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File Number: T 241/90 - 3.3.1

Application No.: 82 201 172.2

Publication No.: 0 075 996

Title of invention: Detergent compositions containing alkylpolysaccharide and nonionic surfactant mixture and anionic optical brightener

Classification: C11D 3/22

D E C I S I O N
of 12 December 1991

Proprietor of the patent: THE PROCTER & GAMBLE COMPANY

Opponent: Hüls Aktiengesellschaft
Henkel KGaA
A.E. Staley Manufacturing Company

Headword: Alkylpolyglucoside/PROCTER

EPC Article 56

Keyword: "Inventive step (denied)"

Headnote



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Boards of Appeal

Chambres de recours

Case Number : T 241/90 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 12 December 1991

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Decision under appeal :

Decision of the Opposition Division of the
European Patent Office of 28 November 1989,
posted on 8 February 1990, concerning maintenance
of European patent No. 0 075 996 in amended
form.

Composition of the Board :

Chairman : K.J.A. Jahn
Members : R.N. Andrews
J.-C. Saisset

Summary of Facts and Submissions

- I. European patent No. 0 075 996 in respect of European patent application No. 82 201 172.2, which was filed on 22 September 1982, was granted on 21 January 1987 (cf. Bulletin 87/04).
- II. Notices of opposition, which were filed on 17 October, 19 October (duly confirmed telex) and 20 October 1987, requested the revocation of the patent on the grounds of insufficiency and lack of inventive step. The oppositions were supported, inter alia, by the following documents:
- (4) US-A-3 925 224
 - (5) DE-A-1 943 689
 - (6) The Journal of the Oil Chemists' Society, Volume 47, pages 162 to 167, 1970,
 - (7) Technical Bulletin, Triton CG-110 (Rohm & Haas),
 - (9) US-A-3 219 656
 - (10) The Journal of the Oil Chemists' Society, Volume 40, pages 695 and 696, 1963,
 - (14) "Fluorescent Whitening Agents". Proceedings of a symposium held at the Royal Institute of Technology, Stockholm, in April 1973, pages 51 to 56 and 115 to 122,
 - (15) GB-A-1 462 133 (corresponding to US-A-3 983 078).
 - (17) US-A-3 721 633 and
 - (18) US-A-4 147 652

During the course of the opposition and appeal proceedings the following documents were referred to:

- (34) DE-B-2 412 839 and
- (39) Surface Active Agents, Schwartz-Perry-Berch, Volume II, pages 318 to 321, 1977.

III. By a decision delivered orally on 28 November 1989, with the corresponding interlocutory decision being issued on 8 February 1990, the Opposition Division maintained the patent on the basis of Claims 1 to 12 filed on 25 October 1989.

The Opposition Division held that the disclosure of the invention was sufficient and that the subject-matter of the amended claims involved an inventive step. The Opposition Division considered that none of the prior art documents suggested that effectiveness of the brightening agent would be improved by using it in a composition comprising an alkylpolyglucoside as defined in Claim 1 with a non-ionic surfactant in the specific ratio.

IV. Appeals were lodged against this decision by Opponents 01 and 02 on 20 and 29 March 1990 respectively with payment of the prescribed fees. Statements of grounds of appeal were filed on 7 and 15 June 1990. In these statements and a further submission submitted on 11 November 1991 and during the oral proceedings held on 12 December 1991, at which both Appellants and the Respondent were represented, the Appellants essentially put forward the following arguments.

Appellant 01 contended that documents relating to detergent field, other than those specifically concerned with laundry detergent compositions, should be taken in consideration in the assessment of inventive step. In this Appellant's opinion, the combination of the teaching of document (4) with that of documents (17) and (18) supported by the disclosure of document (7) rendered the claimed subject-matter obvious.

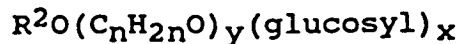
Appellant 02 maintained that document (15), which discloses an optimised laundry detergent composition

comprising two different types of non-ionic surfactants and an optical brightening agent, represented the closest state of the art. Alternatively, he also considered that document (34) could be taken as representing the closest prior art. This Appellant contended that the claimed subject-matter was obvious with respect to the combination of the teaching of either of these documents with that of document (9) and that of document (5) or (6).

