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D E C I S I O N
of 9 July 1997

Case Number: T 1054/92 - 3.2.2

Application Number: 84301578.5

Publication Number: 0122042

IPC: A61F 13/00, A61F 13/18, A41B 13/02

Language of the proceedings: EN

Title of invention:
High density absorbent structures, method of their manufacture and absorbent products containing them

Patentee:
The Procter & Gamble Company

Opponent:
(0I) Personal Products Company
(0II) Mölnlycke AB

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 87(1)

Keyword:
"Entitlement to priority - first and second priority document, no, third priority document, yes"
"Novelty - yes"
"Inventive step - no"

Decisions cited:
T 0472/92, T 0750/94

Catchword:
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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1054/92 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 9 July 1997

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 5 November 1992 revoking European patent No. 0 122 042 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: H. Seidenschwarz
Members: S. Crane
J.-C. De Preter

Summary of Facts and Submissions

I. European patent No. 0 122 042 was granted on 2 November 1989 on the basis of European patent application No. 84 301 578.5 which claimed priority from three United States applications namely US-473 846 (10 March 1983), US-507 824 (24 June 1983) and US-529 900 (6 September 1983).

II. The patent was opposed by the present first and second respondents (opponents 0I and 0II) as well as further opponents (0III), who subsequently withdrew their opposition, on the basis **inter alia** that its subject-matter lacked novelty and inventive step with respect to the state of the art.

The state of the art relied upon included the following pre-published documents:

D2: US-A-4 340 556,

D8: GB-A-2 018 599,

D16: Technical Bulletin "Sanwet IM-300", Sanyo Chemical Industries, October 1979,

D18: Technical Bulletin "SAP Sheet", Sanyo Chemical Industries, January 1982,

as well as the alleged public prior use (designated "prior use U2") of absorbent structures conforming to the teachings of the patent by its proprietors (the present appellants) between 10 March 1983 and 6 September 1983.

III. With its decision posted on 5 November 1992 the Opposition Division revoked the patent. In this decision it was held that the subject-matter of at least claim 1 according to the main and auxiliary requests then on file lacked inventive step having regard in particular to the documents D8 and D16.

IV. After the proprietors of the patent had filed an appeal against this decision it came to oral proceedings before the present Board, in a different composition, on 20 June 1996.

At those oral proceedings the Board held by way of an interlocutory decision that the subject-matter of claim 1 according to the main request then on file was not entitled to the first and second priority dates and that the prior use U2, which took place before the third priority date, was not confidential. The proceedings were therefore to be continued in writing in order to allow the parties to submit further arguments and evidence on the question of what information had actually been made available to the public through this prior use. The interlocutory decision was subsequently notified to the parties in reasoned written form.

V. On 20 December 1996 the appellants filed an affidavit by one of the inventors, Mr Paul Weisman, and the first respondents filed a declaration by a former employee and now employee of their parent company, Ms Judith Roller. Certain aspects of Ms Roller's evidence were criticised in a letter of the appellants dated 14 March 1997 whereupon, on 5 June 1997, the respondents filed a second declaration by Ms Roller.

VI. Second oral proceedings before the Board were held on 9 July 1997. With their letter dated 3 March 1997 the second respondents had indicated their intention not to

attend and were not present. In accordance with Rule 71(2) EPC the proceedings were continued without them.

The appellants requested that the decision under appeal be set aside and the patent maintained in amended from on the basis of the sets of claims 1 to 8 submitted as first, second and third auxiliary requests at the first oral proceedings on 20 June 1996, which now constituted their main and first and second auxiliary requests respectively.

Claim 1 according to the main request reads as follows:

"1. A process for making [an] absorbent structure which is a mixture of hydrophilic fibres and water-insoluble hydrogel in the form of discrete particles of cross-linked polymeric material in a fiber:hydrogel weight ratio of from 30:70 to 98:2, and which is a dry flexible substantially unbonded structure with a moisture content of less than 10% by weight of the dry absorbent structure and wherein the process comprises air laying the mixture while dry to form a web, characterised in that the absorbent capacity of the structure is increased by compressing the web to a density of 0.15 to 1 g/cm^3."

Claim 1 according to the first auxiliary request is directed to "a process for making a disposable diaper or incontinence pad comprising making [an] absorbent structure" and claim 1 of the second auxiliary request to "a process for making a disposable diaper comprising making [an] absorbent structure", the remaining features of those claims being identical with those of claim 1 according to the main request.

