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Fig.1.

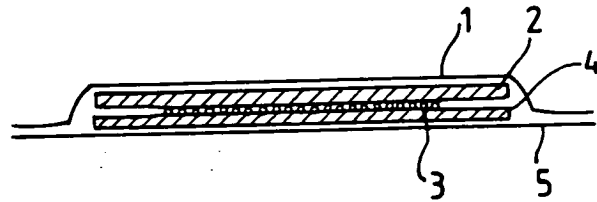


Fig.2.

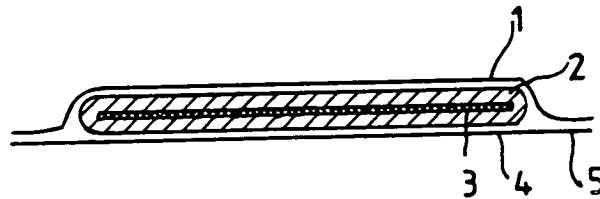


Fig.3.

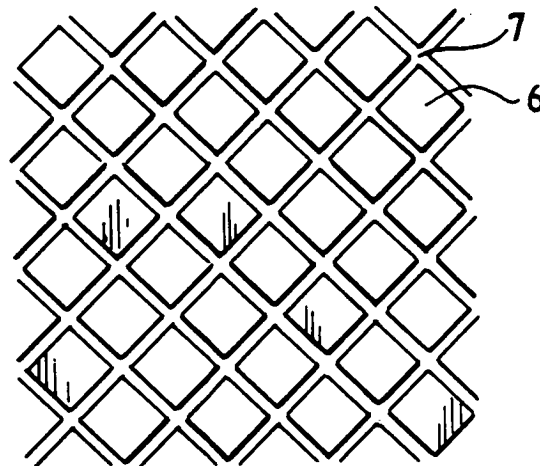


Fig.4.

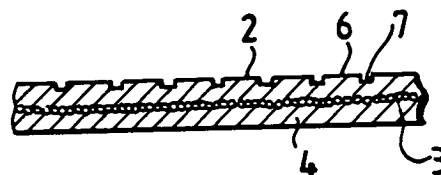


Fig.5.

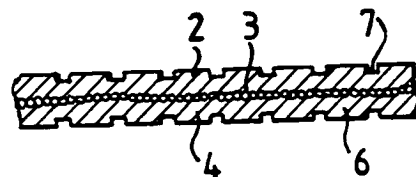
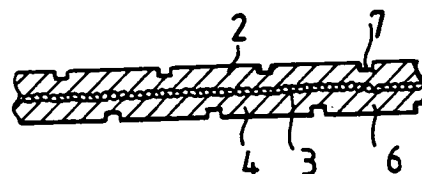


Fig.6.



-1-

SANITARY ARTICLE

The invention relates to a sanitary article such as a disposable diaper which comprises a super water absorbing polymer as the absorbent core and two layers of fluff pulp to contain the polymer therebetween. In particular, the invention provides an improvement in the structure of the fluff pulp layer so that the absorbent polymer may serve as the main absorbent in comparison the fluff pulp layer.

The super water absorbing polymer is also known as a high-molecular water-absorptive material and the fluff pulp is also referred to as cotton-like pulp.

Fluff pulp is used as absorptive core material in most of the commercially available disposable diapers at present. Although super water absorbing polymers have recently been used in some of them to supplement the fluff pulp, there are substantially no diapers in which super water absorbing polymers are used as principal absorber in the core material. The general requirements for the absorptive core material are to have large absorption capacity for the prevention of the leakage of urine from the diaper, to make the return of the absorbed urine to the surface as small as possible, and so on. It is a usual practice to increase the extent of compressing the pulp in order to rapidly diffuse the absorbed liquid to a wide area and reduce the wetness to the touch, so that the above-described requirements can be fulfilled better. However, the more highly the absorptive material is compressed, the more effectively it absorbs but at the same time the harder the material becomes. The compression of the absorptive material to maximize its effect has therefore not been effected practically.