- V. The Respondent argued that the disclosures of Triton CG-110 and Triton BG-10 and the numerous vague and generic disclosures of vast ranges of alkylpolyglucosides and other sugar-based surfactants did not provide any information that would be relevant to the laundry detergent formulator and that there was nothing in the cited prior art to suggest that the claimed compositions would have beneficial properties with respect to cleaning and optical brightening. In particular, in the present compositions the utilisation of the optical brightening agent was increased resulting in a reduction in its waste. This important effect was not known or predictable and was difficult to prove in the laboratory except by careful testing.
- VI. During the oral proceedings, the Board stressed the relevance of documents (6) and (7).
- VII. The Appellants requested that the decision under appeal be set aside and that the patent be revoked. The Respondent requested that the patent be maintained on the basis of the claims in accordance with the main or three subsidiary requests submitted during oral proceedings.

Claims 1 and 5 of the main request read as follows:

"1. A laundry detergent composition comprising:
B. from 1% to 90% by weight of nonionic detergent surfactant; and
C. from 0% to 90% by weight of a detergency builder characterised in that the composition includes:
A. from 1% to 90% by weight of an alkylpolyglucoside detergent surfactant of the formula



wherein R^2 is an alkyl group having 12 to 18 carbons, x is 1.5 to 3, n is 2 or 3, y is from 0 to 10, and
D. from 0.01% to 2% by weight of an anionic optical brightener, the ratio of A to B being from 4:6 to 10:1.

5. A process for cleaning cotton fabrics in an aqueous detergent solution containing from 0.01% to 1% by weight of the detergent composition of any preceding claim."

Claim 1 of the second subsidiary request is identical with the above claim except that the weight ratio of A:B is 1:1 to 10:1.

Claim 1 in accordance with the first and third subsidiary requests is directed to the use of the above specified alkylpolyglucosides for improving brightener effectiveness on cotton of a laundry detergent composition as defined above wherein the ratio of alkylpolyglucoside to non-ionic detergent surfactant is 4:6 to 10:1 and 1:1 to 10:1 respectively.

Claim 5 in accordance with the first auxiliary request is directed to a process of cleaning cotton fabrics in an aqueous solution containing from 0.01% to 1% by weight of the detergent composition defined in any preceding claim.

VIII. At the conclusion of the oral proceedings, the Board's decision to revoke the patent was announced.

Reasons for the Decision

1. The appeal is admissible.

2. There are no formal objections under Article 123 EPC to any of the present statements of claims. In particular, Claim 1 of the main and first subsidiary request is based on Claims 1 and 2 as filed and granted in combination with page 1, line 12, page 2, lines 20 to 29 and page 27, lines 9 and 10 of the published patent application (cf. also page 2, line 5, the paragraph bridging pages 2 and 3 and page 10, lines 54 to 56 of the printed patent specification).

Claims 2 to 5 of these request correspond respectively to Claims 3, 4, 6 and 7 as filed and granted.

The restriction of the weight ratio of A:B to 1:1 in Claim 1 of the second and third subsidiary requests finds a basis on page 4, line 11 and Example VII of the published patent application (cf. also page 3, line 17 and Example 1 of the published patent specification).

3. The disputed patent relates to a laundry detergent composition containing an alkylpolyglucoside detergent surfactant.

- 3.1 In the Board's judgement, document (6) represents the closest state of the art. This document discloses solid and liquid laundry detergent compositions containing alkylpolyglucosides, some of which fall under the formula specified in Claim 1 in accordance with all the Respondent's requests. In addition to 15% alkylpolyglucoside, the solid formulations consist of 35% sodium triphosphate, 10% sodium metasilicate, 39% sodium

carbonate and 1% sodium carboxy methyl cellulose. The liquid compositions contain 15% alkylpolyglucoside, 35% tetrapotassium pyrophosphate, 1% sodium carboxy methyl cellulose and 49% distilled water (cf. Table X on page 165).

