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D E C I S I O N
of 14 March 2001

Case Number: T 0300/97 - 3.3.6

Application Number: 89306599.5

Publication Number: 0349314

IPC: C11D 17/00

Language of the proceedings: EN

Title of invention:
Detergent compositions

Patentee:
UNILEVER PLC, et al

Opponent:
Henkel Kommanditgesellschaft auf Aktien
PROCTER & GAMBLE EUROPEAN TECHNICAL CENTER N.V.

Headword:
Gas bubbles/UNILEVER

Relevant legal provisions:
EPC Art. 54(3), 56

Keyword:
"Novelty (yes) - text of a prior art document interpreted in
the light of its whole content"
"Inventive step (yes)"

Decisions cited:
T 0056/87, T 0666/89

Catchword:
-



Case Number: T 0300/97 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 14 March 2001

Appellant:
(Opponent 01)

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Other party:
(Opponent 02)

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Respondent:
(Proprietor of the patent)

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Representative:

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Decision under appeal:

Interlocutory decision of the Opposition Division
of the European Patent Office posted 14 January
1997 concerning maintenance of European patent
No. 0 349 314 in amended form.

Composition of the Board:

Chairman: P. Krasa
Members: L. Li Voti
C. Rennie-Smith

Summary of Facts and Submissions

- I. The present appeal is from the interlocutory decision of the Opposition Division to maintain European patent No. 0 349 314 in amended form.

Independent Claim 1 reads as follows:

"1. A liquid detergent composition comprising:

- (a) from about 5 to 40 wt % of a particulate detergent builder;
- (b) an aqueous liquid continuous phase;
- (c) a surface active agent; and
- (d) from about 1 to 20% by volume of a gas present as bubbles ranging in diameter from 3-150 microns and having an average diameter from 3-45 microns;

the overall density of the composition being from 85% to 115% of the density of the liquid continuous phase alone."

The remaining claims 2 to 11, including claim 7, relate to particular embodiments of the liquid detergent composition subject-matter of claim 1; claims 12 and 13 relate to a process for preparing such a composition and claim 14 to a method of cleaning dishes by means of such a composition.

- II. Two notices of opposition had been filed against the granted patent, wherein the Appellant (Opponent I) sought revocation of the patent on the grounds of Article 100(a) EPC, in particular because of an alleged

lack of novelty and lack of an inventive step of the claimed subject-matter, whilst Opponent II sought revocation only on the grounds of lack of inventive step.

The oppositions had been based *inter alia* upon the following documents:

D1: EP-A-0 340 989

D2: Chemical Abstracts, vol. 103, no. 106654b

D3: US-A-2 854 346 and

D5: US-A-4 588 582

III. In its decision, the Opposition Division found that the subject-matter of the claims of the patent in suit as amended fulfilled the patentability requirements of the EPC. In particular it held with regard to the novelty of the claimed subject-matter that

- D1 dealt extensively only with non-aqueous compositions;
- even though the first paragraph on page 5 of D1 referred to a suspension of a particulate solid in an unspecified continuous liquid vehicle phase, this passage had to be interpreted as relating also to a composition having a non-aqueous continuous liquid phase;
- even if the cited passage on page 5 had been interpreted to relate to an aqueous suspension, D1 did not disclose all the features of claim 1 of the patent in suit in combination;

- therefore D1 did not take away the novelty of the claims.

With regard to the issue of inventive step it held that

- D2 represented the closest prior art;
- D2 did not provide any information about the stabilisation of the therein disclosed composition over long periods of time at elevated temperature and therefore the skilled person would not have found in its teaching any motivation for modifying the size of the gas bubbles and the content of detergent builder in order to enhance stability;
- D3 and D5 related to different technical fields and would have been disregarded by a person skilled in the art when faced with the problem of improving the stability of an aqueous liquid detergent composition.

IV. The Appellant (Opponent I) filed an appeal against this decision and requested that the decision be set aside and the patent be revoked.

