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D E C I S I O N
of 13 May 1997

Case Number: T 0413/93 - 3.3.1

Application Number: 87302911.0

Publication Number: 0240356

IPC: C11D 3/12

Language of the proceedings: EN

Title of invention:

Detergent powders and process for preparing them

Patentee:

UNILEVER PLC, et al

Opponent:

The Procter & Gamble Company

Headword:

Detergent powder/UNILEVER

Relevant legal provisions:

EPC Art. 52(1), 56, 123(2)(3)

Keyword:

"Amendment (allowable) - exclusion of protection for part of the invention"

"Inventive step (no) - obvious improvement"

Decisions cited:

G 0001/93

Catchword:

-



Case Number: T 0413/93 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 13 May 1997

Appellant I:
(Opponent)

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Appellants II:
(Proprietors of the patent)

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Decision under appeal:

Interlocutory decision of the Opposition Division
of the European Patent Office posted 20 April
1993 concerning maintenance of European patent
No. 0 240 356 in amended form.

Composition of the Board:

Chairman: R. K. Spangenberg
Members: P. Krasa
S. C. Perryman

Summary of Facts and Submissions

- I. These appeals lie from the Opposition Division's interlocutory decision that the European patent No. 0 240 356, relating to detergent powders and process for preparing them, complies in amended form with the requirements of the EPC.
- II. The grounds of opposition were that the subject matter of the patent was neither novel nor inventive and that, furthermore, the invention had not been disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Articles 100(a) and (b) EPC). The opposition was based, inter alia, on document

(1) EP-B-0 010 247.

In the course of the opposition proceedings, the parties cited additional documents, of which finally only documents

(7) GB-A-2 095 274 and

(8) US-A-4 379 080

remained important.

- III. The Opposition Division decided that the process of Claim 1 as granted was anticipated by the state of the art as disclosed in document (7) but held that amended Claim 1, as submitted on 9 February 1993, met the requirements of Articles 84, 123(2) and (3) EPC and was, therefore, admissible. Further, the Opposition Division found that the subject-matter of the amended Claim 1 was sufficiently disclosed, was novel, and involved an inventive step.

They found in particular that in respect to document (1) the technical problem to be solved was to overcome the deficiencies of a process for preparing detergent powders in which the silicate is omitted from the slurry and only subsequently added to the dried beads. According to the Opposition Division, neither document (1), which was silent on the use of a polymeric polycarboxylate, nor the other cited documents rendered obvious the claimed subject-matter.

IV. Appeals against this decision were filed by the Opponent (Appellant I), who also submitted further documents which, however, were of no relevance for this decision, and by the patent Proprietors (Appellants II). Although both parties to these proceedings are not only appellants but also respondents, they will be designated throughout this decision only as Appellant I or Appellants II, respectively.

V. During oral proceedings, which took place on 13 May 1997 before the Board, Appellants II submitted an amended set of seven claims as new main request, independent Claim 1 of which reads (after correction of some obvious clerical errors):

"A process for the production of a detergent powder having a phosphorus content of less than 2.5% by weight and comprising one or more anionic and/or nonionic detergent active compounds, from 10 to 60% by weight of crystalline or amorphous sodium aluminosilicate builder, from 1 to 10% by weight of water-soluble sodium silicate, and optionally other conventional ingredients, the process comprising the steps of:

- (i) spray-drying a slurry including the sodium aluminosilicate builder, from 0 to 2% by weight of water-soluble sodium silicate, and optionally one or more detergent active compounds, to form a powder,
- (ii) admixing with the spray-dried powder from 1 to 10% by weight of water-soluble sodium silicate in the form of a particulate solid, having a $\text{SiO}_2:\text{Na}_2\text{O}$ mole ratio of from 3.0 to 1.0, a bulk density of from 400 to 1100 g/litre and a rate of solution in distilled water at 20°C such that at least 80% by weight is dissolved within 1 minute and at least 95% by weight is dissolved within 3 minutes,

all percentages being based on the final powder,

the process being characterised in that there is also included in the slurry spray-dried in step (i) from 0.5 to 10% by weight of a polymeric polycarboxylate or derivative thereof selected from polyacrylates, acrylic/maleic copolymers, acrylic phosphinate polymers, and mixtures of any two or more of these, as a polymeric powder structurant."

VI. Appellant I submitted in essence

- that the subject-matter of the amended Claim 1 was not novel over document (7); and
- that the subject-matter of the amended Claim 1 was not inventive over document (1) in combination with document (8).

