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D E C I S I O N
of 27 September 2001

Case Number: T 0500/99 - 3.2.6

Application Number: 92915932.5

Publication Number: 0595928

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Language of the proceedings: EN

Title of invention:
FLEXIBLE ABSORBENT SHEET

Patentee:
JOHNSON & JOHNSON INC.

Opponent:
The Procter & Gamble Company
Paul Hartmann Aktiengesellschaft

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - no"

Decisions cited:
T 0246/92, T 0495/91

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0500/99 - 3.2.6

D E C I S I O N
of the Technical Board of Appeal 3.2.6
of 27 September 2001

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 4 March 1999 revoking European patent No. 0 595 928 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: P. Alting van Geusau
Members: G. Pricolo
M. Tardo-Dino

Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 595 928 in respect of European patent application No. 92 915 932.5 filed on 20 July 1992 was published on 9 April 1997.

II. Notice of opposition was filed against the patent as a whole by the respondents (opponents I and II) under Article 100(a) on the grounds that the subject-matter of the claims lacked an inventive step, and under Article 100(b) on the grounds that the patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

III. By decision posted on 4 March 1999 the Opposition Division revoked the patent. The Opposition Division held that the subject-matter of claim 1 lacked an inventive step in the light of the prior art reflected by documents

D2: US-A-4 853 086;

D4: US-A-4 889 597;

or, alternatively, in view of the disclosure of document

D1: US-A-4 144 122,

and document D2.

In its decision, the Opposition Division also referred to document

D3: US-A-3 844 880.

IV. The appellant (patentee) lodged an appeal, received at the EPO on 4 May 1999, against this decision. The appeal fee was paid simultaneously with the filing of the appeal. The statement setting out the grounds of appeal was received at the EPO on 13 July 1999.

V. Oral proceedings took place on 27 September 2001.

The appellant requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of claims 1 to 10 filed during the oral proceedings, or, auxiliarily, that the patent be maintained on the basis of claims 1 to 10 filed with the letter dated 23 August 2001.

As previously announced by letter dated 27 August 2001, Respondent I did not attend the oral proceedings. The proceedings were continued without him (Rule 71(2) EPC). During the written proceedings, Respondent I requested that the appeal be dismissed.

Respondent II requested that the appeal be dismissed.

VI. Independent claims 1 and 10 according to the main request read as follows:

"1. A fluid-absorbent sheet which is used in an absorbent sanitary article, consisting of a non-defibrated, cellulosic board characterized by said board containing effective amounts of debonding agent and cross-linked cellulosic fibers."

"10. A method for manufacturing a fluid-absorbent,

resilient and flexible sheet which is used in an absorbent sanitary article, from a non-defibrated cellulosic board, comprising the step of incorporating in said non-defibrated cellulosic board effective amounts of cross-linked cellulosic fibers and debonding agent."

Independent claims 1 and 10 of the auxiliary request read as follows:

"1. A fluid-absorbent sheet consisting of a non-defibrated, cellulosic board, said board containing effective amounts of debonding agent and cross-linked cellulosic fibers, said board forming a network with chemically relaxed interfiber bonds which is interspersed with individual cross-linked cellulosic fibers."

"10. A method for manufacturing a fluid-absorbent, resilient and flexible sheet from a non-defibrated cellulosic board containing an effective amount of debonding agent, comprising the steps of dispersing said non-defibrated board in water to form a slurry containing a fibrous network with chemically relaxed interfiber bonds; adding an effective amount of individualized cross-linked cellulosic fibers to the slurry to form a network structure which is interspersed with said individualized cross-linked cellulosic fibers."

VII. In support of its requests the appellant relied essentially on the following submissions:

The claims of the main request were more limited in scope than the granted claims, relating to a fluid-

absorbent sheet in general, because they now included a reference to the specific use of the fluid-absorbent sheet in an absorbent sanitary article. Therefore, the requirements of Article 123(3) EPC were complied with.

