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D E C I S I O N
of 7 October 1997

Case Number: T 1065/93 - 3.3.1

Application Number: 86308466.1

Publication Number: 0221777

IPC: C11D 11/02

Language of the proceedings: EN

Title of invention:
Detergent compositions

Patentee:
UNILEVER PLC, et al

Opponent:
Henkel Kommanditgesellschaft auf Aktien

Headword:
Granular detergent/UNILEVER

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes) - unexpected effect"

Decisions cited:
-

Catchword:
-



Case Number: T 1065/93 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 7 October 1997

Appellant:
(Opponent)

Henkel
Kommanditgesellschaft auf Aktien
TFP / Patentabteilung
D-40191 Düsseldorf (DE)

Representative:

von Kreisler, Alek, Dipl.-Chem.
Patentanwälte
von Kreisler Selting Werner
Postfach 10 22 41
50462 Köln (DE)

Respondent:
(Proprietor of the patent)

UNILEVER PLC
Unilever House
Blackfriars
P.O. Box 68
London EC4P 4BQ (GB)
and

UNILEVER NV
Burgemeester s'Jacobplein
P.O. Box 760
NL-3000 DK Rotterdam (NL)

Representative:

Geary, Stephen
Unilever Plc
Patent Division
Colworth House
Sharnbrook
Bedford MK 44 1LQ (GB)

Decision under appeal:

Interlocutory decision of the Opposition Division
of the European Patent Office posted 4 November
1993 concerning maintenance of European patent
No. 0 221 777 in amended form.

Composition of the Board:

Chairman: P. Krasa
Members: J. M. Jonk
R. E. Teschemacher

Summary of Facts and Submissions

- I. The Appellant (Opponent) lodged an appeal against the interlocutory decision of the Opposition Division by which the European patent No. 0 221 777 (European patent application No. 86 308 466.1) was maintained in amended form.
- II. The opposition was based on Article 100(a) EPC, and supported by several documents including:
- (1) EP-A-0 139 523.
- III. The Opposition Division held that the detergent powders as claimed according to the first auxiliary request, submitted by the Respondents (Patentees) on 5 October 1993, were novel and involved an inventive step. Concerning inventive step, they held in particular that the detergent powders as claimed surprisingly provided - as shown by the test-reports filed by the Respondents on 24 August 1989 and 6 June 1990 - improved Flow Figures compared to those of document (1), and because the cited prior art did not suggest that this improvement could be achieved by using the structurant mixture as claimed according to the disputed patent.
- IV. Oral proceedings were held before the Board on 7 October 1997.
- V. During these oral proceedings the Respondents defended the patentability of the subject-matter of the patent in suit on the basis of a set of claims according to the main request as submitted in the course of said oral proceedings in order to overcome objections put forward by the Appellant under Articles 84 and 123(2) EPC as main request, and on the basis of a set of claims filed on 5 September 1997 as auxiliary request.

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

"A granular spray-dried detergent composition containing less than 6% by weight (calculated as phosphorus) of phosphate builders and comprising:

- (a) one or more anionic and/or nonionic detergent-active compounds;
- (b) one or more non-phosphate detergency builders; and
- (c) optionally from 0 to 10% by weight of sodium silicate;

characterised in that it also comprises:

- (d) from 0.5 to 2.5% by weight of a wholly or partially neutralised water-soluble salt of succinic acid; and
- (e) from 0.5 to 5% by weight of a film-forming polymer selected from an acrylic acid or methacrylic acid homopolymer, a copolymer of acrylic acid or methacrylic acid with maleic acid and/or a polyacrylate or an acrylic phosphinate, the polyacrylate or acrylic phosphinate being present in at least 1% by weight."

Claim 1 of the **auxiliary request** differed from Claim 1 of the present main request in that the film-forming polymer is selected from an acrylic acid or methacrylic acid homopolymer, and a copolymer of acrylic acid or methacrylic acid with maleic acid.

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

However, he argued that the subject-matter of the patent in suit as claimed in Claim 1 of the present main request did not involve an inventive step in the light of document (1). In this context, he disputed that the test-reports submitted by the Respondents applying structurant mixtures of a salt of succinic acid and a film-forming polymer as defined in said Claim 1 showed a synergistic effect on the Flow Figures of the detergent powders. He also noted in this respect that, after the restriction of the claimed subject-matter, the burden of proof rested on the Respondents to demonstrate an unexpected effect for all the now claimed compositions.