V. The Appellant's arguments as regards novelty and inventive step as submitted orally and in writing can be summarized as follows:

- D1 related mainly to non-aqueous liquid compositions;
- the first paragraph on page 5 addressed, however, liquid compositions different from the non-aqueous compositions otherwise disclosed in D1 and thus it related necessarily to aqueous compositions;

- therefore, since D1 already disclosed all the other features of the claims of the patent in suit, these claims lacked novelty;
- D2 represented the closest prior art;
- a skilled person, starting from the teaching of D2, would obviously have tried to modify the size of the gas bubbles in the composition in order to achieve optimal stability;
- it was known from common general knowledge about flotation processes, and known from D3 that, in order to stabilize a suspension of a particulate solid in a liquid vehicle, the amount and the size of the gas bubbles must be correlated with the size of the particles to be suspended; in this respect it was argued at the oral proceedings that a skilled person would have been able on the basis of his common general knowledge of physical laws to calculate the size of the gas bubbles necessary for stably suspending a particulate having a defined size;
- moreover it was known from D3 that a stable suspended system could be achieved by bringing the density of the suspended phase close to the density of the liquid phase;
- thus a skilled person would obviously have applied the teaching of D3, relating to the stabilization of a suspension comprising high density particles in an aqueous medium, and his common general knowledge in order to bring the density of the particle-gas bubble unit close to that of the suspending liquid.

With respect to the alleged advantage of increased stability for long term storage at elevated temperature, it argued that

- a commercial liquid detergent composition had to be stable within a temperature range from freezing point up to 40°C and thus the skilled person would have necessarily formulated the composition of D2 in such a way as to possess this stability;
- thus the alleged advantage of increased stability at elevated temperatures could not be considered to represent the objective technical problem solved by the patent in suit, which consisted therefore only in the prevention of phase separation;
- the solution to this problem was obvious for a skilled person in the light of the combination of D2 and D3 or D2 and D5.

VI. Opponent II did not lodge an appeal and is party as of right to these proceedings in accordance with Article 107 EPC, second sentence. However, as communicated by letter, it did not attend the oral proceedings which took place on 14 March 2001 before the Board.

VII. The Respondents' (Proprietors') counter-arguments presented in writing and at the oral proceedings can be summarised as follows:

- the claimed subject-matter was novel because of the arguments put forward by the opposition division in its decision;

- the Appellant had not filed any evidence that the size of the gas bubbles must correlate with the size of the particles to be suspended and while the mathematical calculation presented by the Appellant might be applicable to an ideal system it could not apply to a liquid detergent composition comprising suspended builders;
- D2 did not disclose the inclusion of particles of a detergent builder and did not suggest how the size of the gas bubbles had to be selected in order to solve the problem of the patent in suit;
- the skilled person had thus no incentive for modifying the composition of D2, which was already stable;
- moreover, the teaching of D3 related to the different technical field of metallic paints and brazing pastes and related to the suspension of metallic particles, which were not comparable with builder particles. Therefore its teaching could not be combined with that of D2. Similarly, the teaching of D5 relating to toothpaste compositions could not be combined with the teaching of D2.

VIII. The Respondents requested that the appeal be dismissed.

IX. At the end of the oral proceedings, the chairman announced the decision of the Board.

Reasons for the Decision

1. *Novelty*

1.1 The objection of lack of novelty was solely based on D1. This citation is an European patent application, which was published on 8 November 1989 (Bulletin 89/45), i.e. after the priority date of the patent in suit, but has the earlier priority date of 2 May 1988 and is thus state of the art by virtue of Article 54(3) EPC.

1.2 As agreed by the Appellant, D1 deals mainly with non-aqueous liquid compositions which can tolerate a maximum of 5 % water. In fact not only the introductory part of the description, but also the definition of the goal of the invention and repeated statements in the description refer to non-aqueous compositions (see page 2, lines 1 and 2 and 22 to 25; page 4, lines 18 to 30 and 57 to 58; page 5, lines 7 to 11; page 9, lines 31 to 34; page 10, lines 1 to 3; page 11, line 58 to page 12, line 2; page 15, lines 33 to 34 and 49 to 53; all claims).

The passage on page 5, lines 1 to 6, of the description, however reads:

"According to still another aspect of the invention, a method is provided for stabilizing a suspension of a first finely divided particulate solid substance in a continuous liquid vehicle phase...such that the density of the dispersed solid particles together with the gas bubbles becomes similar to the density of the liquid phase...".

This passage thus fails to specify the nature of the liquid phase, i.e. whether it is aqueous or non-aqueous.

The Appellant had thus based its novelty objection upon the interpretation of this passage as relating to liquid compositions different from the non-aqueous compositions otherwise disclosed in D1 and thus necessarily relating to aqueous compositions.

