BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

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File Number: T 221/90 - 3.3.1

Application No.: 82 200 869.4

Publication No.: 0 070 075

Title of invention: Foaming surfactant compositions

Classification: C11D 1/83

D E C I S I O N
of 10 October 1991

Proprietor of the patent: THE PROCTER & GAMBLE COMPANY

Opponent: 01) Hüls Aktiengesellschaft

02) Henkel Kommanditgesellschaft auf Aktien

Headword: Surfactant/PROCTER

EPC Article 56

Keyword: "Inventive step (confirmed) - non-obvious alternative"

Headnote

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 221/90 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 10 October 1991

Appellant : (Opponent 01)
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Appellant : (Opponent 02)
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Decision under appeal :
Interlocutory decision of the Opposition Division of the European Patent Office dated 1 February 1990 concerning maintenance of European patent No. 0 070 075 in amended form.

Composition of the Board :

Chairman : R.W. Andrews
Members : J.M. Jonk
J.A. Stephens-Ofner

Summary of Facts and Submissions

I. European patent No. 0 076 075 in respect of European patent application No. 82 200 869.4, which was filed on 12 July 1982, was granted on 21 January 1987 (cf. Bulletin 87/04).

II. Notices of opposition, which were filed on 17 October 1989 and 19 October 1989 (by a duly confirmed telex), requested the revocation of the patent on the ground that its subject-matter did not involve an inventive step. The oppositions were supported, inter alia, by the following documents:

(1) US-A-3 839 318
(4) US-A-3 038 862
(5) US-A-3 721 633
(7) US-A-3 547 828
(12) Technical Bulletin, Triton CG-110 (Rohm & Haas).

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

(19) Journal of the American Oil Chemists' Society, Vol 47, pages 162 to 167, 1970
(34) DE-A-2 523 589
(35) Rivista Italiana, essenze, profumi, piante officinali, aromi, saponi, cosmetici, aerosol, Year LVI, No. 10, pages 576 to 572, 1974
(37) DE-A-2 441 818
(38) DE-A-2 544 778
(39) Fette, Seife, Anstrichmittel, Die Ernährungsindustrie, Vol 68, pages 551 to 556, 1966 and
(40) Manufacturing Chemist & Aerosol News, page 27, May 1981.

III. By an interlocutory decision dated 1 February 1990, the Opposition Division maintained the patent in amended form on the basis of Claims 1 to 11 filed on 9 October 1989.

The Opposition Division held that the subject-matter of the amended Claim 1 was novel and involved an inventive step. In the Opposition Division's opinion none of the cited prior art documents suggested that the use of alkylpolyglucosides (APG's) in combination with the anionic cosurfactant mixture defined in Claim 1 and/or the selection of the specific APG's referred to in Claim 1 would result in hand dishwashing compositions having relatively stable foams which have good suds mileage and suds during washing properties.

IV. Appeals were lodged against the decision on 20 and 29 March 1990 and the prescribed fees duly paid. Statements of Grounds of Appeal were filed on 25 May and 1 June 1990. In these statements, further submissions filed on 16 and 26 September 1991 and during the oral proceedings held on 10 October 1991, the Appellants put forward the following arguments:

Appellant 01 contended that the teaching of document (12) combined with that of documents (1) and (4) rendered the claimed subject-matter obvious, particularly since the APG's used in the claimed compositions could not be considered as being a selection. This Appellant also submitted that his comparative tests demonstrated that the claimed technical effect does not occur and, therefore, cannot be used as an indication of the presence of an inventive step.

Appellant O2 maintained that the claimed subject-matter was obvious in the light of the teaching of the cited prior art combined in the following manner:-

(a) document (37)/(38)/(34)/(4) + document (12) or (35) + document (28)
(b) document (37)/(38)/(34)+ document (12) or (35) + document (19)
(c) document (39) + document (12) or (35) + document (28)
(d) document (39) + document (12) or (35) + document (19).

This Appellant also argued that the occurrence of synergism cannot be taken as an indication of the presence of inventive step, since it is to be expected in the detergent field. Furthermore, synergism is widely used by the detergent industry.

