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Anmeldenummer / Filing No / N° de la demande : 81 200 601.3

Veröffentlichungs-Nr. / Publication No / N° de la publication : 42 188

Bezeichnung der Erfindung: Detergent composition containing low levels of
Title of invention: amine oxides
Titre de l'invention :

Klassifikation / Classification / Classement : C11D 1/75, C11D 3/12

ENTSCHEIDUNG / DECISION

vom / of / du 15 August 1988

Anmelder / Applicant / Demandeur : The Procter & Gamble Co.

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant : Unilever N.V.

Stichwort / Headword / Référence : Amine Oxide Surfactant/PROCTER

EPU / EPC / CBE Article 56

Schlagwort / Keyword / Mot clé : "Inventive step - unexpected effect"

Leitsatz / Headnote / Sommaire

Europäisches
Patentamt

Beschwerdekammern

European Patent
Office

Boards of Appeal

Office européen
des brevets

Chambres de recours



Case Number : T 156/87 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal
of 15 August 1988

Appellant :

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Decision under appeal :

Decision of the Opposition Division of the European Patent Office notified on 21 January 1987 and communicated on 24 February 1987 revoking European patent No. 42 188 pursuant to Article 102(1) EPC.

Composition of the Board :

Chairman : G. Szabo

Members : S. Schödel

R. Schulte

Summary of Facts and Submissions

- I. European Patent No. 42 188, granted on 3 October 1984 with nine claims in response to Application No. 81 200 601.3, was revoked by the Opposition Division in a decision notified on 21 January 1987, the reasons being communicated on 24 February 1987.

The subject-matter of the patent was a particulate detergent composition comprising surfactant and builder and containing a small quantity of amine oxide. The purpose of the composition was to provide enhanced soil release and cleaning properties.

According to the reasons for the decision, the subject-matter of the patent in suit lacked an inventive step over the disclosures of document (1) NL-A-7 204 495 insofar as the patent related to nonionic detergents and over the disclosures of document (3) US-A-4 133 779 as far as anionic detergents were concerned. In particular the compositions claimed were a selection from (1) and from (3) and no surprising improvement or unexpected effect had been demonstrated.

- II. A Notice of Appeal was lodged by the Appellant (who was the Patentee) on 21 April 1987, the fee being paid on the same day.

Oral proceedings before the Board were held on 26 April 1988.

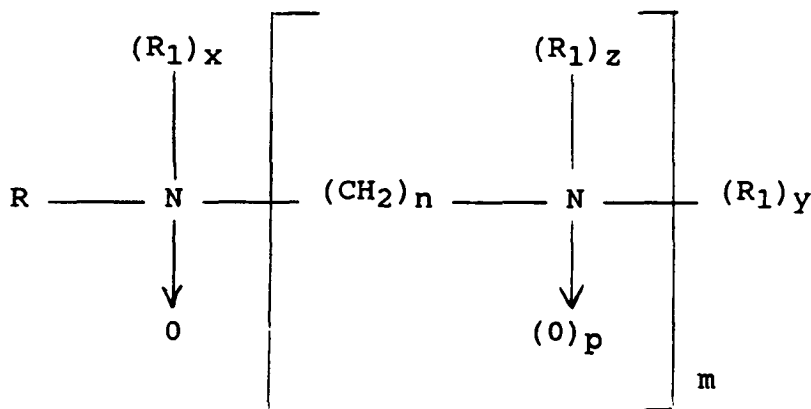
At the end of the oral proceedings, the Appellant presented two requests, a main request, and an auxiliary request, upon which he wholly relied.

Claim 1 of the main request reads as follows:

1. A particulate built detergent composition having enhanced soil release and cleaning properties comprising:

(a) from 5%-60% by weight of a surfactant selected from the group consisting of anionic, nonionic, zwitterionic and ampholytic detergents and mixtures thereof;

(b) from 0.25%-0.75% by weight of an amine oxide having the formula



wherein R is an alkyl or alkenyl group having 10 to 22 carbon atoms, the R_1 's which are identical or different are selected from C_{1-4} alkyl, ethylene oxide and propylene oxide, n is an integer from 1 to 6, m is an integer from 0 to 6, p is 0 or 1, x, y and z are each 1 for alkyl substituents, and integers in the range from 1 to 10 for ethylene oxide or propylene oxide substituents such that the sum of (x+y+z) is not greater than 25; and

(c) from 10% to 45% by weight of a detergent builder; whereby a 1% aqueous solution of the composition has an alkaline pH (20 degree C).

