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**D E C I S I O N**  
of 7 July 1998

Case Number: T 0890/94 - 3.3.1  
Application Number: 87202190.2  
Publication Number: 0269169  
IPC: C11D 3/386

Language of the proceedings: EN

Title of invention:  
Detergent compositions containing cellulase

Patentee:  
The Procter & Gamble Company, et al

Opponent:  
Unilever N.V.

Headword:  
Cellulase-containing detergent composition/PROCTER & GAMBLE

Relevant legal provisions:  
EPC Art. 56

Keyword:  
"Inventive step (auxiliary request, yes) - non-obvious solution  
of the problem underlying the patent in suit"

Decisions cited:  
-

Catchword:  
-



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Case Number: T 0890/94 - 3.3.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.1  
of 7 July 1998

**Appellant:**  
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**Representative:**  
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**Respondent:**  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 5 October 1994  
rejecting the opposition filed against European  
patent No. 0 269 169 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** A. J. Nuss  
**Members:** J. M. Jonk  
S. C. Perryman

## Summary of Facts and Submissions

- I. The Appellant (Opponent) lodged an appeal against the decision of the Opposition Division by which the opposition based on Article 100(a) EPC, which had been filed against the European patent No. 0 269 169 (European patent application No. 87 202 190.2) as a whole, was rejected.
- II. The opposition was supported by several documents including:
- (1) EP-A-0 112 593, and
  - (4) GB-A-2 075 028.
- III. The Opposition Division held that the subject-matter of the claims of the patent in suit was novel and involved an inventive step. Concerning inventive step they held that with respect to the closest state of the art, i.e. GB-A-2 075 028 (document 4), a synergistic improvement of the clay stain removal was achieved, and that it could not be derived from the cited prior art, that said improvement could be realised by the combined use of cellulase and 0.1 to 1% of a specific clay-soil release polymer as claimed.
- IV. Oral proceedings were held before the Board on 7 July 1998.
- V. During these oral proceedings the Respondents (Patentees) defended the patentability of the subject-matter of the patent in suit on the basis of the claims as granted as main request and a set of claims as submitted in the course of the oral proceedings as auxiliary request.

Claim 1 of the **main request** read as follows:

"A detergent composition (for the cleaning and softening of fabrics) comprising a surface-active agent and a detergent cellulase, characterized in that:

- the composition contains from 0.1% to 1% of a clay-soil release polymer having the repeating units:



wherein R is hydrocarbyl having from 2 to 6 carbon atoms, R<sup>1</sup> is C<sub>1</sub> to C<sub>20</sub> hydrocarbon, alkoxy is selected from ethoxy, propoxy, butoxy, or mixtures thereof, y is 2-30, n is an integer of at least 2, and X<sup>-</sup> is an anion; and

- the pH of a 1% solution of the detergent composition in distilled water is from 6.5 to 9.5."

Claim 1 of the **auxiliary request** differed from Claim 1 of the present main request in that the composition also contained **from 1% to 20% of a fabric-softening clay material.**

VI. The Appellant accepted that the subject-matter of Claim 1 of the main request met the novelty requirement of the EPC.

However, he argued that the subject-matter of the claims did not involve an inventive step in view of the combined teaching of documents (4) and (1). He pointed out that in the light of the closest state of the art, i.e. document (4), the technical problem underlying the

patent in suit was to provide a cellulase-containing detergent composition, which additionally had good clay soil cleaning properties. Moreover, he argued that the solution of this problem by adding 0.1 to 1% of the clay-soil release polymer was obvious in the light of the teaching of document (1). In this context, he emphasised that it was known from document (1) that the ethoxylated amine compounds as disclosed therein, which corresponded to the clay-soil release polymers of the patent in suit, had the best clay soil removing properties and were particularly suitable for providing detergent compositions having near neutral pH-values. Furthermore, he argued that the test-report as submitted by the Respondents on 29 July 1994 did not show a synergistic effect but only an additive effect, and that even an unexpected synergistic effect would not render inventive what was already obvious. In this respect, he also noted that the results of said test-report did not appear to be representative for normal washing conditions.

Concerning Claim 1 of the auxiliary request he additionally argued that the patent in suit did not comprise any information whether or not a softening clay in a composition as claimed had a significant effect. In this context, he referred to document (1), which disclosed that a clay-soil release polymer as claimed in present Claim 1 showed a strong anti-redeposition performance, and therefore impaired the deposition of the softening clay on the fabrics.

VII. The Respondents argued, essentially in accordance with the reasoning of the Opposition Division, that the claimed subject-matter involved an inventive step. They emphasised that their test-report credibly showed that a synergy occurred. Moreover, they argued that

document (1) did not give any pointer towards the finding underlying the patent in suit that, in the presence of cellulase, only low amounts of the clay-soil release polymer were needed to provide a good clay-soil removal.