In the light of this closest prior art, the technical problem underlying the patent in suit is to be seen in providing a detergent composition having good detergency, i.e a commercially marketable product.

According to the disputed patent, this technical problem is solved by a laundry detergent composition containing an alkylpolyglucoside of the specified formula, a non-ionic detergent surfactant and an anionic optical brightener. In accordance with the main and second subsidiary requests the weight ratio of alkylpolyglucoside to non-ionic surfactant is 4:6 to 10:1 and 1:1 to 10:1 respectively.

In view of Example 1 of the disputed patent and the experimental reports submitted on 23 October 1989 and 19 November 1991, the Board considers it plausible that this technical problem has been solved.

- 3.2 Document (15) discloses a quaternary ammonium surfactant-free laundry detergent composition, comprising a mixture of a long-chain, water-soluble non-ionic surfactant component consisting of an alkoxyated C₈₋₁₅ primary alcohol having an HLB of 11.7 to 17 and a short-chain, water-soluble non-ionic cosurfactant consisting of an alkoxyated C₈₋₁₁ primary alcohol having an HLB of 7 to 10.5; the mixture having an overall HLB of 10 to 12.5 (cf. Claim 1). The composition may optionally contain detergent auxiliary materials commonly found in laundering compositions, such as optical brightening agents (cf. page 10, lines 106 to 109 and line 116 to 117).

Document (34) discloses a laundry detergent composition comprising from 3 to 30% of a surfactant component consisting of 1 part by weight of a non-ionic surfactant mixture consisting of compounds having different degrees of ethoxylation and 0 to 3 parts by weight of an anionic surfactant, 5 to 70% of aluminosilicate, 2 to 45% of sequestering agents for calcium, 0 to 50% of wash alkalies not capable of sequestering (alkaline builder salts) and 0 to 50% of bleaches as well as other additives usually contained in small quantities, such as optical brighteners (cf. Claim 1 and column 7, lines 41 to 52 in combination with the paragraph bridging columns 11 and 12).

Thus, these two documents disclose laundry detergent compositions comprising optical brighteners (with document (34) exemplifying anionic ones) and a mixture of two different non-ionic surfactants. However, in the absence of any mention of alkylpolyglucosides, the Board considers that document (6) represents the closest state of the art. Even if document (15) or (34) was taken as representing the closest prior art, the Board has satisfied itself that this would have not changed the outcome of the decision.

4. After examination of the cited prior art, the Board has concluded that the subject-matter as claimed in accordance with all the Respondent's requests is novel. Since novelty is not in dispute, it is not necessary to give detailed reasons for this finding.
5. It still remains to be decided whether the subject-matter claimed in accordance with each of the Respondent's requests involves an inventive step.

5.1 Main and second subsidiary requests

According to document (6), the higher alkylpolyglucosides are non-ionic surfactants which show good functionality in various applications, including detergents. They are good foamers with low surface tension, are compatible with inorganic builders, and are biodegradable (cf. Abstract on page 162).

Table X on page 165 of this document lists the results of tests carried out to determine the detergent effectiveness of solid and liquid formulations containing a number of alkylpolyglucosides as the sole surface active ingredient. The Respondent acknowledged that the compounds in this Table in which R is an oxo-tridecyl radical and x is 2.2 and R is an n-hexadecyl radical and x is 1.5 fall under the formula as defined in the present Claim 1.

From the results of these tests, the authors of this paper concluded that the solid formulations containing alkylpolyglucosides were equivalent in detergency to a commercial product (a linear alkylbenzenesulphonate) in soft water, but, in hard water, their efficiency falls to about 85%. The authors, however, expressed the opinion that adjustment of the formulation might improve this performance in hard water. With respect to liquid formulations, the authors found that alkylpolyglucosides perform excellently even in hard water (cf. the paragraph headed "Detergency" in the left-hand column of page 167).