Document D4 disclosed a non-defibrated cellulosic board for use in an absorbent sanitary article, consisting of a mixture of cross-linked and uncrosslinked fibers, but failed to disclose the provision of a debonding agent. It was the latter feature that was responsible for the achievement of a structure having a void volume high enough to provide a good absorption capacity and high fluid acceptance rate, while at the same time maintaining good flexibility, resiliency and tensile strength. Document D4 described the advantages obtainable by combining cross-linked and uncrosslinked fibers but did not disclose that the softness of the fluid-absorbent sheet obtained by such combination might be insufficient. Accordingly, there was no reason for a skilled person to consider the provision of a debonding agent for improving the softness of the fluid-absorbent sheet known from document D4. Nor did documents D1, D2 and D3 suggest that a debonding agent could have improved the absorption capacity, flexibility and resiliency of a structure comprising cross-linked and uncrosslinked cellulosic fibers.

Furthermore, both D1 and D3 disclosed that particular care had to be taken when using debonding agents, since they negatively affected the hydrophilic properties and tensile strength of cellulosic products. Therefore, the subject-matter of the claims according to the main request was not obvious.

The independent claims according to the auxiliary

request additionally defined "a network with chemically relaxed interfiber bonds", thereby referring, in a sufficiently clear manner, to a structure in which the incidence of hydrogen bonding between the fibers was reduced by the debonding agent acting chemically on the cellulose fibers. These independent claims, moreover, were to be understood as implying that the debonding agent was present in such an amount to relax the interfiber bonds only, without affecting the intrafiber bonds. Since a skilled person would have normally expected that the debonding agent acted on both interfiber and intrafiber bonds, the claimed subject-matter went beyond the skilled person's expectations and thus involved an inventive step.

VIII. In its written submissions, respondent I essentially argued as follows:

The Appellant's argument that the problem underlying the patent consisted not only in providing a structure having improved absorbent capacity and sufficient softness, as set out in the decision of the Opposition Division, but also in avoiding the undesired fluffing process, could not support the presence of an inventive step, because the patent itself described that fluffed fibrous material which had been converted to non-fluffed form could have been used. Accordingly, it did not matter when the defiberization took place, and even a material which had been defiberized prior to the reaction of the cross-linking agent, as in D4, fell within the scope of the claims.

IX. The arguments of respondent II can be summarized as follows:

The granted claims were directed to a fluid-absorbent sheet whilst the independent claims of the main request were directed to an absorbent sanitary article with such a fluid-absorbent sheet. Therefore, the claims of the main request extended the protection conferred by the European patent, contrary to Article 123(3) EPC.

D4 already disclosed a fluid-absorbent sheet which was directly used, i.e. in a non-defibrated state, in an absorbent sanitary article, the sheet comprising a mixture of cross-linked and uncrosslinked cellulosic fibers. D4 did not disclose the use of a debonding agent, which provided improved softness of the fluid-absorbent sheet. No other technical effects other than this could be attributed to the debonding agent. In this respect, it was important to note that Figure 3 of the patent was misleading. Indeed, cross-linked fibers, although having a curled configuration, could not form a space frame-like structure as shown in the figure, since the cross-link bonds were between cellulose molecules of a single fiber, rather than between cellulose molecules of separate fibers. The use of a debonding agent to improve the softness of cellulosic fibrous materials was known from either D1 or D3, and, therefore, the subject-matter of claim 1 was obvious. Moreover, cellulosic wood pulp material already treated with debonding agent was a commercially available material, and therefore, its use as a starting material in the production of a fluid-absorbent sheet according to D4 was an obvious step for a person skilled in the art, who, by doing so, would directly arrive at the subject-matter of claim 1.