The respective dependent claims 2 to 8 of all three sets of claims are identical and directed to preferred embodiments of the process according to claim 1.

The respondents requested that the appeal be dismissed.

VII. In support of their requests the appellants argued substantially as follows:

The requirement that the absorbent structure has a moisture content of less than 10% by weight, the absence of which in the first and second priority documents had been the basis for the decision that the absorbent structure **per se** could not derive priority from them, was not an essential feature of the process for making the absorbent structure now claimed. The essential features of that process were the air-laying of a mixture of fibres and hydrogel particles when dry to form a web and subsequent compression of the web to a density of 0.15 to 1 g/cm^3. These features were clearly disclosed in the first and second priority documents so that the subject-matter of the present sets of claims was entitled to their priority. As a consequence prior use U2 did not belong to the state of the art according to Article 54(2) EPC.

In any case, all that this prior use made available to the public was an absorbent structure with particular physical characteristics and it was not possible at the time the prior use took place for the person skilled in the art to determine from these characteristics how the absorbent structure had been made. The affidavit of Mr Weisman demonstrated that there were extensive areas of incertitude in this respect. Ms Roller's declarations were on the other hand tainted by her hindsight knowledge of the invention and by the fact that air-laying of a mixture of fibres and hydrogel

particles was now the method of choice for making absorbent structures of the type in question, but this had not been the case in 1983. It must not be forgotten that Ms Roller's assertions about what she would have been able to determine from the prior art absorbent structure were hypothetical since she had not in fact ever examined it. One factor on which her declarations were silent was that the claimed process required two steps in which the web was first formed and then compressed. It could not be seen how the sequential nature of the process could be distinguished in the product. For these reasons it was apparent that the subject-matter of the present claims was novel with respect to prior use U2.

Lack of novelty had also been alleged with respect to document D8. In that document there was however no disclosure of air-laying of a mixture of fibres and hydrogel particles, no indication that the moisture content of the absorbent structure was less than 10% by weight and no clear teaching that the density of the absorbent structure lay in the range specified in the claims. In the latter respect it had to be noted that document D8 did not indicate the pressure under which the density of the absorbent structure was measured.

Given that the person skilled in the art would not have known how to make the absorbent structure which was the subject of prior use U2, this was not a realistic starting point for the evaluation of inventive step. In any case, the respondents had not been able to show why the use of a two step air-laying and compressing process as claimed would be the obvious method for the person skilled in the art to choose. In this respect they had relied particularly on document D16 but, as Mr Weisman had pointed out in his declaration, the process shown there was not suitable for producing an absorbent structure of the thickness that had been

prior used. Furthermore, it was not clear that this document disclosed a two step process of the type claimed at all.

The route taken by the Opposition Division in its investigation of inventive step, where document D8 was taken as the starting point, was also flawed, since this document in no way related to the problem of avoiding the gel-blocking phenomenon associated with the efficient use of hydrogel material in commercially viable absorbent structures. This problem had first been solved by the claimed invention and had revolutionised the industry. Nowhere in the whole state of the art was there any indication to be found that the claimed process would lead to this remarkable breakthrough.

VIII. In reply the respondents argued substantially as follows:

The requirement that the end product of the process now claimed had a moisture content of less than 10% by weight was as much as essential feature of that process as it was of the end product. For the reasons given in the interlocutory decision of the Board it was therefore clear that the present claims were only entitled to priority from the third priority document. It would lead to absurd results if a claim to a process for making a specific product could be held to have valid priority when a claim to that product did not.

In the second of Ms Roller's declarations she had dealt thoroughly with all of the questions thrown up by Mr Weisman and the appellants as to whether, at the relevant date, the person skilled in the art studying the prior used absorbent structure would have been led to the conclusion that this had most probably been made by the known technique air-laying a dry mixture of

fibres and hydrogel particles with subsequent compression. It was apparent that such compression of the original low density web must take place since the direct air-laying of a web with a homogeneous distribution of hydrogel particles in it would be impossible. Thus on the balance of probabilities, which was the required standard of proof, they had succeeded in demonstrating that the subject-matter of the process claims had effectively been made available by the prior use U2, so that these claims lacked novelty.

