of the above-mentioned prior art patents to maintain the strength of the nonwoven fabric cover, but obtaining an improved softness in the area which comes into contact with the wearer. However, when the fibrous webs are bonded the cellulose acetate fibers being nonabsorbent are difficult to bond. Accordingly, substantially the whole of the binding agent employed in the bonding process is in the layers underneath the surface layer of the lamination of fibrous webs. While the nonabsorbent cellulose acetate fibers are difficult to bond, yet they are bonded sufficiently and held to the other layers of fibers by frictional engagement of fibers and thus overcome linting problems. The resulting fabric has sufficient strength for use as a cover for a sanitary napkin and is characterized by extreme softness, affording the utmost comfort to the wearer of the sanitary napkin.

In another aspect of this invention, the cover for the absorbent core of a sanitary napkin comprises a laminated fabric made up of a web of nonabsorbent cellulose acetate fibers and webs of absorbent cotton or regenerated cellulose fibers, each of the webs having an open, highly permeable portion in the area of its surface which normally comes into contact with fluid discharge and a less permeable, imperforate portion in those areas which cover the sides and back of the sanitary napkin and do not come into direct contact with fluid discharge. These webs are also intermittently bonded together using the same bonding techniques as are employed in bonding the above continuous fibrous webs, i.e. the bonding techniques described in above-mentioned prior art patents. The resulting cover fabric is also strong and possessed of extreme softness but it has the further desirable property in a sanitary napkin cover of having the fluid discharge hit the outer surface and, instead of spreading along the outer surface, immediately penetrate and enter the absorbent core. Accordingly, the sanitary napkin will then have a minimum amount of outer surface soil and excellent efficiency will be made of the absorbent core. The nonabsorbent cellulose acetate fibers aid this characteristic considerably. The open, permeable portions of the fibrous webs form a channel in the cover so that the fluid discharge has no trouble whatever in penetrating the cover and meeting the absorbent core. Since the surface of the cover fabric is nonabsorbent because it is of cellulose acetate fibers, the fluid does not spread along the surface and is not sucked up by the surface of the web, but immediately penetrates the cover and is absorbed by the core, hence keeping the amount of surface soil to a minimum.

The nonwoven webs making up the laminated fabric cover of this other aspect of the invention comprise integral webs having open, permeable portions and, less permeable, imperforate portions in which the fibers forming the open permeable portions are oriented to define a multiplicity of substantially uniformly arranged holes and interconnected groups of fiber segments between the holes. The fiber segments bordering the holes preferably are in substantial parallelism with corresponding portions of the perimeters of the holes, thereby providing a substantially continuous fibrous border for each hole which gives the hole definite identity. The groups of fiber segments are interconnected by fibers common to a plurality of groups at junctures wherein the fibers extend in a plurality of diverse directions substantially in the plane of the fabric, with the groups and the junctures each

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lying in the same general plane. Preferably, the fiber segments in the group are substantially parallelized and closely associated or laterally compacted in the groups and the holes are substantially uniformly regular and uniformly spaced and arranged in a predetermined pattern. Thus, these portions of the webs are highly permeable to liquid and relatively open due to the multiplicity of substantially uniformly arranged holes that it contains. These portions of the webs also possess substantially uniform fluid conducting power due to the uniform arrangement of holes and the uniform arrangement of the groups of fiber segments between the holes, as well as the substantially parallel and laterally compacted arrangement of the fiber segments in the groups.

Moreover, in the highly permeable portions of the webs, the fiber groupings possess thickness through the laminated fabric with the result that the cover has appreciable depth and the wearer primarily will contact the outer surface of the cover rather than the absorbent core through the holes in the cover. This portion of the cover does not present a continuous fibrous surface which will feel wet, but, on the contrary, presents an intermittent arrangement of fiber groupings defining holes extending through the depth of the cover which, as described above, do not retain the fluid but together distribute it rapidly and effectively to the absorbent core.

Advantageously, the permeable or open portions of the cover, i.e. those portions which contain the interconnected groups of fiber segments, is extended into the areas of the cover which may receive pins for securing the sanitary napkin, to a belt for example, during use, since the said interconnected fiber groups will tend to resist tearing thereof when pinned, thus contributing improved pinning strength to that portion of the sanitary napkin.

It is preferable that in the foraminous portion of the cover formed by the interconnected fiber groupings, the fibers be in relatively unstressed positions where they lie in a state of mechanical equilibrium. In this state, in the interconnected groups of fiber segments of the highly permeable portion of the cover, the fibers are mechanically engaged both frictionally and/or by interlocking, to the extent that the arrangement of the fibers is one of equilibrium, in that the fibers themselves have substantially no inbuilt tendency to depart from their configurations in the structure. As a result, the moisture absorptive and conducting properties of the cover are improved and the moisture retentive properties minimized. Thus, the menstrual fluid and the like is quickly delivered by the cover to the absorbent core and is quickly taken up thereby.