With respect to their auxiliary request they referred to the specification of the patent in suit indicating that in accordance with a further aspect of the claimed invention the clay-soil release polymer surprisingly did not impair the deposition of a softening clay and thus its fabric softening benefits.

VIII. The Appellant requested that the decision under appeal be set aside and the patent be revoked.

The Respondents requested as main request that the appeal be dismissed and that the patent be maintained, and as auxiliary request that the decision under appeal be set aside and the patent be maintained on the basis of the set of claims filed as auxiliary request at the oral proceedings on 7 July 1998.

IX. At the conclusion of the oral proceedings the Board's decision was pronounced.

**Reasons for the Decision**

1. The appeal is admissible.

*Main request*

2. After examination of the citations on file, the Board has reached the conclusion that the subject-matter as defined in all claims is novel. Since this issue was not in dispute, it is not necessary to give detailed reasons for this finding.

3. This leaves the issue of whether the subject-matter of the present claims involves an inventive step.

3.1 The Board considers, in agreement with the parties, that the closest state of the art with respect to the detergent composition according to present Claim 1 is the disclosure of document (4).

3.2 Document (4) discloses main wash detergent compositions comprising a surface-active agent and a fungal cellulase producible from *Humicola insolens* as a harshness reducing agent, whereby the pH in a solution of 1 g of such a composition in 1 litre of water is in the range of from 7 to 10, preferably from 7.5 to 9.5 (see page 1, line 49 to page 2, line 3; page 3, lines 46 to 51; page 3, line 63 to page 4, line 2, and Claim 11). Moreover, it discloses that this cellulase exhibits an acceptable high activity at said pH range rendering it possible to perform a washing and harshness reducing process in the main wash without any pre-soaking or other pre-treatment (see page 1, last line to page 2, line 3; page 3, lines 52 to 57, and page 4, lines 55 and 56).

Thus, in accordance with the submissions of the parties, the detergent compositions as claimed in present Claim 1 differ from that as disclosed in document (4) only in that they additionally comprise 0.1% to 1.0% of a clay-soil release polymer as defined in the present Claim 1.

3.3 According to the patent in suit it has been found that relatively small amounts of the clay-soil release polymers as defined in present Claim 1 offset the negative effects on clay-soil removing performance resulting from a pH of 9.5 or below as needed to achieve a satisfying cellulase performance (see page 2, lines 21 to 29 and 54 to 56, and page 3, lines 4 to 6).

Moreover, the Respondents, relying on their test-report, submitted that the combination of cellulase and a clay-soil release polymer as claimed actually provided a "synergistic activity" in improving the clay-soil cleaning properties of the detergent compositions.

- 3.4 Therefore, in the light of this closest prior art, the Board sees the technical problem underlying the patent in suit as the provision of a near neutral or mildly alkaline detergent composition showing optimum cellulase performance and having improved clay-soil cleaning properties (see also page 2, lines 28 to 31, and page 3, lines 4 to 6, of the patent in suit).
- 3.5 The patent in suit suggests, as the solution to this problem, a detergent composition according to present Claim 1, which is characterised in that it contains from 0.1% to 1.0% of a clay-soil release polymer as specified in the claim.
- 3.6 In view of the technical information of the patent in suit, in particular the examples disclosing compositions containing from 0.3% to 0.6% by weight of a clay-soil release polymer, as well as the test-report as submitted by the Respondents showing an improvement of the clay-soil cleaning properties of a cellulase-containing detergent composition by adding the clay-soil release polymer as applied in Example 1 of the patent in suit, the Board is satisfied that the above technical problem is solved by a detergent composition as claimed. This finding does not depend on whether or not the shown improvement is due to an unexpected synergistic effect resulting from the interaction of cellulase and the clay-soil release polymer.

In this context, the Board observes that in view of the Appellant's objections concerning the test-report, in particular with respect to the accuracy of the achieved experimental data, as well as the fact that the test-report does not appear to show a relevant surprising effect in the neighbourhood of the lower limit of the claimed range of from 0.1% to 1.0%, the Board has some doubts whether a synergistic effect in its normal meaning, i.e. an effect which exceeds the added effects of the single components (here the cellulase and the clay-soil release polymer), has been demonstrated for the whole scope of present Claim 1. However, having regard to the further considerations in points 3.7 to 3.12 below, the Board did not consider it necessary to examine this question further.

- 3.7 It remains to be decided, whether the cited prior art would have suggested to a person skilled in the art solving the above-indicated technical problem in the proposed way.
  
