Jan. 13, 1953

R. W. JOHNSON

2,625,161

SANITARY NAPKIN

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Fig. 1.

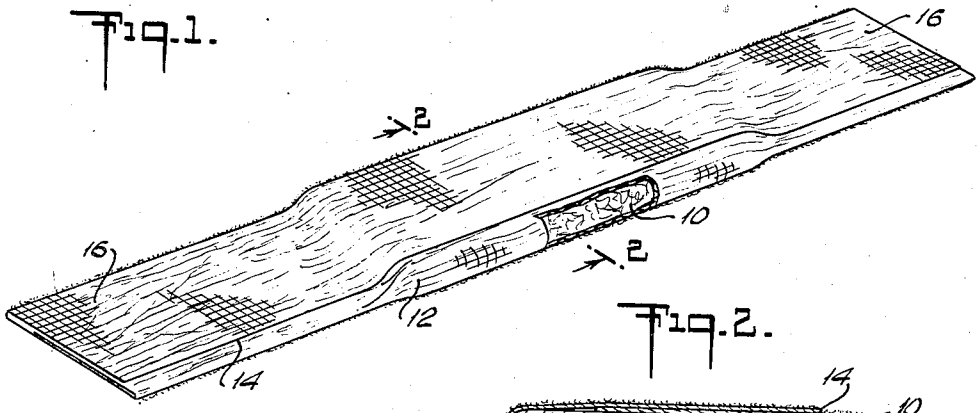


Fig. 2.

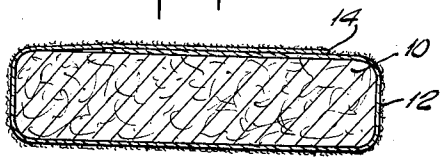


Fig. 3.

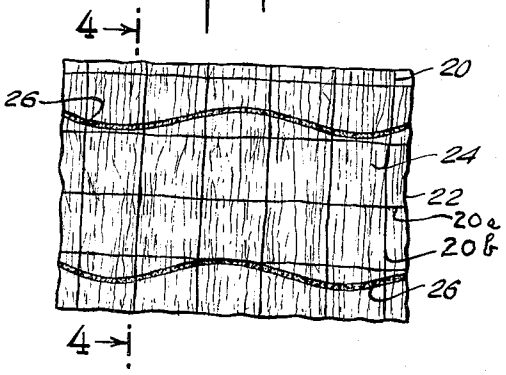


Fig. 4.

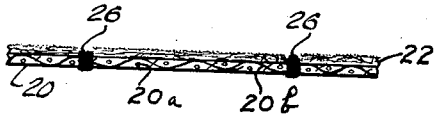
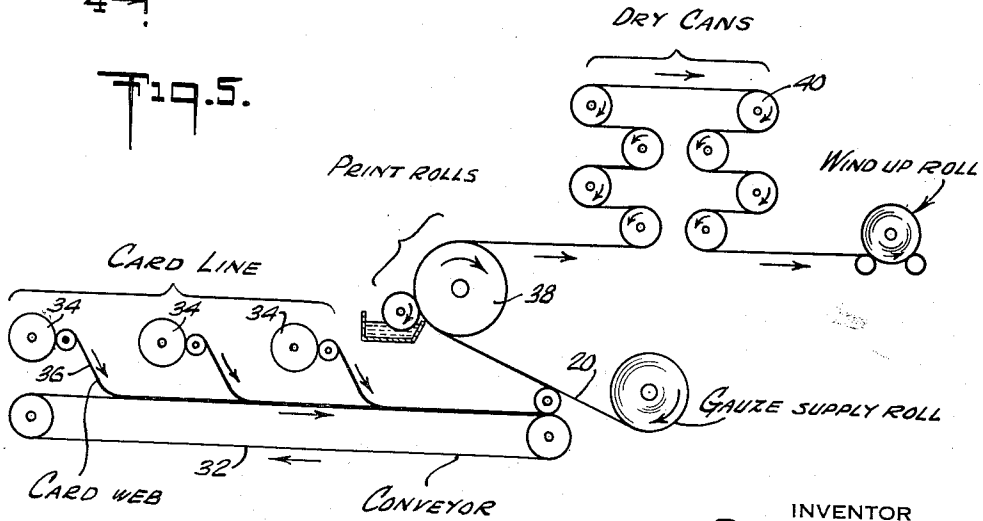


Fig. 5.



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SANITARY NAPKIN

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Application July 12, 1952, Serial No. 298,580

1 Claim. (Cl. 128—290)

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This invention relates to absorbent dressings, particularly those of the sanitary napkin type, and is directed to improving the softness, strength, comfort and absorptive effectiveness thereof.

