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Case Number: T 1202/15 - 3.3.06

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Title of invention:
ANIONIC SURFACTANT POWDER

Patent Proprietor:
Kao Corporation

Opponent:
BASF Personal Care and Nutrition GmbH

Headword:
ANIONIC SURFACTANT POWDER / Kao Corporation

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
Novelty - (yes)
Inventive step - (yes)

Decisions cited:

Catchword:

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Beschwerdekammern

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Case Number: T 1202/15 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 14 January 2019

Appellant: (Opponent)	BASF Personal Care and Nutrition GmbH Rheinpromenade 1 40789 Monheim (DE)
Representative:	BASF Personal Care and Nutrition GmbH Postfach 13 01 64 40551 Düsseldorf (DE)
Respondent: (Patent Proprietor)	Kao Corporation 14-10, Nihonbashi Kayabacho 1-chome Chuo-Ku Tokyo 103-8210 (JP)
Representative:	Hoffmann Eitle Patent- und Rechtsanwälte PartmbB Arabellastraße 30 81925 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 2 April 2015 rejecting the opposition filed against European patent No. 1470206 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	J.-M. Schwaller
Members:	P. Ammendola
	R. Cramer

Summary of Facts and Submissions

I. This appeal lies from the decision of the opposition division to reject the opposition filed against European patent No. 1 470 206.

II. Claim 1 as granted reads as follows:

"*1. An anionic surfactant powder comprising polyoxyalkylene alkyl ether sulphates, in which the average addition mol number of alkylene oxides is 0.05 to 1 and wherein the content of polyalkylene alkyl ether sulfates provided with alkylene oxides added thereto in an amount of 4 mol or more is 0 to 15% by weight, based on the total anionic surfactant powder, wherein the polyoxyalkylene alkyl ether sulphate is represented by the formula (I):*

$$[R_1\text{-}O(AO)_n\text{-}SO_3]_p\ M \quad (I)$$

wherein R_1 represents a straight-chain alkyl group having 8 to 20 carbon atoms, AO represents an oxyalkylene group or oxyalkylene groups having 2 to 4 carbon atoms, which may be the same or different from one another, n denotes the average addition mol number of alkylene oxides in the range from 0.05 to 1, M represents a cation and p represents the number of valences of M."

Claims 2 and 3 define preferred embodiments of the anionic surfactant powder of claim 1, claims 4 and 5 define processes for producing the anionic surfactant powder according to any one of claims 1 to 3, and claims 6 and 7 define uses of the anionic surfactant powder according to any one of claims 1 to 3.

III. The opposition had been based in particular on the following documents:

D2 = US 5 362 479 A

D3 = EP 1 201 740 A2

D4 = EP 0 572 957 A2

D5 = M. F. Cox, "*The effect of "peaking" the ethylene oxide distribution on the performance of alcohol ethoxylates and ether sulfates*", JAOCS, 67, 9, 1990, pages 599 - 604.

IV. The opponent (hereinafter **appellant**) appealed the decision by which the opposition division found, *inter alia*, that:

- the subject-matter of claims 1 to 7 was anticipated neither by D3 nor by D4;
- the prior art closest was that disclosed in D4;
- a skilled person starting from D4 and also considering D5 would not be motivated to modify the surfactants known from D4 so as to arrive at the subject-matter of claims 1 to 7.

V. The patent proprietor (herein after **respondent**) replied with letter of 4 December 2015 enclosed with seven sets of amended claims labelled auxiliary requests 1 to 7.

VI. The summoned oral proceedings were cancelled, the appellant having announced its absence at the hearing.

VII. The appellant requested that the decision be set aside and the patent be revoked.

The respondent requested that the appeal be dismissed (main request) or, alternatively, that the decision under appeal be set aside and that the patent be maintained on the basis of one of auxiliary requests 1 to 7, all filed with its reply of 4 December 2015.

VIII. The appellant argued in essence that the subject-matter of claims 1 to 7:

- lacked novelty over the content of each of D3 (prior art under Article 54(3) EPC) or D4;
- lacked inventive step over the disclosure of D2 in combination with the teaching of D5, or alternatively over the disclosure of D4 in combination with the teaching of D5.

