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Veröffentlichung im Amtsblatt ja/Nein
Publication in the Official Journal Yes/No
Publication au Journal Officiel Oui/Non

001564

Aktenzeichen / Case Number / N° du recours : T 305/88 - 3.3.2

Anmeldenummer / Filing No / N° de la demande : 84 201 677.6

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 145 065

Bezeichnung der Erfindung:
Title of invention:
Titre de l'invention : Detergents

Klassifikation / Classification / Classement : C11D 1/83

ENTSCHEIDUNG / DECISION

vom / of / du 11 April 1989

Anmelder / Applicant / Demandeur : Shell Internationale Research

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence : Detergent concentrate/SHELL

EPÜ / EPC / CBE Article 56

Schlagwort / Keyword / Mot clé : "Inventive step - non obvious combination - state of the art - reassessment - problem solution approach"

Leitsatz / Headnote / Sommaire

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Case Number : T 305/88 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal
of 11 April 1989

Appellant : SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.
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Decision under appeal : Decision of Examining Division 023 of the European Patent Office dated 12 February 1988 refusing European patent application No. 84 201 677.6 pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : P. Lançon
Members : S. Schödel
J. Stephens-Ofner

Summary of Facts and Submissions

I. European patent application No. 84 201 677.6, filed on 20 November 1984 and published under No. 145 065, was refused by a decision of the Examining Division dated 12 February 1988. The decision was based on Claims 1-13 of 24 March 1987. Claim 1 reads as follows:

"Aqueous detergent concentrate, characterised in that in addition to water it contains an active detergent comprising the following components:

(a) 50 to 70%wt of one or more salts of an alkylaryl sulphonic acid,
(b) 5 to 30%wt of one or more polyethyleneglycol ethers of primary or secondary alcohols with the general formula $R(OC_2H_4)_n$-OH, in which R represents an alkyl group with 8-18 carbon atoms and n an integer varying from 5 to 12, and
(c) 0.1 to 25%wt of one or more salts of sulphated alcohols with 6-16 carbon atoms per molecule."

Claims 2-13 are dependent on Claim 1.

II. The reason given for the refusal was lack of inventive step of the subject-matter of Claim 1 in view of the documents:

(9) FR-A-1 361 839 and
(2) BE-A-623 882.

The real aim, according to the Examining Division, was to provide compositions alternative to those disclosed in (9) and (2).

In (9) there was described an active system containing:

(a) an alkylbenzenesulphonate (50-90%);
(b") an ethoxylated nonionic detergent (5-30%), and
(d) an ethoxylated alkylsulphate (5-30%).

The ethoxylated alcohols, falling under (b") - though not being exemplified - were identified as the alternative to the (exemplified) ethoxylated alkylphenols. With this in mind, the only difference with respect to the claimed compositions could be seen in "the presence of an ethoxylated alkylsulfate instead of the corresponding non-ethoxylated ones".

The known compositions containing 25 to 40% by weight of the active material showed transparency points around or below 5°C, which were thus comparable with those of the formulations of the application.

Document (2) disclosed compositions comprising:

(a) an alkylbenzenesulphonate (49-53%);
(b') an ethoxylated alkylphenol (13-17%), and
(c) a (non-ethoxylated) alkylsulphate (32-36%).

These compositions also possessed, at a concentration of 40% by weight actives, very low transparency points, even below 0°C.

The compositions both in (9) and in (2) had the two first mentioned detergent components in common. Exchange of the third component would therefore have been routine for the skilled person, and unhindered by any prejudice.

Document (9) indicated that the non-ionic detergent was responsible for the good transparency behaviour and this was obviously also the case with the compositions of (2). This fact was confirmed by the comparative tests of the

application, which showed the reduction of transparency points if selected non-ionic detergents were added to compositions already containing components (a) and (c) (cf. Table I). Thus the alleged advantage obtained by applying the alkylsulfates (c) was not substantiated.

The improvement in viscosity behaviour during dilution was deprived of importance for the assessment of an inventive step, because only final viscosity was of interest. The tests on page 7 of the application showed that compositions which were considered to be unsuitable, although having a more rapid viscosity drop, possessed comparable or better final viscosity than the formulations of the application.