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 may be secured to a belt. The materials formerly available for covers 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, gauze is rough, especially where folded over the edges of the core. It becomes even rougher when the napkin cover becomes moist or the core is folded.

The present invention eliminates many of these and other disadvantages of previous napkins by improving the porosity, strength and softness of the cover of the napkin. Under the conditions of use (which heretofore have increased the harshness and roughness of gauze covers) my improved napkin is designed to retain its greater softness to the touch and general comfort to the wearer.

The following description and accompanying drawings show, for example only, one form of napkin embodying my invention and a method of producing the cover therefor.

In the drawings:

Fig. 1 is a perspective view of one form of my improved napkin;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a plan of a fragment of the napkin cover shown in Fig. 1, being enlarged somewhat to show its structure and the binder in the form of separated wavy lines;

Fig. 4 is a section on the line 4—4 of Fig. 3; and

Fig. 5 is a schematic view illustrating a preferred method of making the napkin cover of Fig. 3.

Referring generally to the drawings, any suitable absorbent pad or core 10 is surrounded by a wrapper or cover generally indicated as 12, folded about the core and usually overlapped as indicated at 14. The core may be made of any known and suitable material such as cotton fibers, paper, fluffed paper pulp and the like. Such cores are flexible and capable of being folded or bent. They are also resilient in the sense that they tend to resume their original form when the folding force is removed. This, and the thickness of the core, create problems of stretching or strength of the cover which affects safety and comfort in the cover. The cover extends beyond the ends of the core to form pinning tabs 16. So much has been done before my invention.

The sheet material used for my cover is a composite fabric comprising gauze 20 bearing on the

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outer face thereof a fleecy, lightweight, tenuous web generally indicated by reference character 22 of unspun and unwoven textile fibers 24. In the preferred embodiment shown in Fig. 3 the fibers 24 comprising the fleecy web 22 are substantially parallelized or oriented in a direction parallel to the length of the napkin and to one of the two sets of threads from which the gauze 20 is constructed. Preferably the fleecy web 22 comprises a web formed by a conventional cotton carding machine.

The unspun and unwoven fibers 24 in the fleecy web 22 are segmentally or discontinuously united together and also to the gauze carrier or support by intermittent or discontinuous areas of binder 26. Preferably, the binder is applied in the form of intermittent or spaced lines extending continuously across the parallelized fibers and defining a series of sinuous or wavy lines. If desired, however, the binder may be applied discontinuously, in the form of disc shaped spots or annular rings or any other form of binder "islands," arranged, for example, in a staggered overlapping pattern. Instead of the wavy lines or spots of binder, a pattern consisting of intersecting diagonal lines forming a diamond grid may also be used. The binder lines preferably are very narrow (of the order of twenty thousandths of an inch) and are as far apart as the average fiber length of the fibers comprising the web will permit, e. g., of the order of one-quarter inch), so that a substantial proportion of the area of the fleecy web is free of binder.

Examples

A preferred method of preparing such a cover material will now be described in connection with Fig. 4. In making Sample #1, a fibrous web 36 consisting of a blend of 75% 2'', 1.5 denier, dull viscose staple and 25% bleached absorbent cotton comber noils was laid down onto a moving wooden slat conveyer 32 from a conventional cotton card 34. The web was then lifted from the conveyer 32 and shortly after leaving the conveyer, it was adhered to one ply of 14 x 10 gauze 20. The composite structure in the dry state was then fed into a gravure type print unit 38, which segmentally deposited a plasticized polyvinyl acetate adhesive (aqueous emulsion) onto the face of the carded web. This print unit consisted of two metal rolls, the backing roll being wrapped with an 80 square cotton sheeting in order to provide a desirable cushion and to absorb any binder which struck through the structure. The other metal roll was an engraved print roll which deposited binder onto this structure. Sufficient pressure was applied by the print roll against the backing roll so that the adhesive was forced through the web in order to obtain an adhesive bond between the gauze and the fibrous web. After the adhesive was applied, the resulting product was dried on drying cans 40. The resulting material had a weight of 282 grains (18.3 grams) per square yard. This consisted

of 166 grains of 14 x 10 gauze (10.7 grams), 50 grains of binder (3.3 grams), and 66 grains of fiber (4.3 grams).

Sample #2 was made with carded webs deposited from two cards. This material had a weight of 366 grains (23.7 grams) per square yard. This consisted of 50 grains of binder (3.2 grams), 166 grains of 14 x 10 gauze (10.7 grams), and 150 grains of fiber (9.8 grams).