- 1.3 The Appellant's argument that the words "...still another aspect of the invention..." (see above quotation) must necessarily relate to an aqueous composition since the preceding passages relate to non-aqueous compositions is, however, not convincing. These passages, starting from page 4, line 26, refer to

"...suspensions of finely divided solid particulate matter in a non-aqueous liquid matrix..." (page 4, lines 26 to 27; emphasis added).

The meaning of this " non-aqueous liquid matrix " is explained on page 2 of D1, wherein the stability problem of suspensions of particulate matter in liquid laundry detergents is addressed; these non-aqueous liquid laundry detergents are called "liquid matrix" (page 2, lines 22 to 31, in particular lines 27 to 29).

By contrast, "...still another aspect of the invention..." refers to a

"...continuous liquid vehicle phase..." (page 5, line 2; emphasis added).

However, apart from the liquid nonionic synthetic organic detergent, this liquid phase may contain organic solvents as solvent vehicles (page 5, lines 7 to 10). Therefore the Board concludes that "...still another aspect of the invention..." connotes non-aqueous compositions comprising organic solvents in addition to the liquid non-ionic detergents rather than aqueous compositions.

- 1.4 Therefore, in the Board's judgement, the Appellant's interpretation of this passage is a misreading of the document, since it requires taking a single passage out of the context of the whole document, whilst the text of a prior art document should be more properly interpreted taking into account the teaching of the document in its entirety (see in this respect T 056/87, OJ EPO 1990, 188, point 3.1 of the reasons; T 666/89, OJ EPO 1993, 495, point 5 of the reasons).

Therefore, since D1 specifically indicates that its goal is to improve non-aqueous compositions (page 2, line 1 and page 4, lines 18 to 30) and expressly states that the final compositions of the therein disclosed invention are non-aqueous (page 15, line 33), the particular passage relied on must also be considered to relate to non-aqueous compositions.

- 1.5 It follows that D1 cannot destroy the novelty of any of the claims of the patent-in-suit which relate to aqueous compositions.

The subject-matter of the claims of the patent in suit is thus novel.

2. *Closest prior art*

- 2.1 D2 discloses an aqueous liquid detergent composition comprising surface active agents, suspended water-insoluble substances and 0.5 to 8.5 vol.% of gas bubbles having an average diameter of 50 to 700 microns. A specific composition comprises 3 vol.% of gas bubbles having an average diameter of 200 microns and 8.25 wt% (calculated from the data furnished in the abstract) of suspended quartzite particles having a diameter of 5 microns. The composition has a good storage stability.

Even though this document does not specify that the density of the overall composition is from 85% to 115% of the density of the liquid continuous phase alone, this feature is implicitly disclosed in D2 since this is a necessary condition for the physical stability of this type of compositions as will be explained in point 4.2 hereinafter.

- 2.2 The composition of D2 thus differs from that of claim 1 only insofar as it does not comprise a particulate builder and the gas bubbles do not have the size distribution required by claim 1.

The Board thus accepts D2 as representing the most suitable starting point for evaluating inventive step as suggested by the parties.

3. *The Technical Problem*

- 3.1 According to the patent in suit, aerated liquid detergent compositions were already known (see page 3, line 14; page 2, lines 48 to 57). However, when gas bubbles are incorporated into such a composition, it is desirable that the gas bubbles neither coalesce to form bigger bubbles which rise to the surface nor dissolve in the continuous phase thus destabilizing the system during storage over long periods of time at ambient or elevated temperatures (37 °C), in which case an unattractive phase separation would occur (see page 2, lines 12 to 18 and page 3, lines 41 to 44).

According to the invention it was found that when the suspended particles comprise a builder, the size and the amount of the gas bubbles are essential in order to provide a system which is stable during storage at a

broad range of temperatures (page 3, lines 45 to 52). Stability is in this case achieved whenever the density of the dispersed phase is about equal to that of the liquid continuous phase (page 3, lines 18 to 27).

- 3.2 Thus, the technical problem underlying the claimed invention, as against the disclosure of D2, amounted to the provision of an alternative aerated aqueous liquid composition comprising particulate builder and having a stability during storage over long periods of time and at a broad range of temperatures.

As shown in the comparative examples of the patent in suit, a composition possessing all the features of claim 1 is stable for at least three weeks at temperatures from 3 to 37 °C (see examples 2, 3, 5 and 6). This property of the claimed composition was not contested by the Appellant.