On a proper interpretation of document D8 this also disclosed all of the features of claim 1 of the main and first auxiliary request. From the paragraph at lines 96 to 110 of page 1 it could be seen that some of the fibres forming the absorbent structure could be "substituted" by a superabsorbing material (i.e. a hydrogel). This implied therefore that a mixture of the two would be formed before the fibres were air-laid, otherwise no substitution could take place. Furthermore, it was implicit, as had been consistently argued by the appellants themselves with respect to the priority question, that the moisture content of the absorbent structure would be less than 10% by weight, since document D8 contained no indication of adding further moisture from that normally encountered. Lastly, in the absence of any suggestion to the otherwise it had to be assumed that the upper density limit of 0.16 g/cm^3 proposed in document D8 was measured under a conventional low containing pressure, as was the lower density limit of 0.15 g/cm^3 required by claim 1.

If the novelty of the subject-matter of claim 1 were to be recognised then it would however clearly not involve an inventive step. The extensive arguments and evidence adduced by the appellants in support of their contention that the teachings of the contested patent

had revolutionised the diaper industry were irrelevant to the question at hand since the diapers involved, through the prior use U2, belonged to the state of the art. Starting from this publicly prior used absorbent structure, the only technical problem for the person skilled in the art was to identify a suitable method for making it. Here, documents D16 and D18 were of particular relevance since they proposed forming an equivalent absorbent structure by means of air-laying a mixture of fibre and hydrogel particular to form a web, in the same manner as that now claimed, and subsequently compressing the web to the required density. Furthermore, it was stated unequivocally in document D16 that this "blending" method gave better results than those achieved by scattering the hydrogel particles onto a formed web.

Reasons for the Decision

1. *Priority*

In its interlocutory decision of 20 June 1996 the Board set out in points 3.1 to 3.9 of the reasons why the requirement that the moisture content of the absorbent structure be less then 10% by weight was an essential feature of that structure which was not disclosed in the first and second priority document.

The present claims now relate to a process for making such an absorbent structure. Although the requirement concerning the amount of moisture that may be present in the absorbent structure is still present in the claim the appellants argue that it is not an essential feature of the process. The Board cannot accept that view. The fact that the end product must have a moisture content below a certain level imposes clear

limitations on the way the process is carried out. In particular, it is stated in the paragraph bridging pages 10 and 11 of the original application that it is desirable to use humidified air for air transport of the fibres and hydrogel particles and that these will take up moisture during handling. It is therefore apparent that these aspects of the process must be carefully controlled to ensure that the moisture content of the end product remains less than 10% and as a consequence this essential feature of the end product must also be seen as an essential feature of the claimed process when considered in its totality.

The present claims are therefore entitled only to priority from the third priority document.

2. *Main request*

2.1 Novelty

It is not in dispute that the absorbent structure (incorporated into disposable diapers) forming the subject of prior use U2 (a product test in several cities of the United States) has all of the physical characteristics defined in claim 1. As established in points 4.1 to 4.4 of the reasons of the interlocutory decision of the Board this prior use took place before the priority date to which the claims are entitled, i.e. 6 September 1983, and was not confidential. The relevant absorbent structure therefore belongs to the state of the art according to Article 54(2) EPC.

On the evidence before it, in particular the declarations of Ms Roller, the Board is satisfied that at the relevant date the physical characteristics of the absorbent structure mentioned above would have been readily ascertainable for the person skilled in the art. Furthermore, the Board is also satisfied that

routine microscopic examination of the absorbent structure would have revealed to a person skilled in the art that there was a substantially homogeneous distribution of the hydrogel particles throughout the thickness of the absorbent structure. In her second declaration Ms Roller deals with all the possible methods of making the prior used absorbent structure envisaged in the affidavit of Mr Weisman and argues that all of these, apart from air-laying a mixture of fibres and hydrogel particles to form a web, would have led to a visible structure or other physical characteristics which would have been incompatible with what was required. The respondents argue therefore that on the balance of probabilities the person skilled in the art would have been led to the inevitable conclusion that the absorbent structure had been made by such an air-laying method and furthermore, since the attainment of the density of the absorbent structure without a compression step following the air-laying of the web would be infeasible and in any case not lead to the observed homogeneous distribution of hydrogel particles, that this compression step had taken place.

It is however impossible to ignore the fact that Ms Roller's observations and explanations are to some extent hypothetical since she never in fact at any time had the opportunity to study in detail the prior used absorbent structure. In the opinion of the Board it cannot be excluded that this absorbent structure could have exhibited characteristics of some description which would have led the person skilled in the art away from air-laying of a mixture of fibres and hydrogel particles with subsequent compression as being the manner of manufacture. Furthermore, the Board is not convinced that the person skilled in the art would have been readily able to eliminate the scattering, pleating and compression method of document D2 as being a possibility because of the presence of the pleats,

since it is not clear to what extent those pleats would still be visible after the final compression step. Lastly, it cannot be excluded that the person skilled in the art may have come to the conclusion that none of the manufacturing methods known to him had been used and that the absorbent structure was the product of a new method. For these reasons the Board has come to the conclusion that the respondents have not fully and properly proved their case on this point (see decisions T 472/92 and T 750/94, both to be published in OJ EPO). The subject-matter of claim 1 is therefore novel with respect to the prior use U2.

