

# United States Patent

Chapuis

[15] 3,699,966

[45] Oct. 24, 1972

[54] **SANITARY NAPKIN** 3,336,923 8/1967 Devaud.....128/290 R  
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[73] Assignee: **Etablissements Ruby S.A.**, Voiron- 3,411,504 11/1968 Glassman.....128/290 R  
en-Chartreuse, France

[22] Filed: **June 5, 1970**

[21] Appl. No.: **43,699**

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### [30] Foreign Application Priority Data

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*Attorney*—Holcombe, Wetherill & Brisebois

[52] U.S. Cl. ....128/290 R

[51] Int. Cl. ....A61f 13/16

[58] Field of Search.....128/290, 296

### [57] ABSTRACT

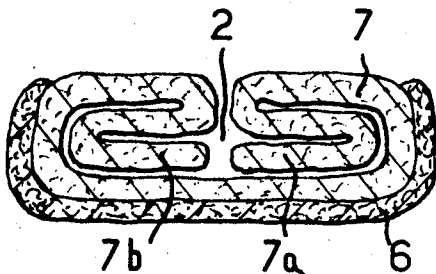
Sanitary napkin comprises alternate layers of hydrophilic and hydrophobic material, with the edges of the hydrophilic material folded inward to define a channel extending through the middle of one side of the napkin.

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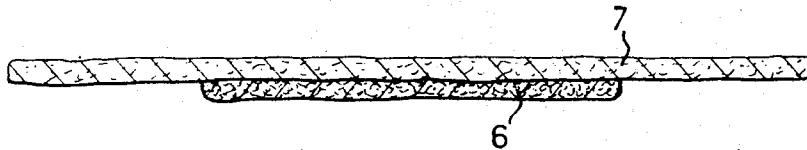
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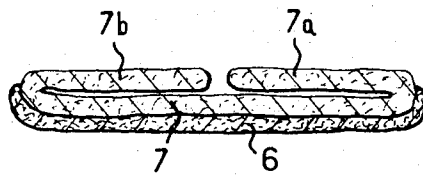
**3 Claims, 9 Drawing Figures**