Furthermore, he argued that insofar as an additive effect was obtained by applying such mixtures of structurants, this could be expected in the light of the examples of document (1) showing comparable Flow Figures by using structurant mixtures of succinate and sodium carboxymethyl cellulose (SCMC).

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 composition D described in document (1) contained only **one** structurant, namely Sokalan DCS (trade mark) containing succinic acid, and that the skilled person would have understood that the SCMC component was used therein as an anti-redeposition agent and not as a structurant. Moreover, in addition to the test-reports filed on 24 August 1989 and 6 June 1990, the Respondents filed a further test-report on 5 September 1997 showing that SCMC when incorporated in a composition which already contained the succinate structurant but no polycarboxylate polymer only gave a negligible increase in Flow Figure. Concerning the

burden of proof they argued that the claimed invention represented a new technical teaching, and that the burden of proof rested on the Appellant to demonstrate that the claimed subject-matter comprised non-inventive embodiments.

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

The Respondents requested that the appeal be dismissed and that the patent be maintained on the basis of the set of claims according to the main request as submitted during the oral proceedings or of the set of claims according to the auxiliary request submitted on 5 September 1997.

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. The amendments to Claim 1 as granted are based on Claims 1, 5, 6 and 7 of both the patent in suit and the patent application as filed.

Present Claims 2 to 7 correspond essentially to Claims 2 to 4 and 8 to 10 respectively of both the patent as granted and the originally filed patent application.

Present Claim 8 is based on Claims 11, 5, 6 and 7 of both the patent in suit and the patent application as filed.

Thus, all amendments made to the claims as granted comply with the requirements of Article 123(2) EPC. In addition, the Board observes that these amendments are clearly limiting features, so that they do not contravene Article 123(3) EPC either.

3. 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 anymore, it is not necessary to give reasons for this finding.
4. The remaining issue to be dealt with is whether the subject-matter of the present claims involves an inventive step in the light of document (1).
 - 4.1 Document (1) relates to a method for the preparation of detergent powders having satisfactory structure and solubility properties comprising spray-drying of an aqueous slurry containing a surfactant system including an anionic and/or a nonionic surfactant, a sodium aluminosilicate detergency builder and sodium silicate, which method is essentially characterised in adding an acid to the slurry in an amount equivalent to 1.5 to 3 parts per weight of hydrogen chloride per 6 parts of sodium silicate having a sodium oxide to silica ratio 1 : 1.6, and precipitating at least part of the sodium silicate (cf. page 2, lines 11 to 25, and page 4). By adding the acid a reduction of insoluble or poorly-dispersible material on storage is achieved (cf. page 1, line 15 to page 2, line 5, and page 3, lines 31 to 36).

This document also indicates that it may often be necessary to use a powder structurant (cf. page 6, lines 7 to 12). In particular, it discloses that most suitable structurants are first **sodium succinate** and the sodium salt of a mixture of succinic, adipic and glutaric acids sold by BASF GmbH as Sokalan DCS. As further suitable structurants **film-forming polymers** of either natural or synthetic origin such as starches, ethylene/maleic anhydride copolymers, polyvinyl pyrrolidones, **polyacrylates** and cellulose ether derivatives such as Natrosol 250 MHR (trade mark) as well as inorganic polymers such as clays and borates of various types are mentioned (cf. page 6, lines 12 to 22). The structurants are used in an amount of from about 0.5 to about 10% by weight, most preferably 3 to 6% by weight (cf. page 6, lines 23 to 26).

Moreover, document (1) discloses as Example D a detergent powder which comprises a mixture of an anionic and a nonionic surfactant, sodium aluminosilicate as a detergency builder, 0.6 parts by weight of SCMC, 6 parts by weight of sodium silicate ($\text{Na}_2\text{O} : 1.6 \text{ SiO}_2$), and 5.0 parts by weight of Sokalan DCS containing - as accepted by both parties - 1.25 to 1.56 parts by weight of **succinic acid** (cf. page 9, Table 1). This detergent powder provides a Dynamic Flow Rate of 100 ml/sec and a Compressibility of 13% v/v (cf. page 10, Table 2) giving a Flow Figure of 87 (cf. the patent in suit, page 7, lines 12 to 14, indicating that the Flow Figure represents the difference between the Dynamic Flow Rate and the Compressibility).