VII. Appellants II argued in essence that the process of Claim 1 according to the main request

- was novel, since not all of its features, in particular the bulk density of the water soluble sodium silicate and the amount of the added polymer polycarboxylate, were directly and unambiguously disclosed in document (7); and
- was inventive, since none of the cited documents either alone or in combination - rendered obvious the claimed invention for a person skilled in the art; in particular since none of the citations (1) and (8) was concerned with **agglomerate strength**, so that a skilled person would not have combined these citations with a view to improving this property of the detergent powder and since, furthermore, document (8), was silent on the post-addition of an alkali metal silicate.

VIII. During oral proceedings, Appellants II submitted also seven sets of claims as auxiliary requests 1 to 7 for the sole purpose, as they declared, to overcome possible novelty objections.

The claims 1 of the auxiliary requests differ from Claim 1 of the main request as follows:

First auxiliary request:

The amount of polymeric polycarboxylate present in the slurry spray-dried in step (i) is "... from 2% to 10% by weight ...".

Second auxiliary request:

The "other conventional ingredients" (introductory clause) and the "one or more detergent active compounds" of step (i) are no longer optional but became mandatory components of the respective compositions by deleting twice the word "optionally" from both the introductory clause and step (i).

Third auxiliary request:

The detergent powder produced has "... a phosphorus content of less than 1% by weight ..." and the claim is supplemented at the end by "... thereby to produce in step (i) a spray-dried powder having a bulk density of at least 400 g/litre and an agglomerate strength of at least 7 N/cm²".

Fourth auxiliary request:

The detergent powder produced has "... a phosphorus content of less than 1% by weight ...", the "one or more detergent active compounds" of step (i) are no longer optional but became mandatory components of the slurry to be spray-dried by deletion of the word "optionally" from step (i), and the claim is supplemented at the end by "... thereby to produce in step (i) a spray-dried powder having a bulk density of at least 400 g/litre and an agglomerate strength of at least 7 N/cm²".

Fifth auxiliary request:

The passage "... from 0.5 to 10% by weight of a polymeric polycarboxylate or derivative thereof selected from polyacrylates, acrylic/maleic

copolymers, acrylic phosphinate polymers, and mixtures of any two or more of these, ..." is replaced by "... from 0.5 to 10% by weight of an acrylic/maleic copolymer ...".

Sixth auxiliary request:

The passage "... from 0.5 to 10% by weight of a polymeric polycarboxylate or derivative thereof selected from polyacrylates, acrylic/maleic copolymers, acrylic phosphinate polymers, and mixtures of any two or more of these, ..." is replaced by "... from 2% to 10% by weight of an acrylic/maleic copolymer ...".

Seventh auxiliary request:

The passage in the introductory clause "... comprising one or more anionic and/or nonionic detergent active compounds, ..." is replaced by "... comprising an anionic and a nonionic detergent active compound, and a soap of a fatty acid, ...".

IX. Appellant I (opponent) requested that the decision under appeal be set aside and that European patent No. 0 240 356 be revoked. Appellants II (patentees) requested that the decision under appeal be set aside and the patent be maintained on the basis of the main request or one of the first to seventh auxiliary requests, all submitted at the oral proceedings on 13 May 1997.

X. At the end of the oral proceedings the Chairman announced the Board's decision to revoke the patent.

Reasons for the Decision

1. *Amendments*

1.1 Main request

Claim 1 results from a combination of Claims 1 and 4 as granted, corresponding (apart from editorial amendments) to Claims 1 and 6 as originally filed. The amendment amounts to a restriction of the scope of Claim 1. Therefore, Claim 1 complies with the requirements of Article 123 EPC as do Claims 2 to 7, which contain only editorial amendments where necessary.

1.2 Auxiliary Requests

1.2.1 Claim 1 of the first auxiliary request differs from Claim 1 of the main request by limiting the amount of the polymeric polycarboxylate present in the slurry to the range of from 2% to 10% by weight. Such a range with the lower limit of 2% by weight was not disclosed in the application as originally filed. However, according to the Appellants' II credible and uncontested submission, this technical feature provides no technical contribution to the subject-matter of the claimed invention (see also above No. VIII). Thus, in the Board's judgement, its introduction results only in the exclusion of protection for part of the subject-matter of the claimed invention as originally disclosed but does not amount to an extension beyond the content of the application as filed within the meaning of Article 123(2) EPC (see G 1/93, No. 16 of the Reasons for the Decision, OJ EPO 1994, 541). Further, the scope

of Claim 1 is restricted by this amendment. Therefore, Claim 1 complies with the requirements of Article 123 EPC as do Claims 2 to 7 remaining, apart from editorial amendments, essentially as granted.