Under these circumstances, the inventors have

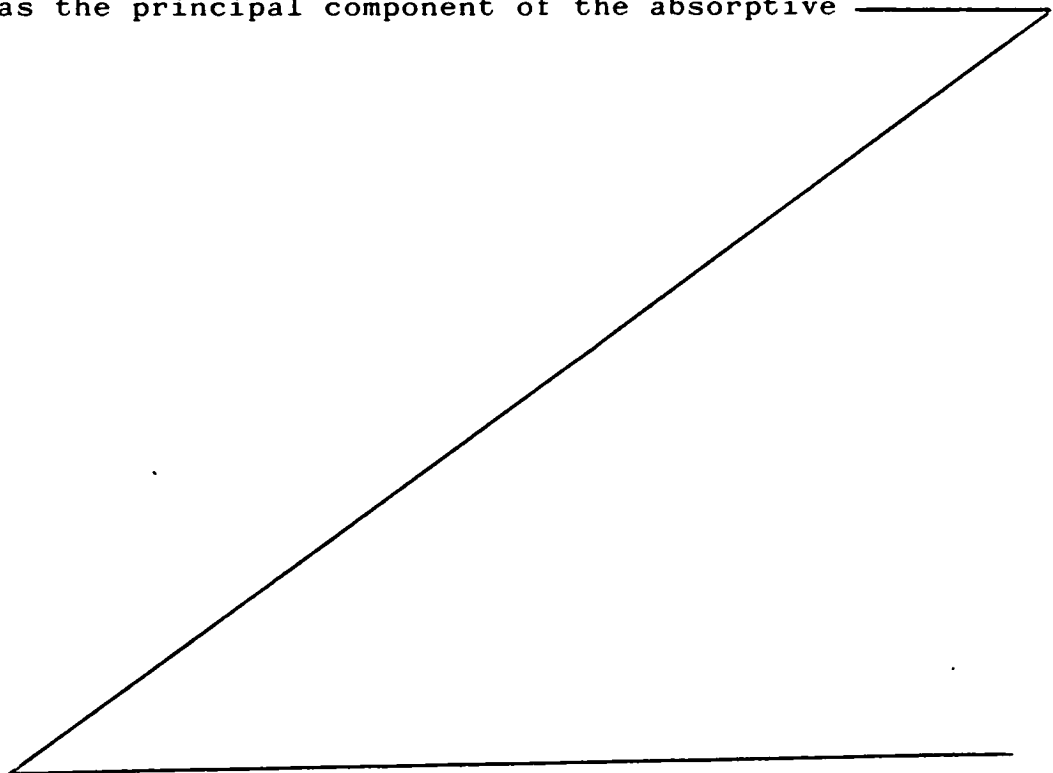
accomplished the present invention as the result of intensive studies to overcome this disadvantage, based on the finding which will be described in detail in the following paragraphs that the use of a combination of
5 fluff pulp and a super water absorbing polymer which can absorb urine in an amount at least several tens of times as much as its own weight and moreover never releases the absorbed liquid, with partly varied degrees of compaction, brings about not
10 only greater absorption capacity and smaller return of urine but also better touch of the absorptive article itself.

More particularly, the present invention provides a sanitary article for absorbing body fluids, comprising:
15 a compressed assembly of an upper fluff pulp layer, a lower fluff pulp layer and a core layer of super water-absorbing polymer disposed between and retained by said fluff pulp layers and providing the principal absorbent of the sanitary article, both of said fluff pulp layers being compressed so
20 as to have an indented lattice pattern on the surfaces thereof remote from said core layer, said surfaces each being comprised of a multitude of compressed small lands which are separated from each other by compressed, criss-crossing, continuous, indented strips wherein each of said lands is
25 surrounded by strips, said lands collectively defining first portions of said fluff pulp layers and having a density of from 0.04 to 0.15 g/cc, said indented strips collectively

defining second portions of said fluff pulp layers
and having a density higher than the density of said
first portions and in the range of from 0.06 to
0.4 g/cc, the areas of said fluff pulp layers that are
5 occupied by said second portions being from 10 to
50 percent of the total areas of said fluff pulp layers.

The fluff pulp layer to be used in the
invention article is manufactured by partially com-
pressing fluff pulp so that the first portion and
10 the second portion are shaped as above defined.

The use of the super water absorbing polymer
as the principal component of the absorptive



core material, as mentioned above, means that at least 40 % of about 50 cc of urine, i.e. the quantity of urine at one excretion, which was absorbed by the core material, has been absorbed by the super water absorbing polymer after 30 minutes.

An important advantage of the present invention is that the use of a super water absorbing polymer as principal absorptive core material can reduce the amount of fluff pulp and therefore the absorptive material is not hardened even if it is compressed with considerably large pressures. Urine can therefore be effectively diffused by sufficient compression.

Moreover, when such a super water absorbing polymer is used principally, substantial increase in the absorption capacity and decrease in the return of urine cannot be gained unless the super water absorbing polymer is used efficiently. The absorptive core material was compressed for the efficient utilization of this super water absorbing polymer so that urine can be diffused widely into the absorptive core material. Too much compression of the core material, however, results in the hardening of the absorptive material even if the super water absorbing polymer is used principally.

Another important advantage of the present invention

concerning this point is that, as the entire absorptive core material is compressed with some pressures and a part of the core material is further compressed with greater pressures, urine is well diffused entirely and further widely diffused in the part where the material is compressed with especially large pressures. Both of the diffusibility of urine and the softness of the absorptive material have thus been achieved. It is necessary for achieving such an appropriate hardening of the material to select the density of the first site of the compressed fluff pulp within the range from 0.04 to 0.15 g/cm³ and that of the further highly compressed second site from 0.06 to 0.4 g/cm³. If the area of the highly compressed second site exceeds 50 % of the whole article, the absorptive core material is hardened, while if the area is smaller than 10 %, urine cannot be diffused effectively. Accordingly, the area of the second site is preferred to be within the range from 10 to 50 %, more preferably from 20 to 40 %.