Although the alkylpolyglucoside in which R is a decyl radical and x is 2.3 gave the best results in both hard and soft water, the Board considers that this would not lead the skilled person to concentrate his attention on alkylpolyglucosides in which R is a decyl radical, particularly since it is clear from the Table X that increasing the length of the alkyl chain and varying the

degree of polymerisation yielded similar degrees of detergency effectiveness. Moreover, the above-mentioned paragraph headed "Detergency" would provide the skilled person with the necessary incentive to further investigate these products with respect to their surfactant properties and laundry detergent compositions containing them.

5.2 Mixtures of surfactants with one another as well as with non-surface active builders and additives are the rule rather than the exception in most deterative formulations. The fact that surfactants are mixed for the purpose of producing an effect not obtainable with any of the components taken separately is common general knowledge in the detergent field (cf. first four lines on page 318 of document (39)). It is also common general knowledge in this field that optical brighteners, especially of the anionic type, are practically indispensable ingredients in home laundry detergents (cf. document (10), first five lines in the left-hand column and the paragraph bridging the left-hand and right-hand columns on page 695). This is illustrated, for example, in the above-mentioned documents (15) and (34). Therefore, commercially available detergent formulations normally contain mixtures of surfactants and anionic optical brighteners. Therefore, in the light of common general knowledge in the laundry detergent field as reflected in documents (10), (15), (34) and (39), the skilled person wishing to modify the laundry detergent compositions disclosed in document (6) with the aim of providing compositions having good detergency would immediately consider blending the alkylpolyglucosides with other surfactants and adding anionic optical brighteners thereto.

5.3 The skilled person would be even more encouraged to adapt this course of action by the disclosure of document (7). This document discloses that the alkylpolyglucoside,

Triton CG-110, is a low irritating non-ionic surfactant having good detergency and soil removal which is compatible with anionic, cationic, non-ionic and amphoteric materials (cf. page 1, especially points 3 and 4).

According to this document and the analysis of three samples of Triton CG-110 submitted by Appellant 02 on 11 November 1991 as document (42), the product contains about 35 to 41% by weight monoglucoside, about 30 to 40% by weight oligoglucosides, less than 2% by weight fatty alcohol and no butyl glucoside. The degree of polymerisation (x) is about 1.5 to 1.7 and the alkyl group (R) is a 50:50 ratio of C₈ and C₁₀. Thus, the essential difference between the alkylpolyglucosides as defined in the disputed patent and Triton CG-110 lies in the length of the alkyl chain. Since this is the only essential difference, the skilled person would reasonably assume that the alkylpolyglucosides falling under the present definition would also be compatible with anionic, cationic, non-ionic and amphoteric surfactants.

Therefore, in the absence of any compatibility problems, it was obvious to solve the technical problem underlying the disputed patent by blending the alkylpolyglucoside surfactant with another surfactant.

- 5.4 In the Board's judgement, the use of a non-ionic surfactant is also obvious, since it is well known in the detergent art that this type of surfactant, especially of ethoxylated alcohol type, have favourable detergency properties, particularly at lower wash temperatures, and are standard components of modern detergents, present to a greater or lesser extent in practically all detergent formulations (cf. also documents (15) and (34)). Thus, non-ionic surfactants would be in the forefront of the

skilled person's mind faced with the problem of selecting a surfactant to blend with the alkylpolyglucoside.

Moreover, the skilled person would automatically consider adding optical brighteners to the resulting blend, since he is well aware that they are regarded as essential additives in almost all present day laundry detergent formulations.

- 5.5 The determination of the weight ratio of alkylpolyglucoside to non-ionic surfactant is a matter of routine experimentation which is well within the competence of the skilled person.
- 5.6 Therefore, the subject-matter of Claim 1 in accordance with the main and second subsidiary request does not involve an inventive step.
- 5.7 If document (15) or (34) was considered to represent the closest prior art, the technical problem underlying the patent in suit would be seen in providing an alternative laundry detergent composition to the optimised ones disclosed in these prior art documents. The proposed solution to this technical problem of including the specified alkylpolyglucosides in the surfactant components of these prior art compositions is obvious since the disclosure of document (6) that alkylpolyglucosides falling within the present definition are promising biodegradable detergents (cf. paragraph headed "Detergency" on page 167) would provide the skilled person with the incentive to employ them in these prior art laundry detergent compositions.
- 5.8 Dependent Claims 2 to 4 of the main request relate to preferred embodiments of the compositions according to Claim 1. It was not argued that these claims contain any

independent inventive features and, lacking such features, they are unallowable in the absence of a corresponding admissible main claim.

