July 2, 1963 A. H. BASSETT 3,095,878

SANITARY NAPKINS AND METHODS OF MAKING THE SAME

Filed June 23, 1960

Fig. 1

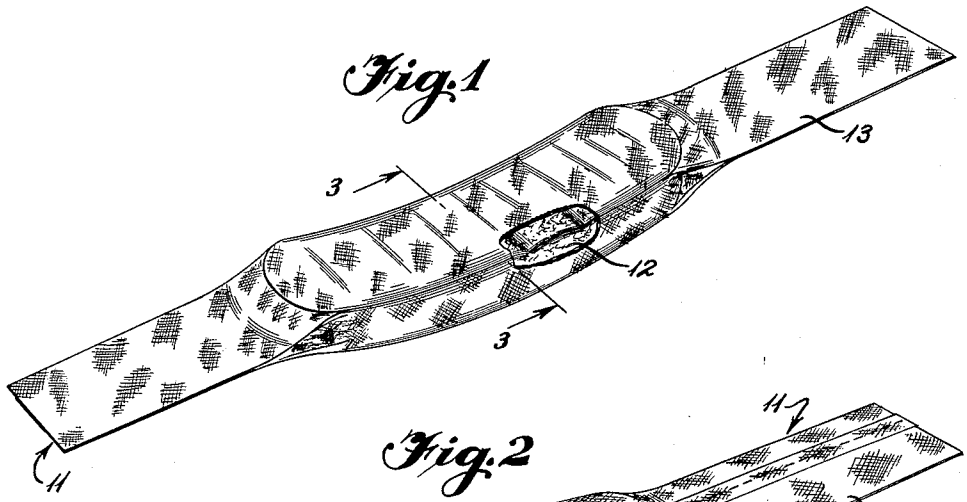

Fig. 2

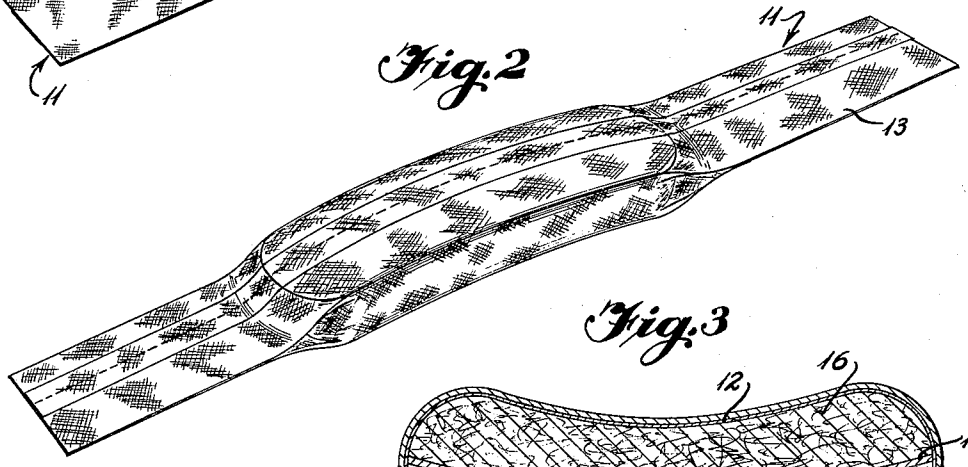

Fig. 3

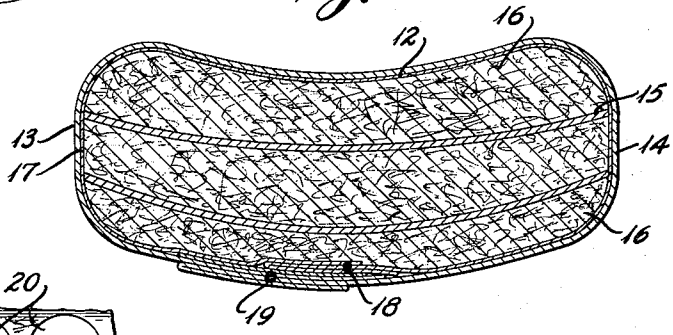

Fig. 4

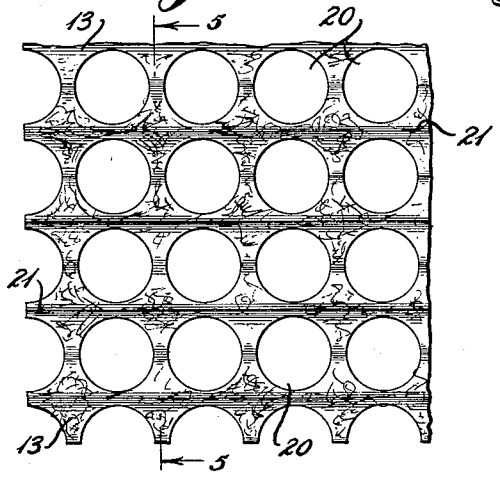

Fig. 5

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SANITARY NAPKINS AND METHODS OF MAKING THE SAME

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1 Claim. (Cl. 128—290)

This 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 a molded absorbent core or pad of the dressing, which makes for greater softness, strength and absorptive effectiveness thereof, and greater comfort to the user.