Lack of novelty of the subject-matter of claim 1 has also been alleged with respect to document D8. This document proposes air-laying a web of hydrophilic cellulose fibres and compressing the web to a density of from 0.0625 g/cm^3 and 0.16 g/cm^3. In the paragraph at lines 96 to 110 of page 1 it is stated that "a limited proportion of these fibres can be substituted by fibres of hydrophilic substances of other origin, for example ..... materials known in the art under the conventional name superabsorbents." This proportion can amount to 50% by weight of the fibres, but preferably does not exceed 30%.

In the opinion of the Board document D8 does not unambiguously teach the person skilled in the art that if he substitutes part of the cellulosic fibres by fibres of a superabsorbent material (i.e. "hydrogel") then he should form a mixture of those two fibres by air-laying them together to form a web. One alternative, for example, would be to form separate layers of the two fibre types. This would still constitute "substitution" of the one fibre by the other in the general sense it is used in document D8. Furthermore, document D8 does not teach that the moisture content of the absorbent structure is less

than 10% by weight. As the appellants' argument in relation to their first and second priority documents that there was an implicit disclosure there of such a moisture content was unsuccessful, it cannot be used against them when determining the disclosure content of document D8 for novelty purposes.

For these reasons the subject-matter of claim 1 is novel with respect to the state of the art according to document D8.

2.2 Inventive step

The Board can develop little sympathy for the argument of the appellants that the prior used absorbent structure, which according to them constitutes merely a "non-enabling disclosure", should not form the starting point for the evaluation of the inventive step of the subject-matter of claim 1. Even if, for the reasons given above, the Board is not convinced that the person skilled in the art would have known how the prior used absorbent structure was made he would clearly have had an interest in investigating the possibilities available to him, since on the basis of routine tests it could be established that the absorbing properties of the structure were very good.

One of the sources of information to which the person skilled in the art can be assumed to have recourse is document D16, which is a technical bulletin of a company which manufactured superabsorbent polymers, i.e. hydrogel. On page 2, document D16 describes, with reference to Figure 2, a blending process in which polymer powder is blown into a hopper in which fibres are afloat. The mixture is then air-laid to form a web. The process is said to be so simple and require so little space that it can be squeezed into a conventional diaper production line with little

additional cost. The process is also said to give an even distribution of the polymer powder throughout the sheet that is obtained. At the bottom of page 4 it is stated that a sheet obtained by the blending process has more absorbent power than a "sandwiched" sheet (i.e. one obtained by scattering the polymer powder on a pre-formed fibre sheet). The appellants have argued that the apparatus shown in Figure 2 of document D16 would only be suitable for making thin and relatively dense materials and would be inoperative for forming the type of absorbent structure to which the claimed invention relates. That argument overlooks however the facts that Figure 2 is highly schematic and that document D16 specifically refers to incorporating the blending process it describes into a conventional diaper production line. The appellants also object to the fact that document D16 does not disclose compression of the air-laid web of the mixture of fibres and hydrogel particles after it has been formed. The compression of an air-laid web to the final required density is however wholly conventional in the art, see for example document D8, and the skilled person would no doubt suspect that the unidentified pair of rollers shown in Figure 2, through which the web passes, is provided for this purpose.

The Board therefore comes to the conclusion that in the light of document D16 and his common general knowledge it was obvious for the person skilled in the art to make the absorbent structure known from prior use U2 by air-laying a dry mixture of fibres and hydrogel particles to form a web and compressing the web to the required density. The subject-matter of claim 1 therefore lacks inventive step (Article 56 EPC).

3. *Auxiliary requests*

The above negative finding with respect to the subject-matter of claim 1 of the main request also extends to the subject-matter of claim 1 according to the first and second auxiliary requests. This follows from the fact that the prior used absorbent structures were incorporated in disposable diapers. The auxiliary requests were only submitted to provide a distinction over the disclosure of document D8, for the case that the prior use U2 was held not be belong to the state of the art.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

S. Fabiani

The Chairman:

H. Seidenschwarz