Reasons for the Decision

Main request (patent as granted)

1. Claim 1 - preliminary remarks

The board stresses that claim 1 as granted defines an anionic surfactant powder that comprises (and, thus, also possibly consists exclusively of) polyoxyalkylene alkyl ether sulfates according to formula (I), wherein **AO** designates oxyalkylene group(s) and the index "n" indicates the average addition mol number of AO units (hereinafter **average AO addition number**). This index of formula (I) renders apparent that the only mandatory ingredient of the patented anionic surfactant powder is a mixture of polyoxyalkylene alkyl ether sulfate molecules with different numbers of AO units.

Claim 1 also requires the average AO addition number of the polyoxyalkylene alkyl ether sulfate ingredient of

formula (I) to be from 0.05 to 1 (hereinafter this feature of claim 1 is referred to as **the 0.05-1 AO range**).

Moreover, the claim requires that the content in molecules with 4 or more AO units (in the mixture forming the polyoxyalkylene alkyl ether sulfate ingredient) is limited to not more than that corresponding to 15% by weight of the total powder (hereinafter this feature of claim 1 is referred to as **the 15% AO4+ limit**).

2. Novelty (Article 54 EPC)

2.1 Novelty vis-à-vis D3

2.1.1 The appellant argued that the subject-matter of granted claim 1 was anticipated in D3 essentially because of the disclosure in its [0019] to [0020] of (solid) polyoxyalkylene alkyl ether sulfates according to formula (II) having an average AO addition number possibly as low as 0.5 or 1 and allegedly exemplified in example 1 of D3. In the opinion of this party, since D3 gives no teaching as to the amount of AO4+ molecules present in the polyoxyalkylene alkyl ether sulfates, the disclosure of D3 encompassed all distributions of the AO units (within the polyoxyalkylene alkyl ether sulfate molecules) that the skilled person could expect to be realistically possible (and thus also those in which the amount of molecules with AO4+ was e.g. 0 or up to 15% by weight, as required in claim 1 at stake).

2.1.2 The board notes preliminarily that the established case law on novelty requires that the prior art discloses directly and unambiguously all the claimed features, be it explicitly or implicitly.

2.1.3 The board finds that the disclosure of example 1 in D3 appears not to refer to an example of a polyoxyalkylene alkyl ether sulfate according to formula (II) of [0019] of D3, but rather to an example of "alkyl sulphate" (compare in D3, page 6, line 6, with the formula (I) in [0018]) apparently not containing any ether functional group.

Nevertheless, the general formula (II) as described in [0019] and [0020] of D3 directly and unambiguously discloses several groups of polyoxyalkylene alkyl ether sulfates, including some (e.g. the groups identified by setting at "0.5" or at "1" the average AO addition number in such formula) that also comply with the requirement of 0.05-1 AO range of the patented powder.

2.1.4 However, D3 undisputedly contains no disclosure on the distribution of the AO units in (all or any of) the groups of polyoxyalkylene alkyl ether sulfates directly and unambiguously disclosed by formula (II).

It is apparent to the board that the absence of any such teaching leaves undetermined the possible distributions of the AO units in the polyoxyalkylene alkyl ether sulfates actually disclosed in D3. In other words, D3 cannot be presumed to directly and unambiguously disclose a specific distribution of the AO units (e.g. one of those with no AO4+ molecules at all, or a group thereof), let alone every possible (in the sense of abstractly conceivable as technically meaningful) individual alternative and group thereof for the distribution of the AO units in the polyoxyalkylene alkyl ether sulfate.

2.1.5 The board stresses also, as undisputed by the appellant, that even the lowest average AO addition

number disclosed in D3, i.e. 0.5, does not imply an amount of AO4+ molecules e.g. necessarily smaller than 15% by weight of the whole polyoxyalkylene alkyl ether sulfate (and thus also necessarily smaller than 15% by weight of any anionic surfactant powder comprising such polyoxyalkylene alkyl ether sulfate).

2.1.6 Thus, none of the groups of polyoxyalkylene alkyl ether sulfates directly and unambiguously disclosed by means of formula (II) of D3 complies with the 15% AO4+ limit.

2.1.7 The board concludes that D3 does not disclose any polyoxyalkylene alkyl ether sulfate or group(s) thereof possessing all the features of the polyoxyalkylene alkyl ether sulfate defined in granted claim 1.