While the covers of this invention may be employed for use in wrapping molded 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 molded absorbent cores have not been completely satisfactory for an effective and comfortable cover.

In an effort to improve over the rectangular construction of the absorbent core of a sanitary napkin, cores have been molded in concave shape to be form-fitting, without destroying the resiliency or absorbent properties thereof. Difficulty has, however, been encountered in providing a cover for the molded absorbent core due to the fact that crevices, wrinkles and cavities are formed in the absorbent core during the molding process. Thus, in order to use as covers for sanitary napkins, having a molded absorbent core, nonwoven fabric such as described, for example, in the Goldman Patent No. 2,039,-312, the Johnson Patent No. 2,705,498 and other patents, it is necessary to crepe the nonwoven fabric so that it may conform to the dished shape of the molded absorbent core. It was found, however, that while the creped nonwoven fabric had good conformability and drapability, it tended to cling to or get caught in the crevices, wrinkles and cavities of the molded absorbent core. This not only makes for a sanitary napkin of poor appearance but also causes roughness and hardness which would chafe the wearer.

It is an important object of this invention to provide an improved cover for a sanitary napkin having a mold absorbent core, 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.

Another object of this invention is the provision of an improved cover for a sanitary napkin having a molded absorbent core which will have a neat, smooth appearance and a soft hand.

A further object of this invention is to provide a novel process for preparing a cover fabric for a sanitary napkin.

In its broadest aspect this invention contemplates an improved cover for the molded core of a sanitary napkin, which cover comprises a creped nonwoven fabric, having relatively large holes therein, the fibers of which are intermittently bonded with a suitable binder. Preferably, the fibrous web is after-treated with a softening agent. Thus, with the improved sanitary napkin cover of this invention, the clinging or catching of the cover material in the crevices, wrinkles and cavities of the

molded absorbent core is reduced or eliminated entirely and there is obtained a neater, smoother and softer sanitary napkin. Moreover, holes in the cover of the sanitary napkin allow the fluid discharge to penetrate the cover quickly and become absorbed into the core.

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

FIG. 1 is a perspective view of a preferred embodiment of this invention,

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

FIG. 3 is a cross-sectional view on an enlarged scale taken on line 3—3 in FIG. 1 in the direction of the arrows,

FIG. 4 is an enlarged detail view of the cover fabric employed in accordance with this invention, and

FIG. 5 is a cross-sectional view of the cover fabric taken on line 5—5 in FIG. 4 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 this invention, there is shown a sanitary napkin 11 which comprises an absorbent core 12 wrapped in the cover 13 of the instant invention, which cover conforms readily to the contour of the absorbent core 12.

The absorbent core 12 is molded in concave shape to be form-fitting to the body, the molding being effected in such a manner that the resiliency and absorbent properties thereof remain substantially the same as in a non-molded core.

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. 3, the absorbent core may comprise a central layer 14 of fluffed wood pulp having on either side thereof a layer 15 of paper tissues. In contact with each of the layers 15 are again layers 16 of fluffed wood pulp. The entire assembly of layers is held within a wrapper or inner cover 17 of creped cellulose, the edges of which are bonded by a suitable adhesive 18. The edges of the cover may also be bonded, as is shown at 19.

The cover 13 of the sanitary napkin comprises a fabric made in accordance with the Kalwaites patent, No. 2,862,251, in a relatively large-hole pattern, i.e. having approximately 100 holes per square inch. In this fabric the fibers are oriented to define a multiplicity of substantially uniformly arranged holes and groups of fiber segments between the holes. Preferably, the holes are substantially uniformly regular and uniformly spaced and arranged in a predetermined pattern. While they are shown to be round in FIG. 5, they may be somewhat egg-shaped or oval, square, triangular, or of some other suitable configuration. They may be arranged as on the points of a diamond in intersecting parallel and straight rows of holes with the long and short axes of the diamonds extending longitudinally and transversely, respectively, of the napkin; as on the corners of squares or rectangles in intersecting parallel and straight rows of holes, which rows may extend longitudinally and transversely of the core or be inclined thereto; or in any predetermined pattern which is suitable for the purposes intended. The shape and arrangement of the holes and of the interconnected groups of fiber segments are such that the cover is extensible in the direction of the length and width of the

absorbent core and therefore may be made to stretch over and conform more readily to the shape of the absorbent core.