The super water absorbing polymer is sandwiched by fluff pulp in the present invention. The pulp of the upper layer must be 20 to 80 % in order to fix the polymer between the upper and the bottom layers of the fluff pulp.

The super water absorbing polymer to be

used in the present invention includes starch polymers, acrylate polymers, cellulosic substances and other high-molecular compounds which can absorb water in amounts at least 50 times as much as its own weight, among which
5 polyacrylate compounds such as sodium polyacrylate are most preferable from the viewpoint of absorptivity.

In the practical application of the present invention, the compression of the entire material and that of the part of it may be effected simultaneously
10 or separately. For example, the partial compression may be effected after the entire compression, or the pulp of the upper and the bottom layers may be compressed first and then the super water absorbing
polymer together with the pulp sandwiching it compressed
15 partially.

Figure 1 is a cross section of a disposable diaper as one example of the absorptive article of the present invention, Figure 2 is a cross section of a disposable
diaper as another example, Figure 3 is a plan view of
20 the absorptive core material of the present invention, and Figures 4 to 6 are enlarged cross sections of the

absorptive core material of the present invention.

1: surface sheet 2,4: fluff pulp
3: super water absorbing polymer
5: back surface sheet
5 6: first site 7: second site

The embodiment of the present invention will now be described in more detail according to the attached drawings.

Figure 1 is a cross section of a disposable diaper as one example of the absorptive article of the present invention, Figure 2 is a cross section of a disposable diaper as another example, Figure 3 is a plan view of the absorptive core material of the present invention, and Figures 4 to 6 are enlarged cross sections of the absorptive core material of the present invention.

15 The disposable diaper of the present invention comprises an absorptive core material in which a super water absorbing polymer 3 is sandwiched by the layers of fluff pulp 2 and 4, said absorptive core material being further covered with a surface sheet 1 and a back surface sheet 5, and the fluff
20 pulp 2 and 4 being composed of a compressed first site 6 and a further compressed second site 7.

. The following is an example of the absorptive article of the present invention.

Example

10 g of fluff pulp was divided into approximate halves to form upper and bottom layers, between which 2.5 g of a super water absorbing polymer (sodium polyacrylate) was spreaded. Then the fluff pulp was compressed as shown in Table 1 to form an absorptive material. 30 ml of artificial urine was allowed to be absorbed by the central part of the prepared absorptive material (120 x 200 mm). After 15 minutes, the return liquid from 100 cm² of the material at a pressure of 35 g/cm² for 2 minutes was allowed to be absorbed by filter paper and the amount of the return was measured. The touch of the absorptive material was also evaluated. The results are shown in Table 1.

Table 1

density of the first site	density of the second site	proportion of the second site (%)	return amount	touch of the absorp- tive material	Remarks
0.03	0.05	30	10.7	○	comparative examples
0.05	0.20	60	3.2	X	comparative examples
0.20	0.40	20	1.9	X	comparative examples
0.10	0.60	20	2.2	X	comparative examples
0.05	0.065	5	8.8	○	comparative examples
0.065	0.20	20	3.4	○	examples
0.04	0.20	10	4.9	○	examples
0.10	0.40	30	2.8	Δ	examples
0.065	0.10	40	4.1	○	examples

○ = good feel to the touch

Δ = less good but still acceptable feel

X = unpleasant feel to the touch

CLAIMS:

1. A sanitary article for absorbing body fluids, comprising:
a compressed assembly of an upper fluff pulp layer, a lower fluff pulp layer and a core layer of super water-
5 absorbing polymer disposed between and retained by said fluff pulp layers and providing the principal absorbent of the sanitary article, both of said fluff pulp layers being compressed so as to have an indented lattice pattern on the surface thereof remote from said core
10 layer, said surfaces each being comprised of a multitude of compressed small lands which are separated from each other by compressed, criss-crossing, continuous, indented strips wherein each of said lands is surrounded by strips, said lands collectively defining first portions
15 of said fluff pulp layers and having a density of from 0.04 to 0.15 g/cc, said indented strips collectively defining second portions of said fluff pulp layers and having a density higher than the density of said first portions and in the range of from 0.06 to 0.4 g/cc,
20 the areas of said fluff pulp layers that are occupied by said second portions being from 10 to 50 percent of the total areas of said fluff pulp layers.

2. A sanitary article as claimed in Claim 1, in which the super water absorbing polymer is sodium polyacrylate.

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Page 1

Last page

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