1.2.2 The Board is satisfied that also the claims of the auxiliary requests two to seven comply with the requirements of Article 123. As all the Appellants' II requests fail for another reason, it is not necessary to give more detailed arguments.

2. *Novelty*

2.1 Prior to investigating the novelty of the claimed subject-matter according to all requests, it is appropriate to clarify the technical significance of the rate of solution as specified in section (ii) of the respective Claims 1. There is no information available on the amounts of sodium silicate and of distilled water to be used in the solubility test given. This feature must, therefore, be considered as satisfied by dissolving any reasonably small amount of sodium silicate in any reasonably large amount of distilled water within the time limits indicated. At the oral proceedings, there was no dispute among the parties that all the sodium silicates mentioned in documents (1) and (7) satisfy this parameter. Consequently, it cannot contribute to any novelty of the claimed subject-matter over the disclosure of these documents.

2.2 Document (7) discloses a process for the manufacture by spray-drying of a phosphorus-free detergent powder comprising a nonionic or an anionic detergent and from 5% to 60% of sodium aluminosilicate. Whereas the crutcher mix had to be practically free of (soluble) sodium silicate, polyacrylate in amounts of from 0,05% to 1% was mentioned as one of the more important

optional adjuvants which could be present in the slurry to be spray dried (page 2, lines 13 to 51 in combination with page 5, lines 38 to 44 and page 8, lines 71 to 75). If it was desired to use sodium silicate in the detergent composition, e.g. for its anti-corrosion activity, such sodium silicate could be post-added (page 6, lines 93 to 106 and page 10, lines 112 to 116). No explicit generic information can be found in document (7) on the bulk densities of the sodium silicate used.

2.3 However, example 2B of document (7) discloses the manufacture of a phosphate free detergent powder containing 12% of nonionic detergent by spray drying an appropriate slurry, impregnating the base beads obtained with nonionic detergent, and post-adding solid particulate sodium silicate. The slurry differs from that used according to Claim 1 of the main request in that it contains only 0,07% of sodium acrylate (document (7), page 13, lines 60 to 72, in combination with lines 40 to 49 and page 11, lines 46 to 65). The bulk density of the beads containing nonionic detergents is usually in the range of from 0,6 g/cm³ to 0,8 g/cm³ (page 7, lines 106 to 112). According to example 2B of document (7) the sodium silicate, which is post-added, has about the same density as the detergent beads (page 13, lines 65 to 72), i.e. a bulk density of 600 g/litre to 800 g/litre.

2.4 Whereas Appellant I argued that the combination of the specific disclosure of example 2B of document (7) with the generic disclosure of this citation in respect to the possible amounts of polyacrylate (see above No. 2.2) anticipated the subject-matter of Claim 1 of the main request, Appellants II contested that such a combination was allowable and maintained that such combination resulted from hindsight.

2.5 The Board has severe doubts in respect of the novelty of the subject-matter of Claim 1 of the main request over document (7). However, it is not necessary to decide this issue, as this request fails for another reason anyway. For the same reason, it is not necessary to consider in detail the novelty of the subject-matter claimed according to the auxiliary requests.

3. *Inventive Step*

Main request

3.1 The Board agrees with the Opposition Division that document (1), which was already discussed in the patent in suit, discloses the most relevant state of the art. From this citation a process is known for the manufacture of a phosphate free detergent composition containing from 20 to 65% by weight of an alkali metal aluminosilicate and from 1 to 7% by weight of a readily soluble sodium silicate having a $\text{SiO}_2:\text{Na}_2\text{O}$ ratio of from 2 to 2.2 and a bulk density of from 350 to 800, preferably of from 350 to 450, and in particular of about 400 g/litre, which process comprised the steps of

- bead formation by spray drying of a slurry containing the alkali metal aluminosilicate, and
- addition of the sodium silicate to the thus obtained powder

(see document (1), e.g. Claim 1 in combination with the paragraph bridging pages 8 and 9, and page 4, lines 10 to 58).

According to the patent in suit, the resulting detergent powders show poor physical properties and low powder strength and, consequently, the technical problem to be solved can be seen in improving these properties (patent in suit, page 2, lines 20 to 28).

3.2 The examples 2 to 5 of the patent in suit demonstrate that the spray-dried base powders manufactured according to the claimed process, i.e. from a slurry containing the various amounts of polyacrylate, acrylic acid/maleic anhydride copolymer, or polyacrylate/phosphinate have an agglomerate strength in the range of from 10 to 12 N/cm². This is a significant improvement as compared with the agglomerate strength of 6 N/cm² of a detergent powder prepared from a slurry which did not contain a polymeric polyacid (comparative example 1; see the patent in suit, the table on page 6 in combination with page 5, lines 26 to 63 and the sentence bridging pages 5 and 6). The Board accepts this superior agglomerate strength as an indication that the improvement of the physical properties of the detergent powders aimed at (see the sentence bridging pages 3 and 4 of the patent in suit), was achieved by the claimed process.