As to the claimed amounts of components, and to the choice of ethoxylation degrees of the non-ionics, the adaptation of such features was routine to the skilled person.

Consequently, the use of such a third component did not provide unexpected advantages, and thus an inventive step could not be recognised for the claimed concentrates.

III. On 2 April 1988, the Appellant filed a notice of appeal, the fee being paid on the same day. A Statement of Grounds was received on 10 June 1988 together with a set of 11 claims (auxiliary request).

In a letter received on 6 March 1989 the Appellant proposed to amend the phrase "... sulphated alcohols ..." in sub-paragraph (c) of Claim 1 of the set of claims as refused (main request) as well as the set of claims as filed on 10 June 1988 (auxiliary request) to read "... sulphated alkanols ...".

IV. The Appellant's arguments may be summarised as follows:

As regards the transparency points, examination of the examples in (9) revealed that there was no consistency in their values as practically all numbers between 1 and 10 were represented there. The use of the (non-ethoxylated) sulfated alcohols or of both non-ethoxylated and ethoxylated sulfated alcohols gave rise to better clear-point compositions vis-à-vis the prior art.

It was not proper to combine document (2) with document (9). The compositions disclosed in (2) were very narrow in ranges of components, and they contained ethoxylated alkylphenols, which were excluded from present Claim 1.

The statement that (a) alkylbenzenesulphonates and (b) ethoxylated alkylphenols were associated with one another as components in the compositions of both (9) and (2), so that the replacement of the third component - the ethoxylated alcoholsulphate of (9) by a (non-ethoxylated) alkylsulphate as in (2) - was mere routine, was not to the point.

The compositions of the invention fulfilled several requirements: their clear point was low, their viscosity was such that they did not flow too easily, and their performance was excellent.

V. The Appellant implicitly requests that the decision of the Examining Division be set aside, and that a patent be granted on the basis of Claims 1-13 filed on 24 March 1987, with the amendment to Claim 1 proposed in the letter filed on 6 March 1989, or, failing this, on the basis of the auxiliary set of Claims 1-11 filed with the Statement of Grounds on 10 June 1988 and subject also to the amendment to Claim 1 proposed in the letter of 6 March 1989.

Reasons for the Decision

1. The appeal complies with Articles 106-108 and Rule 64 EPC and is, therefore, admissible.

2. There is no formal objection to Claims 1-13 forming the main request.

Claim 1 is derived from a combination of Claims 1, 4, 5 and 11 as originally filed. In particular, the proposed amendment to sub-paragraph (c) of Claim 1 is acceptable having regard to the disclosure of original Claim 5. Claims 2 and 3 are unchanged. Claims 4-8 correspond to original Claims 6-10 and Claims 9-13 to original Claims 12-16. Thus all claims meet the requirements of Article 123(2) EPC.

3. The application in suit relates to aqueous detergent concentrates which, after dilution, can be used for cleaning articles such as dishes or fabrics. Concentrates are convenient for storage and transport but for the final users the properties of the washing liquid obtained by dilution are important. Relevant characteristics of such concentrates are suitable viscosity behaviour, i.e. no excessive loss of viscosity on dilution, and a low transparency point, i.e. the temperature at which turbidity, caused by precipitation of solids after strong cooling, completely disappears. A useful criterion in practice is to assume that the transparency point should not be above 5°C (cf. description page 4, lines 14-16).

4. Liquid detergent concentrates of this type are already known e.g. from (2) or similarly from

(4) FR-A-1 251 853.

The latter document, having been first cited by the

Examining Division in the communication dated 28 November 1986, contains more information relevant not only to the chemical character of the constituents but also to the properties of the concentrates which are chiefly of interest in the present context and constitutes, in the Board's view, the closest prior art.

The compositions disclosed in (4) are said to be storage stable, suitable for transport and relatively insensitive to low temperatures. Composition B (without alcohol added) comprises

(a) an alkylbenzenesulfonate
(sodium salt; the alkyl group having from 8 to 10 carbon atoms; 45% bw),
(b') an ethoxylated octylphenol
(the alkyl group being branched; 10% bw) and
(c) an alkylsulfate
(sodium salt; the alkyl group being secondary having from 14 to 18 carbon atoms; 45% bw).