2.1.8 Hence, D3 does not anticipate the subject-matter of granted claim 1.

2.2 Novelty vis-à-vis D4

2.2.1 The appellant argued that the subject-matter of claim 1 was also anticipated in D4 essentially because this document disclosed polyoxyalkylene alkyl ether sulfate of a given formula (II) - whose description starting at line 16 of page 4 of D4 is analysed in detail in the first paragraph of point 3.1.3 of the decision under appeal - in which the average AO addition number is at least 0.5.

2.2.2 The board notes that, similarly to D3 discussed above, also formula (II) of D4 directly and unambiguously discloses several groups of polyoxyalkylene alkyl ether sulfates, including some (e.g. the groups identified by setting at "0.5" the average AO addition number in such

formula) that also comply with the requirement of 0.05-1 AO range of the patented powder.

2.2.3 However, also D4 provides no disclosure as to the possible distribution of the AO units in the polyoxyalkylene alkyl ether sulfates of formula (II). The board thus finds, for substantially the same reasons given in respect of D3 at 2.1.4 to 2.1.6 *supra*, that also the general formula (II) of D4 does not directly and unambiguously disclose any specific polyoxyalkylene alkyl ether sulfate or group(s) thereof complying with the 15% AO4+ limit.

2.2.4 Thus, D4 does not anticipate the subject-matter of granted claim 1.

2.3 It is self-evident that the above findings on the novelty of the anionic surfactant powder of claim 1 vis-à-vis document D3 or D4, apply to any of the other claims of the granted patent.

2.4 It follows from the above considerations that the patent meets the requirements of Article 54 EPC.

3. Inventive step (Article 56 EPC)

3.1 The closest prior art

3.1.1 The opposition division considered the polyoxyalkylene alkyl ether sulfates of formula (II) of D4 having an average AO addition number of at least 0.5 to represent the closest prior art. The appellant did not dispute this finding but argued that also D2 could be held as representing the closest prior art either.

3.1.2 The patent in suit ([0002]) acknowledges that anionic surfactants with sulfuric acid groups have similar applications with those referred to in D4 (page 2, lines 10 to 12), including their use in dentifrices as in D2 (column 1, lines 5 to 11). Hence, from the technical field, both D2 and D4 are suitable.

3.1.3 D2 and D4, however, do not focus on the advantageous properties disclosed in the patent in suit ([0001]), namely that the claimed anionic surfactant powder are "*superior in stability in hard water and low-temperature solubility and improved in powder characteristics such as caking characteristics*". Hence, the prior art closest to the subject-matter of claim 1 can only be determined having regard to the technical features in common.

3.1.4 In this respect the patent in suit (see [0012] and [0013] and the examples) stresses on the particular relevance of only two features, namely the 0.05-1 AO range and the 15% AO4+ limit.

3.1.5 According to the appellant, the relevant disclosure in D2 was "Product 1" in Table 1 on column 5, which has an average AO addition number of "2" and an AO4+ content of more than 30% by weight (of the polyoxyalkylene alkyl ether sulfate). Hence, the subject-matter of claim 1 at stake differs from D2 by both the 0.05-1 AO range and the 15% AO4+ limit.

3.1.6 D4 discloses instead polyoxyalkylene alkyl ether sulfates according to the general formula (II) which have an average AO addition number of at least 0.5. Hence, D4 at least complies with one of the two relevant features of granted claim 1 identified above, and so represents the closest state of the art.

3.2 The technical problem underlying the invention

This has been identified by the opposition division as being to provide an anionic surfactant powder comprising polyoxyalkylene ether sulfates with improved caking characteristics. The board sees no reason to take a different stance.

3.3 The proposed solution

The proposed solution to this problem is the anionic surfactant powder of granted claim 1, which comprises (or consists of) the polyoxyalkylene alkyl ether sulfate of formula (I) with the 0.05-1 AO range and which is further characterised by the 15% AO4+ limit.

3.4 Success of the solution

3.4.1 The opposition division held plausible, in the absence of any evidence to the contrary, that the 15% AO4+ limit (i.e. the feature distinguishing the claimed subject-matter from D4) ensured particularly good caking characteristics to the subject-matter of claim 1 and thus solved the above identified technical problem vis-à-vis this prior art of departure.

3.4.2 For the board this finding was not solely based on the data in Table 1 of the patent in suit (which, as also mentioned in [0080], show that several examples of the invention have good caking characteristics). Indeed, from this data it is impossible to discriminate whether the reported good caking characteristics of the polyoxyalkylene alkyl ether sulfates exemplifying the invention are due to their low average AO addition number or to the fact that they comprise an amount of AO4+ below 15%, or to both of these features.