- 3.3 Therefore the Board has no reason to doubt that a composition as specified in claim 1 solved the technical problem as defined.

4. *Evaluation of inventive step*

- 4.1 As already mentioned, the only differences between the composition of D2 and the claimed subject-matter consist in the fact that the composition of D2 comprises gas bubbles of greater size and does not comprise a particulate detergent builder.

D2 itself does not contain any suggestion which would prompt a skilled person to modify the size of the gas bubbles in relation to the particles to be suspended or to introduce builder particles as part of the suspended solid.

In this respect the Board is convinced that because of the physical and chemical properties of builder particles, which are generally electrolytes or ion exchangers and thus have a polarized surface, as submitted by the Respondents at the oral proceedings, the problem of suspending particles of this type would not have been considered by a skilled person as equivalent to that addressed in D2, namely the stable suspension of inert abrasive particles such as quartzite.

Therefore, in the Board's judgement D2 cannot by itself lead to the subject-matter of the patent in suit.

4.2 D3 relates generally to the suspension of high density particles of greater than colloidal size in a liquid medium (aqueous or non-aqueous) and to methods of increasing the stability of such suspensions (column 1, lines 15 to 18 and column 4, lines 43 to 45).

D3 teaches that there exist some principles regulating the capacity of a liquid to hold such solids in suspension. These are the following:

- the tendency of a solid particle to settle in a liquid medium of lower density under static conditions may be reduced by attaching gas bubbles to the solid particles such that the specific gravity of the suspended phase (particle-bubble unit) is brought close to that of the liquid medium (column 1, lines 47 to 58);
- the gravity induced movement of the particle-bubble units may be reduced by increasing the viscosity of the liquid medium to a viscosity close to that of the suspended phase (column 1, line 59 to column 2, line 15);

- the amount of gas to be used for a satisfactory adherence to the particles varies inversely to the size of the solid particles and directly with the density and concentration of these (column 2, lines 20 to 27);
- in too great a quantity gas bubbles tend to coalesce and rise to the surface (column 2, lines 28 to 33).

Specific examples of D3 relate to brazing pastes comprising copper particles (column 3, lines 29 to 31 and 63 to 70 as well as column 4, lines 62 to 70).

D3 is, however, silent about the influence of reduced or elevated temperatures upon the stability of the suspension.

4.3 In the Board's judgement a skilled person, even if aware of these general principles governing the suspension of solid particles of high density in a liquid medium, would not have found any suggestion in this document to select a bubble size distribution as in claim 1 of the patent in suit for suspending 5 to 40% of particulate detergent builder in an aqueous medium.

In fact D3 contains no teaching either as to modifying bubble size in order to suspend a different type of particles (other than inert metal particles as in D3 itself) or as to producing a suspension which is stable over a broad range of temperatures.

Therefore, there was no reason for the skilled person to combine the teaching of D2 with that of D3, which relates specifically to the suspension of high density particles and in particular of metal particles, in order to solve the technical problem of the patent in

suit.

Equally, the skilled person would not have combined the teaching of D2 with that of D5, which relates to a completely different type of composition, i.e. a toothpaste comprising abrasive particles such as aluminium (as used in example 1) and not a liquid detergent composition comprising particulate builder, in order to solve the technical problem dealt with in the patent in suit.

4.4 Finally, even though, as submitted by the Appellant at the oral proceedings, the theoretical size of gas bubbles capable of suspending solid particles could be mathematically calculated for an ideal system, in fact by just applying the known laws of physics, such a calculation is in the Board's judgement insufficient to allow for any prediction of the stability of a complicated system like a liquid detergent composition comprising builder particles, wherein the presence of surfactants and the polarity of builders and of other possible substances will influence the attractive forces of particles and gas bubbles.

4.5 It follows from the above that the subject-matter of claim 1 is not rendered obvious by D2, D3 and D5, either alone or in combination and whether or not viewed in the light of common general knowledge.

The patentability of the remaining product claims including claim 7 and of the method and process claims derives from that of claim 1.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

A handwritten signature in black ink, appearing to read "G. Rauh", written over a horizontal line.

G. Rauh

The Chairman:

A handwritten signature in black ink, appearing to read "P. Krasa", written in a cursive style.

P. Krasa