3.3 It has now to be decided whether or not the claimed process involves an inventive step.

3.3.1 Document (8) relates to granular detergent compositions comprising, inter alia, from 5% to 40% by weight of an organic surfactant, from 10% to 60% by weight of an aluminosilicate, and from 0.1% to 10% by weight of a film-forming polymer, which compositions preferably contain less than about 2% by weight of alkali metal silicate materials and are preferably substantially free of phosphate (see document (8) column 2, lines 22 to 30, lines 57 to 59, and the paragraph bridging

columns 2 and 3). The granular compositions according to document (8) are prepared by drying by any convenient method an aqueous slurry containing the granule components as designated above, e.g. by using spray-drying towers (column 3, lines 9 to 17). Document (8) discloses in particular:

"... While not intending to be limited by theory, it is believed that the granular detergents herein exhibit superior free-flowing characteristics because the film forming polymer dries to a tough, non-sticky, non-hygroscopic film which **cements the granule walls together much in the same manner as do the glassy phosphates and silicates...**" (column 3, lines 17 to 23; emphasis added),

and further

"Suitable film-forming polymers herein include homopolymers and copolymers of unsaturated aliphatic mono- or polycarboxylic acids. Preferred carboxylic acids are acrylic acid, ... maleic acid, ... The copolymers can be formed of mixtures of the unsaturated carboxylic acids with or without other copolymerisable monomers, ..." (column 9, lines 7 to 17).

- 3.3.2 It is true that, as Appellants II submitted, document (8) was not uniquely concerned with spray drying, but mentions also other drying methods. Nevertheless, spray-drying is explicitly disclosed and there is neither in document (8) any indication that the film forming polymer would not work as intended when the slurry was spray dried, nor did Appellants II

give any argument justifying such an assumption. Therefore, in the Board's judgement, a skilled person would have applied the technical teaching of document (8) in a spray drying process.

3.3.3 Appellants' II further argued that document (8) was concerned with a different technical problem, i.e. with increasing the free flow properties of the detergent powder and not with improving its agglomerate strength. However, this argument is not convincing. First of all, the technical problem underlying the patent in suit was to improve the **physical properties** and the powder strength of the detergent powder obtained (see above No. 3.1). Document (8) is also concerned with the improvement of the desirable physical properties of detergent granules, in particular with the improvement of their crispiness, **durability**, and their free flow which improvement is achieved by "cementing" the granule walls together (column 1, lines 23 to 27). Whereas in conventional detergent powders glassy phosphates and/or alkali metal silicates operate as "cements", document (8) suggests a film forming polymer as a substitute "cement", if neither phosphate nor alkali metal silicate are present **in the slurry** from which the detergent beads are formed (see above No. 3.3.1). Therefore, the technical problem addressed in document (8) is at least very closely related to that of the patent in suit, if not identical with it, and, consequently, in the Board's judgement, a person skilled in the art would have considered the disclosure of document (8) when searching for a solution of the existing technical problem.

3.3.4 From this document, a skilled person being confronted with problems resulting from the omission of phosphate and of sodium silicate from the slurry to be spray dried, got the clear teaching that a film forming

polymer could take over the role of these components as far as their "cementing" properties were concerned. He was further informed that suitable film forming polymers were, inter alia, the homopolymers of acrylic acid and the copolymers of this acid with e.g. maleic acid.

3.3.5 According to the patent in suit, the agglomerate strength tests were performed with the spray dried detergent powder obtained from step (i) of the claimed process, i.e. prior to post-addition of alkali metal silicate (see the patent in suit, page 4, lines 10 to 13 and Claim 8 as granted). Therefore, the fact that, as Appellants II pointed out, document (8) does not mention post-addition of alkali metal silicate at all, cannot have any bearing when evaluating the inventive merits of adding a polycarboxylate to the crutcher mix.

3.3.6 The amounts disclosed for the aluminosilicate, the solid alkali metal silicate, and the polymeric polycarboxylate disclosed and claimed respectively in citations (1), (8) and Claim 1 of the Appellants' II main request can be taken from the following table:

	document (1) Claim 1	document (8) Claim 1	patent in suit main request
alumino-silicate	20-65% by weight	10-60% by weight	10-60% by weight
alkali metal silicate (post-added)	1-7% by weight	-	1-10% by weight
polymeric poly-carboxylate	-	0,1-10% by weight	0,5-10% by weight

This table shows that the respective amounts are broadly overlapping or even identical. Therefore, no contribution to inventive step can result from the claimed amounts. Moreover, to establish such amounts would have been routine work for a skilled person under the prevailing circumstances of this case.