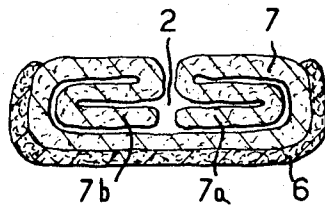
**FIG. 1**



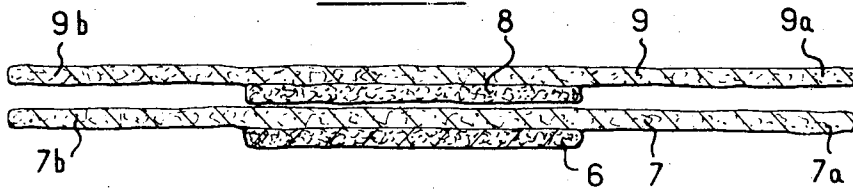
**FIG. 2**



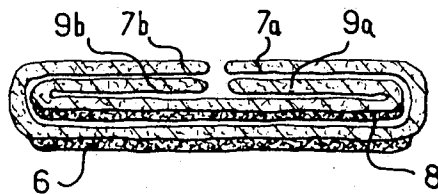
**FIG. 3**

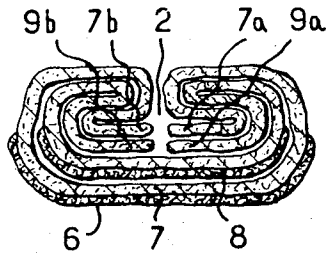


**FIG. 4**

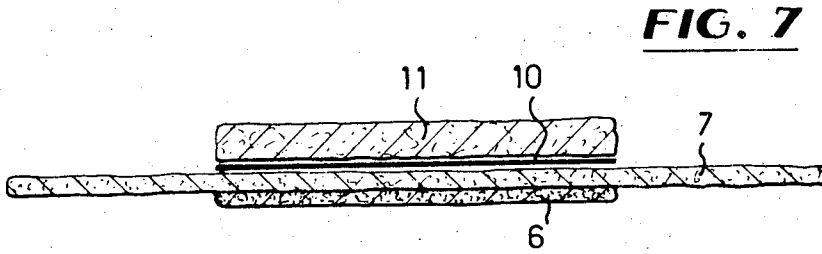


**FIG. 5**

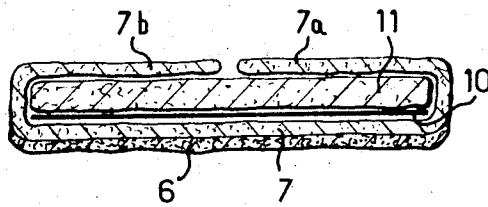




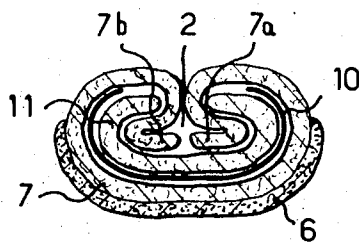
**FIG. 6**



**FIG. 7**



**FIG. 8**



**FIG. 9**

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SANITARY NAPKIN

SUMMARY OF THE INVENTION

This invention relates to an improved sanitary napkin. Known sanitary napkins consist of an absorbent material, generally hydrophilic cotton or cellulose fibers.

The present invention relates to a napkin having novel structural characteristics which make it possible for it to function in an improved manner and absorb a greater quantity of liquid for a given weight of absorbent material.

It is the object of the present invention to provide a sanitary napkin having a channel extending along the middle of one of its major surfaces, characterized by the fact that it comprises at least one layer of absorbent material, preferably of hydrophilic cotton, positioned on a smaller layer of hydrophobic cotton. The two longitudinal edges of the layer of absorbent material are folded inward over this layer of absorbent material at least once to form a channel.

In a preferred embodiment of the invention the sanitary napkin is made from a first layer of hydrophilic cotton positioned on a second, smaller layer of hydrophobic cotton, the lateral edges of the layer of hydrophilic cotton being folded toward each other over the surface of the layer of hydrophobic cotton remote from the layer of hydrophobic cotton. The edges of the composite layer made in this manner are then again folded toward each other so as to leave on the outside of the napkin a layer of hydrophobic cotton while forming a longitudinal channel in the other surface of the napkin. This produced several passages for liquid, which passages are formed between the folds and lead toward the channel.

In an improved embodiment of the invention a first, relatively small, layer of hydrophobic cotton, a first and larger layer of hydrophilic cotton a second, relatively small layer of hydrophobic cotton, and a second and larger layer of hydrophilic cotton are superimposed, after which all the edges of the layers of hydrophilic cotton are folded inward and away from the first layer of hydrophobic cotton. Then the edges of the composite napkin are themselves folded inward so as to produce the channel.

In another method of carrying out the invention a sanitary napkin is made from a base of cotton and cellulose pulp by successively stacking on each other a relatively small layer of hydrophobic cotton, a larger layer of hydrophilic cotton, a relatively small sheet of semi-impermeable cellulose, and a relatively small layer of cellulose pulp, after which the edges of the hydrophilic layer of cotton are folded back on the layer of cellulose pulp and the sides of the resulting composite napkin are then folded toward each other, leaving the layer of hydrophobic cotton outside.

The sanitary napkins according to the invention are especially useful, partly because of their absorbent qualities, and partly because of the comfort with which they may be used.

The sanitary napkins according to the invention may, in a known manner, be kept inside a textile net.

Traction on the end of the net when the napkin is being put in place has a favorable effect which tends to close the channel. This effect compensates for the influence of the longitudinal curvature which is imparted

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to the napkin when it is being put in place, and which has a tendency to open the channel.

Moreover, the alternation in the napkin of hydrophilic and hydrophobic or semi-impermeable layers in the lower central part makes it possible to obtain a better diffusion and a better absorption of the liquid, which has a substantial effect on the comfort derived from the use of these napkins.

The napkins according to the invention have the advantage of having a greater absorbing power than napkins of equal weight heretofore known. They provide an excellent distribution of liquid over the entire napkin. They assure good retention and excellent behavior with respect to lateral flow, which constitutes the principle disadvantage of napkins heretofore known.