- 3.8 Document (4) - as indicated above under point 3.2 - relates to a near neutral or mildly alkaline cellulase-containing main wash detergent compositions. Moreover, it discloses that the compositions may contain anti-redeposition agents (see page 4, lines 10 to 13). However, the nature of such agents is not further specified. Therefore, in the Board's judgment, document (4) as such does not give any pointer to the skilled person that the technical problem underlying the patent in suit could be solved by using a specific clay-soil release/anti-redeposition agent as claimed in accordance with the patent in suit.

3.9 However, a person skilled in the art looking for a solution to the technical problem as defined above was well aware of the existence of agents for improving the clay-soil cleaning properties of detergent compositions such as those disclosed in document (1).

This document (1) discloses detergent compositions containing ethoxylated amines, such as certain ethoxylated amine polymers, having combined clay-soil removal/anti-redeposition properties (see page 3, last paragraph, page 7, line 20 to page 9, line 9, and Claims 1 and 13 to 17).

Moreover, it discloses that these detergent compositions are particularly suitable when formulated to provide a near neutral wash pH, that near neutral wash pH compositions are better for enzyme stability, and that in such compositions the wash pH is preferably from about 7.0 to about 8.5, and more preferably from about 7.5 to about 8.0 (see page 31, lines 7 to 15).

Furthermore, this document also discloses that the ethoxylated amines can be applied in amounts of from about 0.05% to about 95% by weight of the composition, usually from about 0.1% to about 10% by weight for laundry detergents, and preferably from about 0.5% to about 5% by weight (see page 15, lines 8 to 14). In accordance with the examples (Embodiments I to V), the ethoxylated amine polymers are predominantly used in amounts of 1.0% by weight.

In addition, it can be derived from document (1) that, compared to various other ethoxylated amines disclosed therein, an ethoxylated amine polymer having a degree of ethoxylation of 15 shows the best clay-soil removal/anti-redeposition properties (see the Table on pages 35 and 36, in particular page 36, line 14)).

3.10 Therefore, having regard to the fact that it was known from document (1) at the priority date of the patent in suit that said known ethoxylated amine polymers are extraordinary active clay-soil release/anti-redeposition agents, that they can be used in low amounts in low amounts of usually from 0.1% by weight upwards, and that they are particularly suitable at wash pH values whereby the cellulase is able to produce its full activity, in the Board's judgment, this document gives a clear incentive to try to solve the above defined technical problem by adding these ethoxylated amine polymers, which correspond to those used in all the examples of the patent in suit and clearly fall under the scope of present Claim 1, to detergent compositions disclosed in document (4).

3.11 The Respondents submitted in particular that the finding of a synergistic clay-soil removal effect, so that the present clay-soil release polymers could be used in **small amounts of from 0.1% to 1.0%**, involved an inventive step. However, the Board cannot accept this argument, since - as indicated above under point 3.9, third paragraph - document (1) discloses the amounts of 0.1% , 0.5% and 1.0% by weight as suitable, preferred and mostly applied amounts respectively, so that the claimed invention actually has been achieved by merely following the teaching of document (1) without any inventive skill.

3.12 In conclusion, the Board finds that the compositions according to Claim 1 of the main request do not involve an inventive step in the sense of Article 56 EPC.

*Auxiliary request*

4. In accordance with this request a new set of claims was submitted during the oral proceedings before the Board, which set of claims only differed from that of the main request, in that the subject-matter of Claim 1 was restricted to the subject-matter of Claim 6 as granted, i.e. essentially to compositions further comprising from 1% to 20% by weight of a fabric-softening clay material.

Although this auxiliary request was filed very late, the Board was prepared to consider it, because the Respondents could have expected that the addition of a softening clay as now claimed was a likely fall-back position in view of the subject-matter of Claim 6 as granted, as well as the specification of the patent in suit indicating that in accordance with a further aspect of the claimed invention it was found that by adding a softening clay to the compositions of the patent in suit, i.e. to compositions containing a clay-soil release polymer being expected to impair the deposition of the softening clay on the fabrics, surprisingly a significant further improvement of the softening properties was achieved (see page 3, lines 4 to 12, and page 5, lines 34 and 35).

5. After examination of the new set of claims, the Board has reached the conclusion that the subject-matter as defined in all the claims complies with the requirement of support under Article 123(2) and (3) EPC and that of novelty. The Respondents did not raise objections with respect to these issues and the Board sees no reason to disagree. Therefore, it is not necessary to give detailed reasons for this finding.