This is followed by Claims 2 to 6 which are dependent on Claim 1.

The auxiliary request involved a more restricted version of Claim 1 which differed from the main request principally in requiring that the composition comprise, as component (a), from 5% to 25% by weight of an anionic surfactant and by introducing, as a further essential component, from 3% to 50% by weight of a peroxy bleach compound. This was followed by three fully dependent claims.

III. In his written submissions and at the oral proceedings the Appellant has submitted substantially the following arguments:

- (i) The prior art taught the use of amine oxide (Ao) at surfactant levels i.e. always more than 1% and generally more than 2%, in granular formulations, whereas the patent in suit was restricted to exceptionally low levels of Ao (0.25% - 0.75% by weight) in such a composition.
- (ii) The prior art, especially (1), taught that increasing the Ao level in the formulation gave improved detergency performance whereas the patent in suit was based on the opposite finding that an improved cleaning and soil release effect was achieved at the lower than conventional Ao levels claimed (conventional levels being around 2% by weight); two affidavits containing comparative experiments had been filed to support this finding.
- (iii) At the different levels of Ao in the formulations as between (1), which related to US washing conditions, especially low product concentration (~ 0.15%) and the patent in suit, which exemplified European

washing conditions, especially higher product concentration (~ 1%), there were different washing environments involved which were not properly comparable.

- (iv) As regards document (3) this related to light duty compositions free of builder, since the presence of the builder would deactivate the composition by removal of the essential magnesium ions; this had been taken into account by including the presence of builder as an essential feature in both the main and auxiliary requests.
- (v) As to document (1) there was a strong prejudice spelt out against the use of anionic surfactants which would lead the skilled person to avoid their use because of possible interaction with the Ao; this had been taken into account in framing the auxiliary request by restricting the choice of surfactant to anionic surfactant.

IV. The Respondent submitted substantially the following arguments:

- (i) The Ao was an extremely expensive ingredient; the prior art taught the use of Ao: detergent weight ratios which overlapped with the preferred ratios of the patent in suit; at the lower range of detergent utilization levels preferred in the prior art this would result in compositions having the quantities of Ao claimed; the subject-matter claimed was thus prima facie obvious.
- (ii) Any advantageous effects were bound up with the concentration of Ao in the wash liquor rather than in the formulation itself; Ao wash liquor

concentrations corresponding to those exemplified in the patent in suit were, however, known from (1) as were the advantageous effects of such compositions compared with a similar concentration of conventional built washing powder containing no Ao.

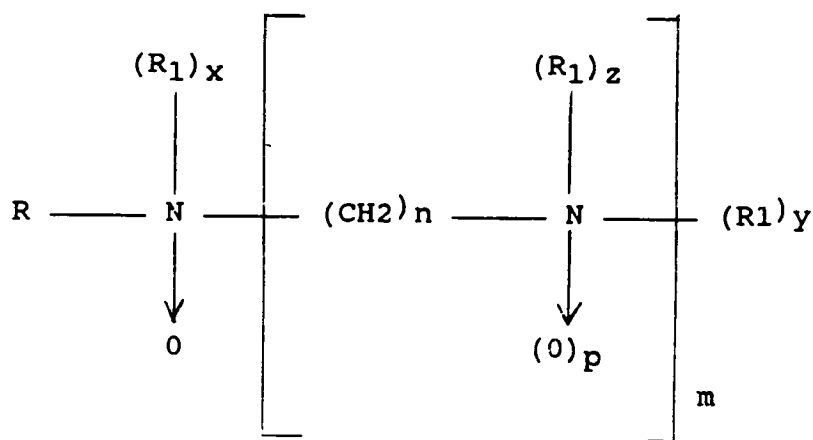
- (iii) The prior art did not teach that increasing the Ao level gave improved washing performance; rather it recognized the ceiling level of Ao below which improved washing performance was obtained.
- (iv) The allegations of the Appellant regarding different washing conditions in the US and in Europe constituted a deviation from the original line of argument according to which the advantageous effects of the Ao were independent of the surfactant matrix used.
- (v) Although the auxiliary request disposed of the relevance of document (1), the addition of builder to the composition of document (3) was an obvious measure in any case.