In order that the invention may be better understood, several embodiments of the invention will now be described purely by way of illustration and example with reference to the accompanying drawings, on which:

FIGS. 1, 2 and 3 are sectional views showing three steps in the manufacture of a napkin according to the invention;

FIGS. 4, 5 and 6 are cross sectional views showing three steps in the manufacture of another embodiment of the invention; and

FIGS. 7, 8 and 9 show three steps in the manufacture of a third embodiment of the invention.

FIGS. 1-3 show the steps in the manufacture of one embodiment of the napkin according to the invention. In this method, one starts with a relatively small layer of hydrophobic cotton 6 on which a relatively large layer of hydrophilic cotton 7 is positioned.

The edges 7a and 7b of the layer of hydrophilic cotton are then folded inward away from the layer of hydrophobic cotton. Then the edges of the resulting product shown on FIG. 2 are again folded upwardly and inwardly. This makes it possible to obtain a napkin according to the invention of the type shown in FIG. 3.

It will be seen that this napkin comprises a channel 2 which is formed by a double folding of the layer of hydrophilic cotton 7, whereas the layer of hydrophobic cotton 6 surrounds the lower and side parts of the napkin.

It will be appreciated that such a configuration of the napkin makes it possible to distribute the liquid very well and increase the absorptive capacity of the napkin.

FIGS. 4-6 show an improved embodiment of the invention illustrated in FIGS. 1-3. In this case, a first relatively small layer 6 of hydrophobic cotton, a first and larger layer 7 of hydrophilic cotton, a second, smaller layer 8 of hydrophobic cotton and a second and larger layer 9 of hydrophilic cotton are superposed. The edges 7a, 7b, 9a and 9b of the layers of hydrophilic cotton are then folded in away from the layers 6 and 8 of hydrophobic cotton.

In order to produce a napkin according to the invention the edges of the resulting product as shown in FIG. 5, are then again folded inward, so as to produce the configuration shown in FIG. 6. In this embodiment of the napkin according to the invention it will first be noted that the channel 2 adjoins several folds formed by the cotton layers, thus facilitating distribution of the liquid. Moreover, when the liquid tends to run down, it first encounters the layer 8 of hydrophobic cotton

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which provides substantial resistance to its passage, then in the case of a particularly abundant flow of liquid which passes through the layer of hydrophobic cotton, it accumulates in the absorbent layer of hydrophilic cotton 7, the outer layer 6 of hydrophobic cotton then insuring that the napkin is completely fluidtight.

FIGS. 7-9 show a third embodiment of the napkin according to the invention, made of cotton fibers and cellulose pulp.

A relatively small layer 6 of hydrophobic cotton and a larger layer 7 of hydrophilic cotton support a sheet of semi-impermeable cellulose 10 and a layer of cellulose pulp 11.

The sheet of semi-impermeable cellulose has characteristics analogous to those of a layer of hydrophobic cotton, that is to say, it substantially resists the passage of liquids.

The edges 7a and 7b of the layer of hydrophilic cotton 7 are then folded in over the layer 11 of cellulosic pulp.

It then suffices to again fold the two longitudinal edges of the resulting product shown in FIG. 8 in order to obtain a napkin according to the invention, which is shown in FIG. 9. In this case as well the channel according to the invention permits excellent distribution of the liquid between the folds of its various components, with the sheet of cellulose 10 and the layer 6

of hydrophobic cotton forming two successive obstacles to the passage of liquid.

The napkins according to the invention, as hereinbefore described, have proven very efficacious.

It will of course be appreciated that the embodiments which have been described have been given purely by way of illustration and example, and may be modified as to detail without thereby departing from the basic principles of the invention.

What is claimed is:

1. Sanitary napkin comprising a channel along the middle of one of its surfaces characterized by the fact that it comprises a first relatively small layer of hydrophobic material, a first larger layer of hydrophilic material, a second relatively small layer of hydrophobic material, and a second larger layer of hydrophilic material, the edges of the layers of hydrophilic material being folded toward each other away from the first layer of hydrophobic material and the edges of the resulting product being again folded toward each other to form said channel.

2. Napkin as claimed in claim 1 in which said layers are made of cotton.

3. Napkin as claimed in claim 1 in which said second relatively small layer is made of semi-permeable cellulose and the remaining layers are made of cotton.

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