Both Appellants insisted that, in the assessment of inventive step, prior art other than that relating to hand dishwashing composition had to be taken into consideration and that the Opposition Division had erred in regarding the APG's used in the claimed compositions as a selection with respect to either alkyl chain length or degree of polymerisation.

V. The Respondent submitted that the disclosure of the product Triton CG-110 and the numerous vague and generic disclosure of vast ranges of APG's and other sugar-based surfactants do not provide relevant information and do not suggest the defined APG's for use in the defined compositions.

VI. The Appellants requested that the decision under appeal be set aside and the patent be revoked. The Respondent requested that the patent be maintained on the basis of

the claims submitted by way of a main or auxiliary request in the course of oral proceedings.

Claim 1 in accordance with the Appellants' main request reads as follows:

"A foaming dishwashing liquid detergent composition comprising 10 to 15% (by weight of the composition) of

(1) a mixture of anionic cosurfactants neutralised with one ore more cationic moieties consisting essentially of:

(a) from 1 to 95% by weight, of a water soluble alkylbenzene sulfonate in which the alkyl group contains from 10 to 13 carbon atoms and

(b) from 5 to 99% by weight, of a cosurfactant selected from the group consisting of an alkyl glyceryl ether sulfonate in which the alkyl group contains from 8 to 18 carbon atoms, an alpha olefin sulfonate in which the olefin group contains from 10 to 18 carbon atoms, an alkyl polyethoxylate carboxylate in which the alkyl group contains from 10 to 18 carbon atoms, and the polyethoxylate chain contains from 2 to 6 ethoxylate groups and mixtures thereof and

(2) an alkylpolyglucoside surfactant having the formula:

$$R^2O(C_nH_{2n}O)_tZ_x$$

wherein Z is a moiety derived from glucose; R^2 is an alkyl group that contains from 12 to 18 carbon atoms; t is from 0 to 10 and x is from 1.5 to 4; n is 2 or 3 and including less than 10% fatty alcohol and less

than 50% short chain alkyl polyglucosides, the weight ratio of (1):(2) being from 1:10 to 10:1."

Claim 1 in accordance with the auxiliary request is directed to the use of the specified APG's for providing a stable foam which is readily rinsible in a foaming dishwashing liquid detergent composition.

VII. At the conclusion of the oral proceedings, the Board's decision to maintain the patent on the basis of the Appellant's main request was announced.

Reasons for the Decision

1. The appeal is admissible.

2. There are no formal objections under Article 123 EPC to the claims of the main request since they are adequately supported by the original disclosure and do not extend the protection conferred. Thus, Claim 1 is based on Claim 1 as filed and granted in combination with page 4, lines 21 to 30, page 5, lines 4 to 6, page 8, lines 8 to 11 and page 14, lines 4 to 7 of the published patent application (cf. also column 3, lines 20 to 33 and 45 to 47, column 5, lines 62 to 64, column 6, lines 19 and 20 and column 7, lines 21 to 25 of the printed patent specification). Claims 2 to 6 correspond to Claims 6, 2, 3, 4 and 7 respectively as filed and granted.

3. The patent in suit relates to a dishwashing liquid detergent composition comprising a water-soluble alkylbenzene sulphonate in admixture with other surfactants. Document (34), which may be regarded as representing the closest state of the art, discloses a dishwashing composition comprising (a) an

akylarylsulphonate with 9 to 18 carbon atoms in the alkyl radical and (b) an α-olefinsulphonate having 8 to 20 carbon atoms, wherein the weight ratio of components (a):(b) is 90:10 to 50:50 (cf. the paragraph bridging the first two pages of the description).

In the light of this closest prior art, the Board sees the technical problem underlying the disputed patent in providing further dishwashing liquid detergent compositions comprising a mixture of anionic surfactants.

According to the disputed patent this problem is solved by including in these prior art compositions an alkylpolyglucoside of the formula and composition as defined in the present Claim 1.

3.1 In view of the fact that the present Claim 1 also relates to at least two other combinations of anionic surfactants, it can be envisaged that at least two other documents could be considered as representing an equally close prior art, viz documents disclosing the combination of an alkylbenzenesulphonate with an alkyl glycerl ether sulphonate or with an alkyl polyethoxylate carboxylate, such as, documents (4), (37), (38) and (39).