Sample #3 was made from carded webs deposited from three cards. This material had a weight of 460 grains (29.9 grams) per square yard. This consisted of 50 grains of binder (3.2 grams), 166 grains of 14 x 10 gauze (10.7 grams), and 245 grains of fiber (16.0 grams).

The engraved roll used in making these samples had a wavy print design, and the print lanes were spaced ¼" apart. This particular design resulted in a fabric having high absorptive capacity, excellent drape, and desirable softness. The engraving was so designed so as to meter approximately 50 grains of binder per square yard of web to the structures described above.

The properties of the three samples described above compared to 14 x 10 gauze, were as follows:

	Grains/ Sq. Yd.	Bulk	Tensile Strength (6 Ply) Lbs./In. Width	
			Long	Cross
Sample #1	282	0.036 in. (4 ply)	33.0	17.7
Sample #2	366	0.043 in. (4 ply)	32.6	16.7
Sample #3	461	0.056 in. (4 ply)	36.1	15.5
14 x 10 Gauze	166	0.024 in. (4 ply)	17.2	6.9

In the product of the present invention, the fleecy, tenuous card web comprises an applique of fibers that are adhesively anchored or bonded to the threads of the gauze web at a multiplicity of relatively spaced binder areas (e. g., 26, Fig. 3) where the fibers of the card web and some of the threads of the gauze web are contiguous. The number of fibers anchored to a given area of the gauze web will, of course, depend upon the weight of the applied web. It may, for example, be relatively light. Thus, when a single card web is used, the applied fibers may, for example, be of the order of, say, about 20, 23, 30, 35, 40, 50, 60, 70, 80, 90, 92.4 or more grains per square yard of gauze, corresponding roughly to a range of 1½ grams to 6 grams per square yard of gauze web. Accordingly, a very large proportion of the applied fibers will be in direct contact with the threads of the gauze web and will be adhesively anchored or bonded thereto. The bonded fibers will therefore exhibit a high resistance to displacement when the product (for example, in the normal use of a napkin covered thereby) is subject to rubbing or scuffing.

If preferred, however, a much heavier web may be applied to the gauze, for example, up to 350 grains per square yard, even when using only a single card. By using one, two, three or more cards in series, it is apparent that a wide range is possible in the weight of the fiber applique, varying, for instance, from as low as 20 grains per square yard to multiples of the heaviest web may be formed by a single card with a double doffer.

The fleecy fibers intermittently anchored to the outer face of the napkin substantially reduce the chafing action and improve its softness and comfort. This desirable result is accomplished, however, without adversely affecting the open structure of the cover or the absorptive effectiveness of the napkin. In addition, the applied fibers adhesively bonded to the threads of the gauze reinforce its strength to some extent, minimize the tendency of the gauze to unravel or lose its uniformity of weave, and permit the use of a more open mesh gauze than would otherwise be acceptable as napkin cover material or mechanically feasible to handle. The present invention therefore provides an inexpensive means of improving strength, softness and absorptive effectiveness of napkin cover. It also enables the production of a more uniform gauze of low thread count, characterized by resistance to unraveling and distortion when handled.

The napkin cover per se and the method of making the same are described and claimed in my divisional application, Serial Number 317,250, filed October 28, 1952.

Having now described my invention in specific detail and exemplified the preferred manner in which it may be carried into practice, it will be apparent to those skilled in the art that many variations, modifications and extensions of the principles involved may be made without departing from the spirit or scope thereof. Thus, for example, in lieu of polyvinyl acetate, one may use any of the thermoplastic or thermosetting resin binders well known in the nonwoven fabric art, including for example, those described in the Joshua Goldman Patent 2,039,312, or the Joseph Goldman Patent 2,407,548, or the Esther Goldman Patent 2,545,952. These binders and binding operations, being well known and conventional, need not be described herein since reference may readily be made to the prior art including the patents mentioned.

The invention claimed is:

A catamenial napkin having an absorbent pad and a wrapper around said pad, said wrapper comprising a thread web, and an applique of carded fibers adhesively bonded to the threads of said web in a multiplicity of relatively spaced areas which occur where fibers of said applique and some of the threads of said web are in contiguous relation to each other, said applique having a basis weight in the range of about 1½ grams to 6 grams per square yard and providing such a paucity of fibers in relation to the area of the thread web on which said fibers are applied, that such a large proportion of the fibers in said applique will be disposed in contiguous relation to said threads so as to be bonded to said thread web as aforesaid, thereby attaining secure anchorage of said applique to said web and imparting to the wrapper a characteristic of high resistance to displacement of the applique fibers from the thread web by scuffing or rubbing which occurs as an incident to normal body action against the surface of the napkin when the napkin is worn in a normal manner.

ROBERT W. JOHNSON.

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