- 4.2 The Respondents, relying on their test-reports, submitted that the combination of structurants comprising a wholly or partly neutralised water-soluble salt of **succinic acid (component d)** and a **film-forming polymer as defined in Claim 1 (component e)** possesses a "synergistic activity" in improving the structure of

the detergent powders in terms of their Flow Figures in the sense that a certain total amount of said combination of structurants provides a higher Flow Figure than that obtained with the same amount of either component d) or component e), so that a reduced amount of structurants can be used in order to achieve the same effect.

- 4.3 Therefore, in the light of document (1), the underlying problem can be seen in the provision of spray-dried detergent powders of the type as claimed in present Claim 1 having for a given total amount of structurants improved structure characteristics in terms of a higher Flow Figure whilst maintaining satisfying Dynamic Flow Rates (preferably less than 20 ml/s), Compressibilities (preferably more than 80% v/v) and water-solubilities, or in other words the provision of detergent powders showing satisfying properties in these respects using a reduced overall content of structurants (see also page 3, lines 12 to 15, of the patent in suit).

According to present Claim 1 this technical problem is essentially solved by spray-dried detergent powders comprising from 0.5 to 2.5% by weight of a wholly or partially neutralised water-soluble salt of succinic acid and from 0.5 to 5.0% by weight of a film-forming polymer selected from an acrylic acid or methacrylic acid homopolymer, a copolymer of acrylic acid or methacrylic acid with maleic acid and/or a polyacrylate or an acrylic phosphinate, the polyacrylate or acrylic phosphinate being present in at least 1% by weight.

- 4.4 Having regard to the results of the test-reports filed by the Respondents on 24 August 1989, 6 June 1990, and 5 September 1997, further indicated as test-reports (I), (II) and (III) respectively, the Board considers it plausible that the technical problem as defined above has been solved.

The experimental results of the test-reports (I) and (II) show that if the concentration of sodium succinate is raised from 0.5 to 2.5% the Flow Figure goes from 42 to 60 and that if the concentration of an acrylic acid/maleic acid copolymer (Polymer X) is raised from 0.5 to 5.0 the Flow Figure goes from 49 to 71. Moreover, they show that structurant mixtures according to the claimed invention, namely a mixture according to Example 4 consisting of 0.5% of sodium succinate and 0.5% of Polymer X, a mixture according to Example 5 consisting of 2.5% of sodium succinate and 0.5% of Polymer X, and a mixture according to Example 6 consisting of 2.5% of sodium succinate and 0.5% of a sodium polyacrylate (Polymer Y), give Flow Figures of 62, 86 and 72 respectively, Dynamic Flow Rates of 77, 100 and 83 respectively, and Compressibilities of 15, 14 and 11 respectively.

Thus, the Flow Figures of 62 and 86 obtained by using mixtures of the structurants sodium succinate and Polymer X in amounts as indicated in the Examples 4 and 5, respectively, lie well above the Flow Figures which can be deduced from the graphs of test-report (II), which show the relationships between Flow Figures and concentrations of the structurants sodium succinate and Polymer X, for the corresponding amounts of either sodium succinate or Polymer X. Moreover, it can be deduced from said graphs that in order to achieve certain Flow Figures, such as those obtained according to the Examples 4 and 5, reduced overall amounts of structurants can be used if mixtures of sodium succinate and Polymer X are applied.

Moreover, having regard to the teaching of document (1) indicating that the use of sodium succinate - at least in the preferred concentration of 3 to 6% by weight - is preferred to other structurants such as a polyacrylate corresponding to Polymer Y (cf. page 6,

lines 12 to 26, in combination with Claim 9 and the examples), a skilled person would not have expected that the Flow Figure of 72, achieved according to Example 6 by using a mixture of sodium succinate and Polymer Y, i.e. a mixture obtained by partly replacing the preferred succinate, in an overall concentration of 3% by weight, lies well above the value which can be deduced from the graph for succinate alone at the corresponding concentration.

In addition, the experimental results of test-report (III) show that SCMC does not provide a relevant effect on the Flow Figure, since the omittance of SCMC, used in the experiments of the test-reports (I) and (II) as an anti-redeposition agent each time in an amount of 1.2% by weight of the total composition, from one of the compositions tested only gave a negligible reduction of the Flow Figure.

Thus, these test-reports I to III, showing for a mixture of succinate and Polymer X and for a mixture of succinate and Polymer Y improvements of the Flow Figures as well as good Dynamic Flow Rates and Compressibilities, provide sufficient evidence to render it credible that the technical problem as defined above is solved within the whole scope of present Claim 1, i.e. by using all the film-forming acrylic polymers as claimed.