5.9 Claim 5 in accordance with the main request concerns a process for cleaning cotton fabric using a solution of a detergent composition according to Claim 1. The use of aqueous solutions containing detergents at the specified concentration to wash cotton fabric is standard procedure. Therefore, this claim merely represents the same teaching as Claim 1 expressed in a different manner and is also unallowable for lack of inventive step for the reasons set out above.

6. First and third subsidiary requests

6.1 Claim 1 in accordance with these requests relate to the use of the specified alkylpolyglucosides for improving brightener effectiveness on cotton fabric of a laundry detergent composition comprising a non-ionic detergent surfactant and an anionic optical brightener.

The Respondent filed these claims in this particular form on the basis of the Enlarged Board of Appeal's decision G 2/88 (OJ EPO 1990, 93). However, the present case is distinguished from this earlier one in so far as the Enlarged Board's decision was solely concerned with the novelty of a claim directed to the use of a known compound for a particular purpose which is based on a technical effect, whereas in the present case the compositions involved are acknowledged to be novel (cf. paragraph 4 above).

6.2 In the Board's judgement, the closest prior art is still document (6) which discloses the use of

alkylpolyglucosides falling within the present definition in laundry detergent compositions.

In the light of this prior art the technical problem is to be seen in providing laundry detergent compositions suitable for commercial exploitation.

This technical problem is successfully solved by using the alkylpolyglucosides in a composition containing a non-ionic surfactant and an anionic optical brightener.

- 6.3 For the reasons given above in connection with the corresponding composition claims, the proposed solution to this technical problem is obvious.
- 6.4 Claims 2 to 4 of the first subsidiary request, which relate to preferred embodiments, are, in the absence of any independent inventive features, also unallowable.
- 6.5 Claim 5 in accordance with the first subsidiary request is, in effect, identical to Claim 5 of the main request (amendment of "composition in any preceding claim" to "composition defined in any preceding claim"). Therefore, this claim is unallowable for the reasons set out in paragraph 5.9 above in connection with the corresponding claim of the main request.
- 6.6 With respect to the Respondent's assertion of an improvement in brightener effectiveness, it is pointed out that even if a significant improvement had been demonstrated vis-à-vis the closest prior art (document (6)), this would not indicate the presence of an inventive step since it is the result of an obvious measure, i.e. the blending of an alkylpolyglucoside with a non-ionic surfactant and an anionic optical brightener in order to produce a commercial laundry detergent.

The Respondent also contended that the effect of the defined alkylpolyglucoside on a brightener in a laundry composition was difficult to prove in the laboratory except by careful testing. It must be assumed that the skilled person who is concerned with the development of laundry detergent formulations would carry out single wash or multiple wash cycle tests to evaluate the performance of a composition with respect to cleaning ability and efficiency of uptake of the optical brightener onto the fabric. It must also be assumed that the skilled person would take care to ensure that any differences in cleanliness and brightness would be detected.

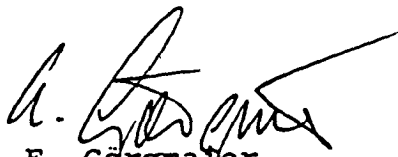
7. In view of the above finding, it is not necessary to consider the other, less relevant prior art documents relied upon by the Appellants in the course of oral proceedings.

Order

For these reasons, it is decided that:

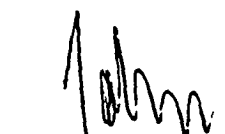
1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar



E. Görgmaler

The Chairman



K.J.A. Jahn