IX. After hearing the Parties the Board announced its intention to issue a Communication under Rule 58(4) EPC.

In its communication the Board proposed to maintain the patent in amended form on the basis of the auxiliary request of the Appellant filed at the oral proceedings but with certain further amendments inserted by the Board. Claim 1 of the auxiliary request in its thus amended form reads as follows:

"A particulate detergent composition having enhanced soil release and cleaning properties comprising:

- (a) from 5% to 25% by weight of a surface-active agent;
- (b) from 0.25% to 0.75% by weight of an amine oxide having the formula



wherein R is an alkyl or alkenyl group having 10 to 22 carbon atoms, the R_1 's which are identical or different are selected from C_{1-4} alkyl, ethylene oxide and propylene oxide, n is an integer from 1 to 6, m is an integer from 0 to 6, p is 0 or 1, x, y, and z are each 1 for alkyl substituents, and integers in the range from 1 to 10 for ethylene oxide or propylene oxide substituents such that the sum of (x+y+z) is not greater than 25,

- (c) from 3% to 50% by weight of a peroxybleach compound;
and
- (d) from 10% to 45% by weight of a detergent builder;
whereby a 1% aqueous solution of the composition, measured at 20°C has a pH in the range from 8.5 to 11 and wherein the surface active agent consists of anionic surfactant."

Claim 1 is followed by Claims 2 to 4 which are dependent on Claim 1 and define further features of the composition. Also involved is an amended description which has been adapted to the claims.

- X. The Appellant requested during oral proceedings that the patent be maintained on the basis of the main request or alternatively on the basis of the auxiliary request containing the further amendments of the Board.

By letter of 17 June 1988 the Appellant agreed to the text of the claims attached to the communication under Rule 58(4) EPC and also to the individual amendments proposed therein to the description. He gave it as his understanding of the scope of Claim 1 that it did not exclude the presence of other surfactants such as nonionics in lower (additive) levels as compared to the anionic surfactant.

The Respondent indicated no further objection to the proposed text beyond suggestions for three additional amendments.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.
2. The patent in suit relates to a detergent composition with enhanced soil release and cleaning properties.
3. Claim 1 of the main request is directed to a particulate built detergent composition comprising three essential components, namely (a) a surfactant (5-60% by weight), (b) a specified amine oxide (0.25-0.75% by weight) and (c) a detergent builder (10-45% by weight).
 - 3.1 A three component particulate detergent composition wherein the surfactant and amine oxide are associated with a

builder as essential ingredients is not disclosed in any claim or the description of the patent in suit or indeed in any of the documents of the underlying application.

Also, the upper limit of the range for component (a), (i.e. 60% by weight), is nowhere mentioned in relation to a particulate composition. The relevant upper value in Claim 3 as granted in this connection is 25% by weight.

- 3.2 Thus Claim 1 of the main request contains subject-matter extending beyond the disclosure of the application as originally filed and extends the protection conferred by the patent as granted. It contravenes Article 123(2) and (3) EPC and is hence not allowable on formal grounds. The same applies to the remaining Claims 2-6 since these are dependent on the invalid Claim 1.

It is not, therefore, necessary for the Board to consider whether the subject matter of the claims of the main request is novel or might involve an inventive step.

4. As regards Claim 1 of the auxiliary request, this is allowable in formal respects, since its content is derivable from the documents of the application as originally filed, and its scope is restricted compared with the granted Claim 3 on which it is based. The percentage limits imposed on the various components are derived from original Claims 4 (amine oxide) and 5 (builder) and original page 3, line 34 (lower limit of the anionic). Dependent Claims 2 to 4 substantially correspond to Claims 6, 7 and 9 as filed and granted. Thus, the claims comply with Article 123(2) and (3) EPC and the same applies to the amendments in the specification.

- 4.1 Concerning the letter of the Respondent dated 31 May 1988 following the invitation of the Board pursuant to Rule 58(4) to file observations, this contained three specific suggestions for further amendments.

The first, at page 3, line 16 of the specification is clearly acceptable, since the passage now refers to five, not three essential parameters.

The remaining two suggestions, i.e. those at page 6, line 45 and page 7, line 26 refer to non-essential ingredients of the compositions (organic bleach activators and liquid hydrocarbon-containing regulants respectively). It is considered that the wording does not lead to any direct contradiction and is consequently not such as to raise any real doubts as to the true scope of Claim 1. There is moreover a strong interest in avoiding any additional amendments over and above those which are clearly essential.

The Respondent's suggestions in this respect are thus not acceptable, except the correction on page 3.

