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SANITARY TOWEL

The present device relates to a sanitary towel for effective treatment of menstrual fluid.

An object of the present device is to provide a sanitary towel, the morphological stability of which is improved in the manufacturing process, in which the escape of the component materials is prevented, and also which is excellent in absorbency.

Figures 1 to 3 are lateral cross sections of conventional sanitary towels. Figures 4 and 5 are lateral cross sections of the sanitary towels of the present device. Figures 6 and 7 are longitudinal cross sections of the sanitary towels of the present invention.

Sanitary towels are usually composed of an absorbing member comprising one or both of absorbent paper and cotton-like pulp, that is, fluff pulp, the bottom and the sides of which are covered with a liquid-impermeable leak-proof material, which is further covered entirely with a liquid-permeable surface material, and an adhesive tape provided on the unused surface. An example is illustrated in Figure 1, in which reference numeral 1 indicates a surface material, 2 an absorbent paper, 3 a leakproof material, and 7 an adhesive tape.

Recently, super-absorbent polymers, which are high molecular weight absorbents, are often incorporated into the absorbing member to improve its absorbency. Figures 2 and 3 are examples showing the structures of sanitary towels of that type, in which an absorbent paper 2^1 is laminated onto a fluff pulp 4. A super-

absorbent polymer 5 and a fluff staple fiber 6 are also present.

The use of super-absorbent polymers, as illustrated in these examples, seem to have improved the absorbency in general, but the following disadvantages have not yet been overcome. For example, there are two problems in the structure of the towel illustrated in Figure 2. Firstly, as the super-absorbent polymer is positioned close to the outer surface of the napkin, the absorbed menstrual fluid, when present in only a small amount, cannot reach the super-absorbent polymer 5 but is absorbed by the fluff pulp 4 or the absorbent paper 2^1, to remain there. The super-absorbent polymer 5 does not therefore work effectively. Secondly, in the step of laminating the absorbent paper 2^1 onto the fluff pulp 4 to form the towel, the pulp or the absorbent paper is sometimes displaced from the position to be laminated, or the fluff pulp sometimes escapes from the end a. Thus, portions of fluff pulp may contaminate either the production machinery, or the product itself, which is undesirable from the viewpoint of hygiene.

On the other hand, the sanitary towel illustrated in Figure 3 is an example having a structure like the letter "e" in which both ends of the fluff pulp pad 4, onto the surface of which the super-absorbent polymer 5 is sprayed, are folded. The difficulty in positioning the components of the absorbing member as seen in the sanitary towel of Figure 2 is sufficiently improved in the sanitary towel of Figure 3, but the problem of the escape of the fluff pulp has not yet been solved

because of the presence of part b. The absorbency, on the other hand, is better than that of the sanitary towel of Figure 2 because the super-absorbent polymer 5, being situated near the working surface, is more effectively utilized. Therefore, the sanitary towel of Figure 3, in contrast to that of Figure 2, shows excellent absorbency when only a small amount of menstrual fluid is discharged. However, when the amount of the fluid to be absorbed is increased, the absence of absorbent paper or other diffusively-absorbing material in the structure of the absorbing member increases the amount of the absorbed liquid (menstrual fluid) per unit volume of the absorbing member, resulting in overloading. This problem may be overcome to some extent by increasing the amount of the super-absorbent polymer or the fluff pulp, but this is not a real solution of the problem because of increased cost and overal thickness of the sanitary towel which result. The sanitary towel of Figure 3 thus suffers from substantial disadvantages.

According to the invention there is provided a sanitary towel which is substantially extended in the longitudinal direction and composed of a liquid-permeable surface material for contact with the skin, a liquid-impermeable leakproof material and an absorbing member inserted between said surface and leakproof materials, characterised in that said absorbing member is composed of, outwards from the surface for contact with the skin, a primary absorbent paper, a mixture of a fluff pulp and a super-absorbent polymer, and a secondary absorbent paper, and that said

secondary absorbent paper is covered at least partly by said primary absorbent paper.

Sanitary towels of the present invention can have the following advantages:-

(1) excellent absorbency due to the effective utilization of the entire absorbing member in which a super-absorbent polymer is incorporated, irrespective of the amount of the menstrual fluid to be absorbed,

(2) excellent hygienic qualities due to the prevention of the escape of absorbent material during manufacture, and

(3) low cost.

The present device will now be described in more detail according to the attached drawings.

Figures 4 to 7 illustrate examples of the sanitary towel of the present device. Figures 4 and 5 are lateral cross sections (in the direction of the minor axis) and Figures 6 and 7 are longitudinal cross sections (in the direction of the major axis). The sanitary towel of Figure 4 is prepared by laminating a fluff pulp 4 onto a primary absorbent paper 21 which is somewhat wider than that of the final product, scattering thereon a super-absorbent polymer 5, fixing part or the whole of said super-absorbent polymer 5 in the fluff pulp 4, providing a secondary absorbent paper 22, folding the primary absorbent paper so that it covers the two lateral ends of the secondary absorbent paper 22, thereby forming a covered absorbing member, covering the external surface of said member with a

(17)

leakproof material 3, further covering the entire sanitary towel with a surface material 1, and providing an adhesive tape 7 on the free surface.

In the sanitary towel of Figure 5, the width of the primary absorbent paper 21 is further increased and its lateral ends are allowed to overlap each other so that the secondary absorbent paper 22 is completely covered with the primary absorbent paper 21. Further, in the sanitary towels of Figures 6 and 7, the longitudinal ends of the secondary absorbent paper 22 are also covered with the primary absorbent paper 21.