Claims 1 and 10 of the auxiliary request did not meet the requirements of Article 84 EPC, because the meaning

of the term "network" and of the expression "chemically relaxed interfiber bonds" was not clear. Anyway, the subject-matter of these claims also lacked an inventive step, because a network with chemically relaxed interfiber bonds which was interspersed with individual cross-linked cellulosic fibers was automatically obtained when carrying out the teaching of D4 in the presence of a debonding agent, irrespective of when the debonding agent was added. Moreover, a debonding agent was effective only after dewatering, when the cross-linked fibers were already formed, and thus could not affect the intrafiber bonds.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 The Board is satisfied that the amendments comply with the requirements of Article 123(2) EPC. Indeed, support for the definition of the independent claims 1 and 10 of the main and auxiliary request can be found in original claims 1 and 10, and in the original description (see the published patent application, page 1, first paragraph; page 7, last paragraph; page 19, line 28 to page 20, line 6). Dependent claims 2 to 9 of both requests correspond to original claims 2 to 9.

2.2 The claims of the main and auxiliary request also meet the requirements of Article 123(3) EPC.

In the Board's view, the reference in claims 1 and 10

of the main request to the intended use of the fluid-absorbent sheet cannot extend the protection conferred so as to encompass products other than fluid-absorbent sheets; on the contrary, it excludes from the protection those fluid-absorbent sheets that are not suitable for use in an absorbent sanitary article.

Since independent claims 1 and 10 of the auxiliary request define additional features with respect to granted claims 1 and 10, they do not extend the protection conferred.

2.3 Respondent II submitted that the meaning of the term "network" and of the expression "chemically relaxed interfiber bonds", in claims 1 and 10 of the auxiliary request, was not clear, contrary to Article 84 EPC.

However, in agreement with the Appellant's view, the Board is of the opinion that the skilled person would have no difficulties in understanding that the definition "network with chemically relaxed interfiber bonds" refers to a fibrous structure in which the incidence of hydrogen bonding between the fibers is reduced by the debonding agent acting chemically on the cellulose fibers.

3. *Novelty*

Novelty of the subject-matter in accordance with claims 1 and 10 of the main and auxiliary requests follows from the fact that none of the cited documents discloses the provision of a debonding agent in a non-defibrated cellulosic board which includes cross-linked cellulosic fibers.

Novelty was in fact not disputed.

4. *Inventive step - main request*

4.1 The technical problem underlying the patent in suit consists in providing a fluid-absorbent cellulosic sheet which does not utilize peat moss as a primary absorbent medium, yet it has a sufficient absorption capacity as well as a relatively short fluid acceptance time, and possesses good flexibility and resiliency for use in disposable absorbent articles, particularly for sanitary usage (see page 3, lines 17 to 20 of the patent).

4.2 In accordance with the opinion expressed by the parties present at oral proceedings, document D4 represents the closest prior art, and discloses a fluid-absorbent sheet which is used in an absorbent sanitary article (column 3, lines 53 to 56), consisting of a non-defibrated, cellulosic board containing effective amounts of cross-linked cellulosic fibers (see column 15: lines 9 to 12; 22 to 24; 30 to 38; column 14, lines 1 to 5). The subject-matter of claim 1 is distinguished therefrom in that the board contains effective amounts of debonding agent.

4.3 Since the technical problem mentioned in the patent was in relation to prior art which was less relevant than D4, an inquiry must be made as to which other technical problem objectively existed when starting from D4 as the closest prior art (see e.g. T 246/92 or T 495/91, not published in the OJ EPO).

As explained in the patent (page 3, lines 52 to 53), the debonding agent acts on the cellulose fibers to

reduce the incidence of hydrogen bonding between the fibers. A softer fluid-absorbent sheet is thereby provided.

The objective problem solved by the patent in suit may therefore be seen in providing a softer fluid-absorbent sheet.

4.4 In order to solve this problem, the skilled person would turn to document D3, which includes the general teaching (column 1, line 63 to column 2, line 2) to use debonding agents for conferring improved softness to cellulosic sheet materials. The disclosure of document D3, that the use of debonding agents results in a decrease of the tensile strength of the cellulosic sheet materials (see column 2, lines 2 to 8), would not prevent the skilled person from using them, since it does not constitute a prejudice but only an indication that a reduced tensile strength has to be accepted if an improvement of the softness is desired.