The integral fibrous webs having the open, permeable portions and less permeable, imperforate portions may conveniently be made by the process and apparatus described in the Kalwaites Patent No. 2,862,251.

It is to be understood that the laminated cover fabric may, if desired have but one web in which there is an open, permeable portion, namely the outer or surface web of cellulose acetate fibers.

It is also to be understood that where the webs each have an open, permeable portion and less permeable, imperforate portions, each web may be prepared by bonding an open, permeable web portion to less permeable, imperforate web portions to form the web used as a layer of the laminated fabric.

Other objects and advantages of this invention will be apparent from the following description taken in connection with the accompanying drawing wherein

FIG. 1 is a perspective view of a sanitary napkin made in accordance with this invention,

FIG. 2 is a perspective view showing the reverse side thereof,

FIG. 3 is a detail view of the laminated cover material made in accordance with one embodiment of this invention,

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FIG. 4 is a cross-sectional view on an enlarged scale taken on line 4—4 in FIG. 1 in the direction of the arrows.

FIG. 5 is an enlarged fragmental view of a portion of claim 3, illustrating the arrangement of the webs and the intermittent positions of the bonding material, and

FIG. 6 is a cross-sectional view taken along line 6—6 in FIG. 5 in the direction of the arrows.

Like reference numerals indicate like parts throughout the several views of the drawing.

Referring now to the drawings for a detailed description of one embodiment of this invention, there is shown a sanitary napkin 11 which comprises an absorbent core 12 wrapped in the cover 13 of this invention, which cover conforms readily to the configuration of the absorbent core 12.

The absorbent core 12 is shown as being rectangular in shape and having a rectangular cross-section; however, it may have any other suitable shape.

The absorbent core 12 may comprise any material and internal structure capable of distributing and channelling the flow of fluids inside the core. Thus, the absorbent core may comprise a single layer or wadding of cotton fibers, fluffed wood pulp (purified cellulose), creped cellulose tissues, or any of the known materials used for this purpose. Advantageously, the absorbent core may be a laminated structure made up of several layers of suitable materials. For example, as shown in FIG. 4, the core may comprise a central layer 14 of paper tissues, having on either side thereof a layer 15 of fluffed wood pulp. In contact with each of the latter layers is another paper tissue layer 16, and finally the outside layers 17 are again of fluffed wood pulp. The entire assembly of layers is held within a wrapper or inner cover 18 of creped cellulose, and the assembly within the cover 13.

The cover 13 comprises an outer or surfaces web 19 of cellulose acetate fibers having an open, permeable portion 20, and less permeable, imperforate portions 21 and a plurality of webs 22 of cotton or regenerated fibers having similar open, permeable portions 23 and less permeable, imperforate portions 24. The webs 20 and 22, which may be made in accordance with the above-mentioned Kalwaites patent, are laminated together by applying adhesive 25 in an intermittent pattern. As particularly shown in FIGS. 3 and 5, the intermittent pattern is produced by a plurality of spaced sinuous lines of adhesive. Because the cellulose acetate fibers of the outer web are nonabsorbent, little or no adhesive will be present in said outer web, the outer web being in the main frictionally engaged by the fibers of the underlying web.

In preparing the cover 13 of this invention any suitable method of laminating the web of cellulose acetate fibers and the webs of cotton or regenerated cellulose fibers may be employed. For example, the webs may be cut to the desired length from suitable sources of supply such as rolls of the material and the cut lengths collated at a predetermined point with the cellulose acetate fiber web on top, the adhesive being applied in intermittent pattern before or after the collating step, and pressure is applied to the laminated webs to cause the same to be bound together.

The cover may be wrapped around the absorbent core by hand or by a device which is conventional for this purpose in the manufacture of sanitary napkins. Of course, in wrapping the cover around the core, the cellulose acetate fibers will form the outside surface.

Having now described the invention in specific detail and exemplified the manner in which it may be carried into practice, it will be readily apparent to those skilled in the art that innumerable variations, applications, modifications, and extensions of the basic principles involved may be made without departing from its spirit or scope.

The claim is:

75 A sanitary napkin comprising in combination an ab-

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sorbent pad and a cover surrounding the pad and in intimate contact therewith, said cover comprising a plurality of fibrous webs of cellulosic fibers, the outer fibrous web being permeable and consisting of non-absorbent cellulosic fibers and the remaining fibrous webs being permeable and consisting of absorbent cellulosic fibers, and a binder material distributed in a predetermined pattern of spaced binder areas in bonding relationship with the absorbent cellulosic fibers passing through said areas, said areas extending over the surface of and substantially through the fibrous webs of absorbent cellulosic fibers and

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the outer fibrous web of non-absorbent cellulosic fibers being substantially free of binder material.

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