The thus-prepared sanitary towel of the present invention is excellent in absorbency and free from leakage or stickiness, due to the rapid contact and effective absorption and retention of even a small amount of menstrual fluid by the super-absorbent polymer 5, which is situated near the working surface, and the effective absorption by an entire sanitary towel, when the amount of the fluid is increased, based on the longitudinal diffusion by the secondary absorbent paper 22 which is provided immediately beneath the super-absorbent polymer 5. Unlike conventional sanitary towels, the entire periphery of the fluff pulp of the towel of the present device is covered with the primary and secondary absorbent papers 21 and 22. The sanitary towel of the present invention is therefore free from extraneous matter arising from the escape of fluff pulp, and so has greatly improved hygienic properties. Moreover, as these advantages can be brought about simply by extending to some extent

a part of the _____

absorbent paper, which has been used conventionally, the present device is highly advantageous from the viewpoint of cost, because no substantial change in the structure of the sanitary towel is necessitated. In the practical applications of the present device, there are no limitations on (1) the starting material and process for the preparation of the surface material, (2) use or non-use of as well as the starting material and amount of the fluff staple fiber, (3) the amount of the fluff pulp, (4) the type and amount of the super-absorbent polymer, (5) the process for the preparation and amount of the absorbent paper, (6) the type and characteristics of polyethylene-laminated waterproof paper (7), the type, position, and amount of the adhesive tape, and the like.

The present device will be more readily understood by the following examples, but these examples are not intended to limit the scope of the present invention.

Example 1

Sanitary towels as listed in Table 1 were prepared using the following component materials, and the return amounts, morphology of the products, and the hygienic qualities of the towels obtained were evaluated. The results are shown in Table 1.

(19)

Component materials:

1) Nonwoven fabric (surface material):
olefin, heat-bonded
basis weight: 20 g/m^2

2) Absorbent paper 1:
100 % pulp, a product by an ordinary paper-making process
basis weight: 18 g/m^2

3) Absorbent paper 2:
100 % pulp, a product by an ordinary paper-making process
basis weight: 25 g/m^2

4) Leakproof material:
10 μ polyethylene laminated on 25 g/m^2 waterproof paper

5) Fluff pulp: NBKP type

6) Super-absorbent polymer: sodium polyacrylate (0.3 g)

Two absorbents, i.e. a rapidly absorbing type (a) and a slowly absorbing type (b) were used.

0.3 g of each of these absorbents (a) and (b) was homogeneously scattering onto a No. 2 filter paper (6 cm in diameter) provided on a support connected to a buret filled with physiological saline solution, and the tap was opened to start the measurement. The absorption rate

of type (a) absorbent was 5 cc/min while that of type (b) absorbent was 2 cc/min.

Table 1

	Structure of the sanitary towel	Super-absorbent polymer	Return amount*1(g) Small amount absorption	Return amount*1(g) Large amount absorption	Morphology and hygienic qualities of the product	
Products for comparison	Fig. 1	-	1.5 g	4.2 g	○	good
	Fig. 2	Type a)	1.4	2.4	△	discrepancy in the absorbent member
	Fig. 2	Type b)	1.5	2.8		escape of the pulp
	Fig. 3	Type a)	0.8	2.0	◎	no discrepancy
	Fig. 3	Type b)	1.1	2.6		escape of the pulp
Products of the present device	Fig. 4	Type a)	0.7	0.9	○	no discrepancy
	Fig. 4	Type b)	0.9	1.2		no escape
	Fig. 5	Type a)	0.8	0.8	○	no discrepancy
	Fig. 5	Type b)	1.0	1.2		no escape

Note) *1 Return amount

A predetermined amount of physiological saline was rapidly dropped onto the sanitary towel for absorption, and left to stand for 1 minute. 10 sheets of filter paper were placed on the sanitary towel and left to stand for 3 minutes under a load of 50 g/cm^2. The filter paper was weighed and the increase in its weight was defined as the return amount. 5 g of the physiological saline was dropped onto the towel for the absorption of a small amount and 10g for the absorption of a large amount.

As clearly understood from Table 1, the sanitary towel of the present invention shows good dryness on the surface, that is, only a small return amount, in the absorption of both small and large amounts, and also excellent in the morphological and hygienic qualities of the product. Among the super-absorbent polymers used, the one having a large absorption rate showed better absorbency.

Example 2

A sanitary towel was prepared under the same conditions as described in Example 1, except that polyethylene/polypropylene conjugate fiber and rayon were treated and applied by heat-bonding as surface material in place of nonwoven fabric, and starch-acrylic acid graft polymer (0.3 g) as super-absorbent polymer, and the absorption characteristics, morphology, and the hygienic qualities of the product were tested in the same manner.

The superiority of the product of the present device was shown in every item as in Example 1.

CLAIMS:

1. A sanitary towel, which is substantially extended in the longitudinal direction and composed of a liquid-permeable surface material for contact with the skin, a liquid-impermeable leakproof material and an absorbing member inserted between said surface and leakproof materials, characterised in that said absorbing member is composed of, outwards from the surface for contact with the skin, a primary absorbent paper, a mixture of a fluff pulp and a super-absorbent polymer, and a secondary absorbent paper, and that said secondary absorbent paper is covered at least partly by said primary absorbent paper.

2. A sanitary towel as claimed in Claim 1, wherein the lateral ends of said secondary absorbent paper are covered by said primary absorbent paper.

3. A sanitary towel as claimed in Claim 1, wherein both ends of said primary absorbent paper overlap each other.

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