4.5 The appellant was not able to convincingly show that the use of a debonding agent in the mixture of non-defibrated cross-linked and uncrosslinked fibers would provide, apart from the known effect of reducing the incidence of hydrogen bonding between the fibers and thereby improving the softness of the cellulosic sheet, other technical effects. Indeed, the debonding agent acts on the hydrogen bonds between both the cross-linked and the uncrosslinked fibers, thereby relaxing the whole fibrous network of the cellulosic material. Therefore, the debonding agent acts in a manner which is known, and does not provide any unexpected results. Moreover, the effects of a higher void volume and of an increased overall bulk described in the patent (page 5,

lines 40 to 41) are nothing more than the predictable result of the reduction of the incidence of hydrogen bonding between the fibers caused by the debonding agent.

The appellant argued that the debonding agent was responsible for the achievement of a structure having a void volume high enough to provide a good absorption capacity and high fluid acceptance rate, while at the same time maintaining good flexibility, resiliency and tensile strength. But also the structure according to D4, which is not provided with a debonding agent, has similar properties (see D4, column 5, lines 50 to 55 and column 15, lines 30 to 34), such that it can be used in disposable absorbent articles (column 15, lines 59 to 65).

4.6 The appellant also submitted that there was no reason for a skilled person to consider the provision of a debonding agent in the fluid-absorbent sheet known from document D4, since the latter did not disclose that the softness thereof might be insufficient.

The Board cannot follow this line of argument. The achievement of improvements in comfort is a constant preoccupation for the expert in the technical field of sanitary articles. Since the expert knows that softness goes hand-in hand with comfort (cf. page 3, lines 8 to 10 and 20 to 22 of the patent), seeking to improve the softness of known fluid-absorbent sheets is for him a normal task.

4.7 Therefore, the Board comes to the conclusion that the provision of a debonding agent in the starting material of D4 is an obvious option when softness of the

resulting fluid-absorbent sheet is desired and hence, the subject-matter of claim 1 does not involve an inventive step. It follows that the main request cannot be allowed.

5. *Inventive step - auxiliary request*

5.1 Document D4 discloses (see point 4.2 above) a fluid-absorbent sheet consisting of a non-defibrated, cellulosic board, said board containing effective amounts of cross-linked cellulosic fibers. There can be no doubt that document D4 discloses the further feature of claim 1, that the board forms a network interspersed with individual cross-linked cellulosic fibers. Indeed, this feature is the direct result of mixing uncrosslinked and cross-linked fibers.

5.2 Therefore, the subject-matter of claim 1 is distinguished from the fluid-absorbent sheet of D4 in that the board contains effective amounts of debonding agent and in that it forms a network with chemically relaxed interfiber bonds.

5.3 As explained above (point 4.4 of this decision), it is considered to be obvious to provide a debonding agent in the fluid-absorbent sheet of D4. If a debonding agent is provided, then the interfiber bonds are automatically relaxed, because the debonding agent acts chemically on the cellulose fibers to reduce the incidence of hydrogen bonding between the fibers (cf. point 2.3 of this decision). Therefore, the obvious provision of a debonding agent in the fluid-absorbent sheet of D4 directly leads to the subject-matter of claim 1, which does not involve an inventive step. It also follows that the second auxiliary request cannot

be allowed.

5.4 The Appellant argued that claim 1 was to be understood as implying that the debonding agent was present in an amount effective to relax the interfiber bonds only, without affecting the intrafiber cross-linked bonds, which would be an unexpected result, since the skilled person would have normally expected that the debonding agent acted on both interfiber and intrafiber bonds.

The Board cannot agree with this view, which is not supported by any passages in the patent. Moreover, it is generally known that by cross-linking the creation of chemical bonds (cross-links) between polymer molecules (intrafiber bonds) is meant, whereby the chemical nature of the cross-links is variable (see e.g. D2, lines 5 to 7 and 24,25 and 35 to 38). It is also known that a debonding agent acts on the hydrogen bonds between fibers (interfiber bonds). Intrafiber cross-links and interfiber bonds are therefore, generally, of different nature. For this reason, the skilled person had no reason to believe that the debonding agent would act on both the hydrogen intrafiber bonds and the intrafiber cross-links.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Patin P. Alting van Geusau