3.2 Thus document (4) discloses detergent compositions in the form of shampoos comprising an alkylarylsulphonate and an alkyl polyethoxylate carboxylate (cf. Claim 1).

3.3 Document (37) discloses a liquid detergent dishwashing composition comprising an anionic synthetic detergent selected from linear alkylbenzenesulphonates, paraffin sulphonates, fatty alcohol ether sulphates and mixtures thereof, a phosphate builder and a suds-enhancing agent selected from alkyl glyceryl ether sulphonates,

tertiary amine oxides and fatty acid mono- and dialkanolamides (cf. Claim 1).

3.4 Document (38) discloses a liquid detergent composition comprising a surface active agent and a derived soyprotein comprising soymetaprotein (cf. Claim 1). According to the paragraph bridging pages 15 and 16 suitable anionic surfactants include alkali metal alkylbenzenesulphonates, alkali metal alkyl glyceryl ether sulphonates and alkali metal olefinsulphonates.

3.5 Document (39) discloses that hand dishwashing composition are based on synthetic surfactants such as, for example, alkylbenzenesulphonates, fatty alcohol sulphates, fatty alcohol poly(glycol ether) sulphates or nonionic compounds, such as, fatty alcohol poly(ethylene glycol) ethers, and alkylphenol poly(ethylene glycol) ethers and, occasionally, higher molecular weight alkyl glyceryl ether sulphonates or amine oxides (cf. second paragraph in the left-hand column on page 551).

3.6 However, irrespective of which of these five documents is taken to represent the closest state of the art, the technical problem underlying the patent in suit is the same as the one defined above.

3.7 In the light of this definition of the technical problem it becomes unnecessary to consider the experimental evidence submitted by Appellant 01 and the Respondent in the course of the opposition in any detail. It is sufficient to say that none of the compositions used in the experiments for comparative purposes corresponded to one falling within the teaching of the above-mentioned prior art.

4. After examination of the cited prior art, the Board has concluded that the claimed subject-matter 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 requirement of inventive step is met by the claimed subject-matter.

5.1 Documents (12) and (35) disclose that the alkylglucoside Triton CG-110 is a low irritating nonionic surfactant which is compatible with anionic, cationic, nonionic and amphoteric materials. The product also possesses good detergency wetting an soil removal and excellent foaming properties with the foams exhibiting good stability. In view of these properties document (12) recommends, inter alia, that the product be used as a hand dishwashing detergent. Document (35) emphasises the possible cosmetic applications of the product in, for example, shampoos and skin cleansing compositions, such as soaps and bubble baths.

According to document (12) and the analysis of three samples of Triton CG-110 submitted by Appellant 02 on 25 September 1991, the product contains about 35 to 41% of monoglucoside, about 30 to 40% of oligoglucoside, less than 2% fatty alcohol and no butyl glucoside. The degree of polymerisation (symbol x in the present Claim 1) is about 1.5 to 1.7 and the alkyl group (present symbol R) is a 50:50 ratio of C8 and C10. Thus, the essential difference between the alkylglucosides as defined in the present Claim 1 and Triton CG-110 lies in the length of the alkyl chain (represented by the symbol R).

5.2 Similarily document (40) discloses the properties and possible cosmetic uses of Triton CG-110. According to this document Triton CG-110 is expected to show high flash

foam, comparable to anionics, better foam stability than anionics, hard water tolerance and compatibility with nonionics, anionic and cationic surfactants while being readily biodegradable. Accordingly, this document recommends it for a variety of cosmetic and toiletry applications including soaps and synthetic bars to produce creamy foams and help prevent excessive skin degreasing; shampoos and bubble baths to produce a good mild cleaning product, skin creams, lotions and make-up, aiding emulsion stability while giving good skin feeling with mildness.

5.3 However, it should be borne in mind that the documents and the other documents referring to alkylpolyglucosides have been cited in the knowledge of the proposed solution to the technical problem underlying the disputed patent. Faced with this technical problem, the skilled person has a large number of possibilities open to him with no particular indication in the prior art or his common general knowledge to lead him in the direction of the proposed solution.