The cover is uniformly and highly permeable and open due to the multiplicity of substantially uniformly regular and uniformly spaced holes that it contains and due to the correspondingly uniform arrangement of the interconnected groups of fiber segments which define the holes. The cover possesses the capacity to distribute liquids striking the same in this area uniformly into the absorbent pad by virtue of the uniform arrangement of the holes and the groups of fiber segments and the capillary effect of the parallel fiber segments in the fiber groupings. Thus, liquids and even fluids containing solids pass readily through the holes in the cover and are distributed to the absorbent core rapidly and uniformly.

In accordance with this invention, the fabric web of oriented fibers is bonded to give it greater strength, preferably by applying a binding agent to the fabric web in an intermittent arrangement. Any suitable binding agent may be employed. Thus, for example, there may be employed, as plasticized aqueous dispersion, polyvinyl acetate and copolymers thereof, polyvinyl chloride and copolymers thereof, copolymers of butadiene with acrylonitrile and/or styrene, and copolymers of polyvinyl acetate with modifiers such as certain lower alkyl acrylates. Binding agents such as polyvinyl chloride, certain epoxy resins, polyvinyl alcohol may be applied to the fabric web in the form of solutions thereof in suitable solvents. Other suitable binders include viscose, hydroxethyl cellulose, methyl cellulose and polyethylene. These binding agents may be applied in any manner well known in the art. For example, the binding agent may be applied in the form of intermittent or spaced lines extending continuously across the fibrous web and defining a series of straight lines, or sinuous or wavy lines. The binding agent may also be applied discontinuously, i.e. in the form of disc-shaped spots or annular rings in staggered relation, free from each other or in overlapping arrangement. The amount of binding agent used and the pattern thereof on the fibrous web should be such that a substantial proportion of the fibrous web is free of binding agent.

In order to give the fabric web improved wet strength, there may be applied thereto certain thermosetting resins such as, for example, quaternary ammonium modified urea formaldehyde resins. These resins may be incorporated in the fibers before they are converted into web form by the Kalwaites process, or they may be applied to the fabric web in an aqueous medium, or together with the binding agent by adding the same to the solution or aqueous dispersion thereof.

As is set out above, creping the nonwoven fabric of sanitary napkin cover causes the same to conform to the dished shape of the molded absorbent core. The creping of the nonwoven fabric may be effected in any suitable manner. For example, the nonwoven fabric in the form of a web of indefinite length may be passed through knurled rollers, or a pleating apparatus so as to make bends or folds therein crosswise thereof. The nonwoven fabric web with pleats may, if desired, be passed through a pressing device to crease the pleats to give them more stability; however, this step is not necessary. The pleating apparatus may employ relatively movable upper and lower plates having V-shaped grooves, or meshing V-grooved rollers to perform the pleating operation. Excellent conformability and drapability of the cover fabric are obtained when the pleats are small, i.e. narrow and close together.

To enhance the conformability and drapability of the cover fabric and to reduce the clinging thereof to the crevices, wrinkles and cavities of the molded absorbent core, the creped fibrous cover fabric is given an after-treatment with a softening agent of the cationic surface-acting agents. Examples of such surface-acting agents are the quaternary ammonium salt compounds containing one or two alkyl groups, the alkyl groups containing 8 to 18 carbon atoms and which are sold under the tradename of Arquads, such as a compound of the formula

$$(C_{18}H_{37})_2N(CH_3)_2Cl$$

There may also be employed as softening agents for the fibrous cover fabric other cationic quaternary salts of amino amides, long chain compounds containing primary, secondary or tertiary amino groups, long chain compounds containing thiourea groups and the like.

The covers may be wrapped around absorbent cores by hand or by a device which is conventional for this purpose in the manufacture of sanitary napkins.

The sanitary napkin cover of this invention has the softness desired in a sanitary napkin, and due to the dished shape of the molded absorbent core increased comfort is given to the wearer of the sanitary napkin.

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.

What I claim is:

A sanitary napkin comprising in combination, a molded absorbent core having an arcuate shape with a plurality of crevices and wrinkles on its concave surface, and a conformable and drapeable cover wrapped about said core and in intimate contact therewith, said cover comprising a soft and highly permeable fibrous nonwoven fabric in which the fibers are oriented to define a multiplicity of substantially uniformly arranged holes and groups of fibers between said holes, and in which the fibers are bonded together at spaced areas by a resinous binding agent, said cover having about 100 holes per square inch and said cover being creped with the pleats of the crepe running transverse of the absorbent core, said fabric cover having incorporated therein a softening agent whereby said cover takes the arcuate shape of the core without entering and conforming to the crevices and wrinkles on the concave surface of said core.

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