- 4.5 In this respect, the Appellant disputed in view of lack of effect of SCMC on the Flow Figures and having regard to the typical structure of polymeric acrylic phosphinates that the test-reports provide sufficient proof for the alleged improvement of the Flow Figures within the whole scope of present Claim 1.

However, the structure of SCMC substantially differs from that of the acrylic (co)polymers as now claimed, so that the lack of activity of SCMC cannot be considered as a convincing indication that the acrylic (co)polymers as now claimed, which were already indicated as the preferred film-forming polymeric polycarboxylates in the originally filed application (cf. page 5, line 20 to page 6, line 8), do not show the alleged effect.

Furthermore, the structures of the polymeric acrylic phosphinates as claimed in present Claim 1 differ from those of polyacrylates only in that they comprise a minor phosphine content (cf. formulas (I) and (II) indicated in document EP-A-0 182 411 referred to in the patent in suit, page 3, lines 33 and 34), so that - on the balance of probabilities - it appears likely that the acrylate phosphinates have about the same structurant properties as the other acrylic polymers as claimed.

Therefore, these submissions as put forward by the Appellant, who in accordance with the established case law of the boards of appeal carries the burden of proof for the facts he alleges, cannot be accepted by the Board because of lack of convincing proof.

- 4.6 The question now is whether document (1) would have suggested to a person skilled in the art solving the above-indicated technical problem in the proposed way.
- 4.7 Document (1) - as indicated above under point 4.1 - relates to a method for the preparation of detergent powders, whereby sodium succinate or film-forming polymers of either natural or synthetic origin such as starches, ethylene/maleic anhydride copolymers, polyvinyl pyrrolidones, polyacrylates and cellulose ether derivatives such as Natrosol 250 MHR (trade mark)

as well as inorganic polymers such as clays and borates of various types can be used as structurants and whereby the use of the succinate is preferred. However, in the Board's judgment, this document does not give any pointer to the skilled person that the technical problem underlying the patent in suit as defined above could be solved by providing a granular spray-dried detergent composition as now claimed.

4.8 In this respect, the Appellant submitted that, in view of the good Flow Figures up to 87 as achieved by powders D and H containing mixtures of SCMC with Sokalan DCS, and by powder G containing a mixture of SCMC and Natrosol 250 MHR (trade mark; a cellulose ether derivative) (cf. Tables 1 and 2), the use of mixtures of structurants as claimed in present Claim 1 did not involve an inventive step.

However, in view of the disclosure of document (1) indicating that an **anti-redeposition agent** may be included (cf. page 7, line 10), that **powder F does not contain a structurant** (cf. page 8, lines 11 to 13) and that **powders G and H contain only one structurant** (cf. page 8, lines 13 to 17), a skilled person (1) would have understood, on the one hand, that **all the powders A to H disclosed in Table 1 contained SCMC as an anti-redeposition agent** and, on the other hand, that therefore the powders D, G and H contained **only one structurant**. Moreover, even if the skilled person - as submitted by the Appellant - would have concluded that SCMC was used as a structurant, this resulting teaching did not give to a skilled person any pointer that by using a mixture of SCMC and Sokalan DCS or Natrosol 250 MHR a beneficial effect could be obtained, since this would need the determination of the effect of each structurant alone and that of their mixtures in comparable compositions, which is clearly not possible here. In any case, the powders as disclosed in the

examples of document (1) could not provide an incentive to the skilled person that the present technical problem could be solved as claimed, since none of them contained an acrylic film-forming polymer as structurant.

4.9 In this context, the Board observes that a skilled person in view of the disclosure of document (1) **could** have used a mixture of structurants since such possibility was not excluded. 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 replace the most preferred sodium succinate by a mixture of succinate and one or more of the film-forming structurants mentioned in document (1), let alone to replace it by a mixture of structurants as now claimed according to the patent in suit.

4.10 In conclusion, the Board finds that the granular spray-dried detergent composition according to present Claim 1 involves an inventive step in the sense of Article 56 EPC.

Since Claims 2 to 7 relate to particular embodiments of the compositions claimed in Claim 1, and Claim 8 concerns their preparation, Claims 2 to 8 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 with the following claims and a description yet to be adapted:

Claims:

Nos. 1 and 8 as submitted during the oral proceedings,
Nos. 2 to 4 as granted,
Nos. 5 to 7: granted Claims 8 to 10 renumbered and
dependencies adapted.

The Registrar:



E. Görgmaier

The Chairman:



P. Krasa