Even if the argument that the fact that the skilled person is aware that sugar ethers are biodegradable, mild to skin and, unlike petroleum based products, are derived from renewable resources would provide him with the incentive to employ them in hand dishwashing compositions is accepted, the skilled person would consider that Triton CG-110 solved the problem and would have no reason to search for other solutions.

Not only would the skilled person have no reason to continue along this route, he would also be discouraged from doing so by the knowledge of the difficulties involved in the commercial manufacture of alkylpolyglucosides with longer alkyl chains even though documents (1) and (7) discloses processes for their preparation.

Thus, document (1) describes a process for the preparation of C6-18 alkylglucoside and C6-18 alkyloligoglucoside comprising reacting glucose with a straight or branched primary alcohol having 6 to 18 carbon atoms in the presence of an acid catalyst at about 80° to 130°C removing the water of reaction substantially as fast as it is formed, controlling the catalyst concentration and temperature so that solubilisation of said glucose and formation of desired product occur, while oligomerisation and degradation of glucose is substantially avoided and using a molar ratio of alcohol to glucose such that decreasing glucose solubility with rising alcohol molecular weight is compensated for by increasing said molar ratio (cf. Claims 1 and 2).

Since the amount of excess alcohol to be removed and the difficulties involved in its removal increase with increasing molecular weight of the alcohol, the skilled person, in the absence of any foreseeable advantages, would not consider using alkylpolyglucosides with alkyl radicals containing more than the 10 carbon atoms of Triton CG-110.

5.4 Document (7) discloses the preparation of mixtures of alkylglucosides, alkyloligoglucosides and alkanols by reacting glucose and a lower alkanol, preferably n-butanol, in the presence of an acid catalyst to form a mixture of lower alkylglucosides which are then reacted with higher alkanols (cf. column 2, lines 16 to 61). For the reasons given above, this document would not prompt the skilled person, even if he had decided for environmental reasons to propose alkylglucosides as a solution to the problem underlying the disputed patent, to look further than Triton CG-110.

5.5 Document (19) discloses the physical and functional properties of some higher alkyl polyglycosides in which x varies from 1.3 to 9.0 and R from C10 to C18. In various tables in this document the results of a foam test, surface tension measurement, a toxicological investigation and a test designed to evaluate the detergent effectiveness of heavy duty solid and liquid compositions are reported (cf. Tables III, V, IX and X).

However, this document provides the skilled person with no incentive to propose alkylglucosides as a solution to his problem rather than one of the other possibilities or, if he were to suggest them as a solution why he should move away from Triton CG-110 to the higher alkyl derivatives.

5.6 Document (5) discloses built liquid detergent compositions comprising a builder selected from sodium nitriloacetate, potassium nitriloacetate and potassium polyphosphate and a C_{8-25} alkylglycoside containing 2 to 50 monomeric units (cf. Claim 1). According to column 2, lines 31 to 36, preferred alkylglycosides are alkylglucosides of C_{10-14} alkanols containing 1 to 4 glucose units.

Even if the obligatory presence of a builder in these prior art compositions is ignored, this document provides the skilled person with no teaching which would induce him to include to specified alkylpolyglucosides in the known compositions to solve the technical problem underlying the disputed patent. In the light of the above-mentioned manufacturing difficulties, the skilled person would be deterred from contemplating using the higher alkylpolyglucosides referred to in column 2 of this document. If he were to consider alklypolyglucosides at all as a possible solution to his problem, he would concentrate attention on such products as Triton CG-110.

6. Therefore, in the Board's judgement, the proposed solution to the technical problem underlying the patent in suit is not obvious. Thus, the subject-matter of Claim 1 in accordance with the main request involves an inventive step. Claims 2 to 6, which relate to preferred embodiments of the composition according to Claim 1, are also allowable.

7. In the light of the above finding, it is not necessary to consider the Respondent's auxiliary request.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Opposition Division with the order to maintain the patent on the basis of the main request submitted in the course of the oral proceedings.

The Registrar: **The Chairman:**

E. Görgmaier R.W. Andrews