3.4.3 Reason 3.2.2 of the decision refers rather to the comparison of "*comparative example 4*" with "*example 12*" and "*example 13*" ([0088] and [0089] to [0091] of the patent) because these examples, despite not being representative of the patented polyoxyalkylene alkyl ether sulfates (all have an average AO addition number of about 2), allow to infer some information on the influence of the AO4+ content on the caking characteristics.

The opposition division noted correctly that the polyoxyalkylene alkyl ether sulfate of "*comparative example 4*" with a 31.5% AO4+ content formed directly a paste during the drying step ([0088] of the patent in suit). Instead, examples 12 and 13 with an AO4+ content of about 19-17% could be dried in the form of powders and the occurrence of caking therein was only observed after two weeks (see Table 5 in combination with [0077] of the patent). On the basis of this comparison the opposition division found plausible that a reduction of the amount of AO4+ molecules (leaving unchanged the overall amount of AO and, thus, the average AO addition number) resulted in better caking characteristics. Therefore, and also considering the goog caking characteristics of the examples of the invention reported in Table 1, it concluded that the subject-matter of granted claim 1 (i.e. the proposed solution which is distinguished from the prior art of departure by the 15% AO4+ limit) successfully solved the objective technical problem.

3.4.4 The appellant provided no argument addressing the above reasoning of the opposition division. It only referred to the examples in Table 1 of the patent, stressing that in this Table a larger average AO number also corresponded to a larger amount of molecules with AO4+

and to worse caking characteristics. But this consideration has no bearings on the opposition division's reasoning discussed above.

3.4.5 Thus, the board sees no reason to depart from the finding of the opposition division, and concludes that the posed technical problem is solved.

3.5 Non-obviousness of the solution

3.5.1 In the present case the assessment of inventive step boils down to the question if the prior art and/or the common general knowledge suggest to the skilled person - looking for an anionic surfactant powder comprising polyoxyalkylene alkyl ether sulfates with improved caking characteristics - that such characteristics could be improved in the polyoxyalkylene alkyl ether sulfates of D4 by limiting the amount of AO4+ molecules present therein.

3.5.2 The board notes that D4 - which mentions neither the caking characteristics of the anionic surfactant powders nor the distribution of the AO units in these - does not contain any teaching that the AO4+ content may play a role on the caking characteristics of polyoxyalkylene alkyl ether sulfates.

3.5.3 The appellant has submitted that D5, in particular the section entitled "Reduction of high-mole homologs" at page 601, disclosed the advantages of using "peaked" polyoxyalkylene alkyl ether sulfate (i.e. polyoxyalkylene alkyl ether sulfate with a narrow distribution of AO units) with a low average AO addition number. This line of reasoning implies that D5 would motivate the skilled person to also reduce the

amount of AO4+ molecules in the polyoxyalkylene alkyl ether sulfate of D4.

3.5.4 The board notes however that, as correctly noted in the decision under appeal and undisputed by the appellant, D5 contains no disclosure of the caking characteristics of these "peaked" polyoxyalkylene alkyl ether sulfates.

D5 only describes the "peaking" of polyoxyalkylene alkyl ether sulfates (i.e. the reduction of the amount therein of molecules with several AO units) to be advantageous in view of certain properties (such as the lower melting points or the lower viscosity of their solutions mentioned in the section entitled "Reduction of high-mole homologs") that appear totally unrelated to caking characteristics.

The disclosure of D5 thus does not motivate the skilled person, searching to improve the caking characteristics of the polyoxyalkylene alkyl ether sulfates of D4, to focus on the possibility of reducing the amount of AO4+ molecules present therein.

3.6 Hence, the board concurs with the finding of the opposition division that the subject-matter of granted claim 1 involves an inventive step over the cited prior art.

3.7 It is self-evident that the above findings that the anionic surfactant powder of claim 1 involves an inventive step over the cited prior art, also necessarily imply that this prior art cannot possibly render obvious the subject-matter of any of the other claims of the granted patent, because of their dependence on claim 1 at issue.

3.8 The claims of the patent as granted therefore meet the requirements of Article 56 EPC

4. As the appellant has not succeeded in showing that the set of claims as granted does not meet the requirements of the EPC, its appeal must fail and the decision of the opposition division becomes final.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Magliano J.-M. Schwaller

Decision electronically authenticated