3.3.7 For these reasons, the Board concludes that a skilled person who was looking for a solution of the existing technical problem would have combined the technical teachings of documents (1) and (8) and would have incorporated, with a reasonable expectation of success, a polyacrylate or a acrylic/maleic copolymer as disclosed in citation (8) to a slurry as known from document (1) in order to improve the physical properties of the detergent powder aimed at. In other words, a skilled person would have used such a polyacrylate or acrylic/maleic copolymer to compensate for any shortcomings in this respect caused by the absence of phosphate and/or alkali metal silicate. Thereby, he would have arrived at the subject-matter of Claim 1 of the **main request**. Thus, the subject-matter of this Claim 1 does not involve an inventive step and the main request must fail.

3.4. During the oral proceedings, Appellants II have expressly stated that the purpose of the limitations contained in Claims 1 of auxiliary requests 1 to 7 was to meet novelty objections raised during the opposition and appeal proceedings (see above No. VIII). Nevertheless, the Board has examined whether an inventive step can be recognised when taking into account these limitations.

3.5. For this purpose, the Board starts from the most relevant state of the art and the technical problem as identified above in points 3.1 and 3.2 in respect of

the main request, since Appellants II have not indicated any additional advantages or other particular effects obtained by the subject-matter of these auxiliary requests.

3.6. The solution to the present technical problem (see point 3.2 above) according to the **first auxiliary request** differs from that according to Claim 1 of the main request only by the more limited amount of the polymeric polycarboxylate present in the slurry, which is now from 2 to 10% by weight. It follows from Appellants' II submissions which have already been taken into account in respect of the admissibility of the amendment pursuant to Article 123(2) EPC (see No. 1.2.1 above) that this feature does not alter the character of the invention according to the main request and cannot, therefore, impart an inventive step to the present solution of the unchanged technical problem.

3.7. The solutions to the present technical problem according to the **second, third, and fourth auxiliary request** differ from the solution according to the main request only by technical features already disclosed in documents (1) and (8) (see points VIII, 3.1 and 3.3.1 above). Therefore, the subject-matter of these requests does not involve an inventive step for substantially the same reasons as set out in respect of the main request (see points 3.3.4 to 3.3.7 above).

3.8 The solution according to Claim 1 of the **fifth auxiliary request** differs from that according to Claim 1 of the main request in so far as the polymeric polycarboxylate present in the slurry of step (i) is now solely "an acrylic/maleic copolymer". Since copolymers of acrylic and of maleic acid are among the preferred film forming polymers disclosed in

document (8) (see above points 3.3.1), the selection of this particular component does not involve an inventive step (see also above point 3.3.7).

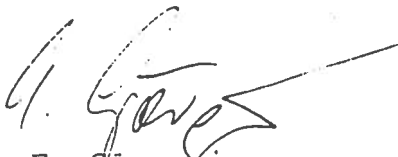
- 3.9 Nor can the solution of the present technical problem as proposed according to the **sixth auxiliary request**, i.e. by additionally restricting the amount of the acrylic/maleic copolymer to the range of "from 2% to 10% by weight", impart inventiveness to the respective process, for substantially the same reasons already given in above point 3.6 in respect to the first auxiliary request.
- 3.10 The solution according to Claim 1 of the **seventh auxiliary request** differs from that according to Claim 1 of the main request in so far as the detergent powder obtained has to contain an "anionic and a nonionic detergent active compound, and a soap of a fatty acid". The feature of combining these three surface active components is known from document (1): all but one example, i.e. the examples 1 to 4 and 6 to 15 disclose spray drying of slurries comprising various sulfonates and adducts of fatty alcohols and ethylene oxide and a soap (document (1), tables I and II on pages 15 to 18 and the paragraph bridging pages 18 and 19). For the reasons given in respect of the main request it was, therefore, obvious for a person skilled in the art to apply the technical teaching of document (8) especially to slurries containing this particular combination of detergent active agents. Thus, the subject-matter of Claim 1 of this request does not involve an inventive step either.
- 3.11 Therefore, the patent in suit cannot be maintained on the basis of any of Appellants' II auxiliary requests.

Order

For these reasons it is decided that:

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

The Registrar:



E. Görgmaier

The Chairman



R. Spangenberg