- 4.2 As regards the statement concerning the scope of Claim 1 of the auxiliary request in respect of additive quantities of surfactants other than anionics by the Appellant in his letter of 17 June 1988, the Board would comment as follows. The Appellant himself during the oral proceedings proposed a claim directed to "A particulate detergent composition ... comprising (a) from 5% to 25% by weight of an anionic surface active agent; ...". This proposal would first of all have rendered open an originally closed definition as to the total quantity of surface active agent present (5% to 25% by weight), since the 5% to 25% by weight of anionic could then be supplemented by further quantities in excess of 25% of, say, a nonionic surfactant and secondly, would have

represented a non-allowable selection based on mixtures always containing at least 5% anionic, which was not supported by the original disclosure. This would have permitted the effective addition of the other kinds of surfactants, notwithstanding the fact that they were deleted from the claim.

In contrast, the form of Claim 1 constituting the auxiliary request as amended by the Board is restricted to the 5% to 25% by weight overall maximum surfactant originally disclosed, while specifying that this surfactant must be anionic in accordance with the first option in the originally granted claim of the patent and the supporting examples. As to the accepted wording of the claim in respect of the case of addition of other ingredients in ineffectual quantities or for other purposes to the composition, this is a matter of interpretation relevant to enforcement but outside the question of validity concerning the Board in the present appeal.

5. The relevant state of the art in relation to the claims of the auxiliary request is Document (3). Document (3) discloses a detergent composition consisting essentially of (a) a specified water soluble amine oxide, (b) a magnesium salt of a specified anionic detergent and (c) the balance selected from water, mixtures of water and C₁ - C₅ alkanols, and inert filler salts. The ratio of amine oxide to anionic detergent is from 1:100 to 1:2 by weight (cf. Claim 1 of (3)). The compositions are especially useful for the removal of greasy soils. Although the preferred embodiments are in a liquid form there are also granular or tableted formulations.
6. Compared with this state of the art, the technical problem is to be seen in providing a detergent composition with improved cleaning and soil release performance.

- 6.1 The solution of this technical problem, which is outlined in more detail in Claim 1 of the auxiliary request briefly was to supplement the known composition with substantial quantities of a peroxybleach compound (3% to 50% by weight) as well as a detergent builder (10% to 45% by weight) and to restrict the quantity of Ao to within the range 0.25% to 0.75% by weight.
- 6.2 According to Examples I and II of the patent in suit compositions having the low levels of Ao claimed give an improved washing performance compared with a similar composition without Ao (by about 1 on a scale of 0-4) and according to Example III the claimed composition gives an improved washing performance compared with a similar composition having a conventionally higher level of Ao of around 2% (by about 3 on the scale of 0-4).
- 6.3 A comparative experiment filed on 3 August 1987 with the declaration of André Baeck, i.e. during the appeal proceedings, demonstrated that compositions built according to the patent in suit but having a magnesium counterion in the anionic surfactant as in (3) also had an improved cleaning effect compared with a similar built bleach containing composition with conventional levels of Ao around 3% in the formulation. Although there was some discussion as to the significance of the presentation of the test results, the Board accepts that the composition claimed can provide a true improvement of one point on a scale of 0-4, rather than plus or minus half a point as implied by the "computerised" presentation in the declaration.
- 6.4 On the basis of these improvements, it is considered plausible that the technical problem is solved by the claimed measures.

7. Since none of the documents of the prior art discloses a particulate built detergent composition consisting of four essential components including a bleach and the low levels of Ao specified, the subject matter of claim 1 is novel under Article 54 EPC.
8. On the matter of inventive step, the question must be asked, whether there was any promise or hint in the state of the art, including general knowledge, that improved cleaning and soil release performance could be obtained by adding a builder and a bleach and restricting the quantity of Ao in the compositions of (3) to the range 0.25% to 0.75% by weight.
 - 8.1 This question must be answered in the negative. It may be true that the claimed levels of Ao can be seen as derived in part from a selection from the Ao: anionic surfactant ratios of 1:100 to 1:2, preferably 1:15 to 1:3 disclosed in (3), at anionic detergent formulation levels around 10% i.e. the lower level of the preferred range of 10-35% given in (3) (cf. col. 4 lines 15-17, col. 5 line 42). However, the more specific disclosure of the examples in (3), which in the Board's view must be given correspondingly more weight, indicate formulation levels of Ao in particulate compositions of not less than 3% (cf. Example VI). Even in the liquid composition of Example VIII in (3), which is for use without dilution, the quantity of Ao is still 1.0% by weight. Thus there is no particular recommendation in (3) to work at Ao levels below 3% in particulate compositions and certainly not below 1% in any composition. Moreover the reliance of the system according to (3) for its working performance upon the presence of magnesium as the counterion in the anionic surfactant would in the Board's view constitute a prejudice restraining the skilled person from experimenting with adding the most common builders, since these would, as a general rule, sequester the essential

magnesium ions. The closed definition of the compositions in claim 1 of (3) in any case indicates that these are fully formulated without the addition of builders.