6. This leaves the issue of whether the subject-matter of the claims of this request involves an inventive step.

- 6.1 As in case of the main request, the Board considers, in agreement with the parties, that the closest state of the art with respect to the detergent compositions of present Claim 1 is the disclosure of document (4).
- 6.2 In accordance with the patent in suit it has been found that - as already indicated above under point 4, second paragraph - detergent compositions comprising both a clay-soil release polymer as defined in present Claim 1 and a softening clay not only show an improved clay-soil removing performance, but also **improved fabric softening benefits**.
- 6.3 Therefore, in the light of this closest prior art, the Board sees the technical problem underlying the patent in suit as the provision of a near neutral or mildly alkaline detergent composition showing optimum cellulase performance and having not only improved clay-soil cleaning properties, but also a further improved fabric softening activity.
- 6.4 The patent in suit suggests, as the solution to this problem, a detergent composition according to present Claim 1, which is characterised in that it contains from 0.1% to 1.0% of a clay-soil release polymer as specified in the claim and from 1% to 20% of a fabric softening clay material.
- 6.5 In view of the technical information of the patent in suit indicating that it was surprisingly found that the deposition of a softening clay on fabrics, and therefore its softening activity, is not impaired by the presence of the clay-soil release polymer, as well as the Examples I to III disclosing compositions containing from 0.3% to 0.6% by weight of a clay-soil release polymer and from 6.4% to 8.5% by weight of bentonite clay, the Board is satisfied that the above technical problem is solved.

In this context the Appellant objected that the patent in suit did not provide sufficient evidence that a significant improvement of the softening activity was indeed achieved. However, the Board notes that in accordance with the established case law of the Boards of Appeal the burden of proof in this respect lies with the Opponent. Moreover, as already has been set out above (see point 4, second paragraph), the Appellant could not have been taken by surprise.

6.6 The question now is whether the cited prior art would have suggested to a person skilled in the art solving the above-indicated technical problem as now claimed.

6.7 Document (4) - as indicated above under points 3.2 and 3.8 - relates to near neutral or mildly alkaline cellulase-containing main wash detergent compositions, which among other ingredients also may contain anti-redeposition agents. However, the nature of such agents is not further specified. Moreover, document (4) does not provide any indication that the compositions, apart from the cellulase, could comprise a further softening agent, let alone a softening clay. Therefore, in the Board's judgment, document (4) as such does not give an incentive to the skilled person that the technical problem underlying the patent in suit could be solved by a composition using in combination the specific clay-soil release/anti-redeposition agent as claimed in accordance with the patent in suit and a softening clay.

6.8 Document (1) discloses - as indicated above under point 3.9 - detergent compositions containing ethoxylated amines, such as certain ethoxylated amine polymers, having combined clay-soil removal/anti-redeposition properties in amounts as claimed in accordance with the patent in suit. Moreover, it discloses that the compositions, among various other

optional detergent components, may contain fabric softening agents and enzymes (see page 29, last line to page 30, line 8). However, the nature of the optionally applicable softening agents and enzymes has not been further specified.

With respect to the main request, the Board considered that a skilled person in the light of the combined teaching of documents (4) and (1) would have expected that by adding an ethoxylated amine polymer as disclosed in document (1) to a detergent composition of document (4) an improvement of the clay-soil removal properties could be obtained.

However, having regard to the fact that it was known from document (1) that ethoxylated amine polymers, which are present in the compositions of the patent in suit, show an extraordinary clay-soil suspending activity (see the Table on page 35 and 36), in the Board's judgment, the skilled person would rather have been refrained from using a softening clay as a further softening agent, because - as submitted already in the patent in suit - he would have expected that the presence of an ethoxylated amine polymer would significantly impair the deposition of the softening clay on the fabrics and therefore its softening activity.

- 6.9 In this context, the Board observes that a skilled person in view of the combined teaching of documents (4) and (1) could have used a mixture of cellulase and a softening clay. However, according to the established case law of the boards of appeal for determining lack of inventive step, it is necessary to show that considering the teaching of the relevant prior art as a whole, without using hindsight based on the knowledge of the claimed invention, the skilled person would have arrived at the claimed solution of

the technical problem to be solved. However, as indicated above, a skilled person, when trying to solve the technical problem underlying the patent in suit, would not have any reason to use a softening clay as a further softening agent.

6.10 In conclusion, the Board finds that the detergent composition according to Claim 1 of the auxiliary request involves an inventive step in the sense of Article 56 EPC.

Since Claims 2 to 8 relate to particular embodiments of the compositions claimed in present Claim 1, they are also allowable.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent on the basis of the set of claims filed as auxiliary request at the oral proceedings on 7 July 1998 and a description yet to be adapted

The Registrar:

*E. Görgmaier*  
E. Görgmaier



The Chairman:

*A. Nuss*  
A. Nuss