- 8.2 The objection of the Respondent that it would have been obvious to add builders anyway and that not all builders sequester magnesium ions is unconvincing. It is clear from the comparison test in Example I of (3) where the washing performance of anionic surfactants having a magnesium counterion is compared with those having a sodium counterion - such a replacement of magnesium by sodium being an expected side effect of adding substantial quantities of a common builder - shows a major loss of washing performance when magnesium is replaced by sodium (cf. col. 6, compositions A, C, E, G, I, K). Moreover, while it may be true that not all sequestering agents are selective for magnesium, it cannot be assumed that a conventionally built detergent will normally leave Mg ions unbound.
- 8.3 Thus the skilled person would have had to regard the addition of a builder to the compositions of (3) not only as unnecessary but also as inevitably overshadowed by the risk of loss of detergent performance due to sequestering of the advantageous magnesium counterions. It cannot therefore be regarded as obvious to solve the existing technical problem by adding a builder to the compositions disclosed in (3). Thus taking into account also unexpected improved performance which has been shown by examples of the patent in suit and the voluntarily submitted comparative experiment in the Declaration of André Baeck, to be due to the Ao level alone, it cannot have been obvious to modify the compositions of (3) in such a way as to arrive at a composition falling within the terms of Claim 1, as regards the advantageous Ao level, let alone to add a builder as well as a bleach.

9. Document GB-1 379 024 (1a) - equivalent to document (1) - does not provide such an effective starting point for an obviousness attack on the auxiliary request, firstly because it is concerned exclusively with a particular class of surfactants, namely nonionics, which have been excluded in Claim 1 of the auxiliary request, and secondly because of the warning in (1a) to the effect that it is preferable to exclude from the compositions any anionic detergent active compounds, as the presence of any significant amounts of these compounds, for example more than about 5% by weight, tends to give decreased detergency, possibly due to some interaction with the amine oxide detergent active compounds (cf. (1a), page 3, lines 9-16). This constitutes in the Board's view a prejudice discouraging the skilled person from adding anionic detergents, even in amounts somewhat below 5%, since especially at lower level Ao formulations such destructive interaction would be expected to have a debilitating effect on the composition. It is thus surprising in the light of the results given in the examples of the patent in suit, that even at the claimed low levels of Ao, the anionic detergent based compositions do provide an improved washing and soil release performance, both compared with compositions having no Ao and with compositions having conventional higher levels of Ao (cf. examples I, II and III of the patent in suit).
- 9.1 It is for this reason also that the teaching regarding the effectiveness of low wash liquor concentrations of Ao in (1a) cannot be regarded as a teaching to be transferred to solving the technical problem arising from (3), since any such general teaching is overshadowed by the particular prejudice applying to the presence of anionic surfactants in the case of the patent in suit. Consequently, questions as to whether (1a) teaches that low Ao levels or higher Ao

levels are more effective as well as of the significance of different washing conditions used in European or US practice need not be considered in further detail.

10. The remaining documents (2) and (4) apply only to liquid compositions and are thus more remote from the subject-matter claimed. Furthermore there is no suggestion in either of them that improved washing and/or soil release performance is associated with any particular level of Ao in the formulation. The question does arise, however, as to whether a one-way-street situation could arise wherein a skilled person wishing routinely to reformulate the compositions of (2) or (4) as particulate compositions would be led necessarily to arrive at a composition falling within the terms of Claim 1. Once again the question must be answered in the negative, since in reformulating it is considered that the teachings of the prior art in relation to the component levels appropriate to particulate compositions would be followed and these, as has been shown above, do not lead to the subject matter claimed.
11. Thus the subject-matter of Claim 1 of the auxiliary request is not regarded as arising in an obvious manner from the state of the art and is considered therefore to involve an inventive step (Article 56 EPC).

Consequently, Claim 1 of the auxiliary request, together with dependent Claims 2-4, which relate to preferred embodiments of Claim 1, are patentable. The revised description as presented and amended is in agreement with these claims.

Order

For these reasons, it is decided that:

- (1) The decision of the Opposition Division is set aside.
- (2) The patent is to be maintained on the basis of the claims and description annexed to the Communication of the Board pursuant to Rule 58(4) EPC and dated 25 May 1988, with the further amendment on page 3 at line 16, of deleting "three" and replacing it by "five".

The Registrar:

The Chairman:

F.Klein

G.Szabo