The relevant properties tabulated are:

actives	clear point	viscosity
% bw	°C	centistokes at 25°C
40	13	400
34	12	400

The compositions thus are not too viscous and show good performance when diluted with water.

5. The technical problem underlying the application in suit vis-à-vis this state of the art may be seen in providing an alternative detergent concentrate having similar or better handling properties, in particular with reference to its clear point and to its viscosity behaviour.

The solution to this problem as specified in present Claim 1 consists, briefly, in a detergent concentrate having three active ingredients with cleansing action, namely:

(a) an alkylarylsulfonate (50-70% bw, preferably a C_8-C_{16} alkylbenzene-sulfonate),
(b) a polyethyleneglycol ether of higher primary or secondary aliphatic alcohols(5-30%bw) and
(c) an alkylsulfate (having from 6-16 carbon atoms per molecule; 0.1-25% bw).

It is clear from the Examples, in particular Examples 8 and 10, that this technical problem has been solved by the measures of Claim 1:

	actives % bw	clear point °C	viscosity centistokes at 20°C
Ex. 8	37	4	610
	35	3	590
Ex. 10	37	5	540
	35	4	530

No abrupt drop in viscosity values upon dilution to 35%wt solids can be observed and the compositions have a narrow spread of clear points within the optimal range at or below 5°C. There is no reason so far to cast doubts on these results.

6. None of the documents cited discloses a concentrated detergent liquor comprising the three active ingredients (a), (b) and (c) as specified in present Claim 1. The subject-matter of this claim is therefore novel under Article 54(2) EPC, and since novelty is no longer

disputed, it need not be discussed further.

7. It remains, therefore, to examine whether or not the claimed solution to the technical problem as set out above was obvious in the light of the cited prior art.

7.1 Starting from (4), the closest prior art, the known (a-b'-c)-containing "basic" composition had to be modified in at least two respects to arrive at the claimed subject-matter, namely,

- by replacing (b') the ethoxylated phenol derivative, by (b), an ethoxylated aliphatic alcohol and

- by considerably diminishing the amount of ingredient (c).

Neither of these variations is disclosed or suggested in (4), although a closer analysis of this document reveals certain information which cannot be ignored.

Thus, the properties of the said detergent concentrates clearly depend to a large extent on the elements forming the compositions. As far as the alkylbenzenesulphonates and alkyl sulphates are concerned, even a difference of one carbon atom in one alkyl chain can substantially influence the properties of the composition. For a low clear point it is necessary that the C_{10} portion within the C_8-C_{10} alkylbenzenesulphonate be kept small.

Favourable results, both with the clear point and the viscosity, are obtained if neutralisation of the acid precursors of (a) and (c) is effected by means of a mixture of sodium and/or potassium salt and ammonia. Use of ammonia alone leads to a relatively high viscosity.

Although the presence of an alkylphenolpolyether has a generally beneficial effect on the various properties a dramatic drop in the viscosity of the known composition A (comprising (a), (c) and Na_2SO_4) occurs on lowering the quantity of sodium sulphate, which is itself an inactive ingredient;
((4) page 1, penultimate paragraph; page 2 paragraph 3; page 3, paragraph 3, 4, 6; page 6 compositions A and B, last paragraph; page 7, paragraph 1 tables).

7.2 The teaching of (2) is more limited than that of (4). This is true for the detergent concentrates disclosed therein, which are very similar to those of (4) as regards the chemical nature of their actives. In Examples B and A constituent (a) is a C_8-C_{10}-alkylbenzenesulfonate (51% bw); while (b") is an isooctylphenolpolyglycolether (15% bw) and (c) is a sec. alkylsulfate (34% bw). Comparison of the two examples shows that the broader alkyl range in component (c) (C_8-C_{18} as opposed to C_{12}-C_{16}) gives a poor result on the clear point (15°C as compared with <0°C); viscosity data are not indicated.

7.3 Document (9) is still more remote from the application in suit than the other documents under discussion. As far as 3-component detergent compositions are concerned only ingredient (a) is in common with that of the claimed composition; the other ingredients (b", d) are different in their chemical structure. The ethoxylated nonionics (b") in the introductory part of (9) are broadly defined as being either condensation products of C_8-C_{20} alcohols with ethyleneoxide (b; n being from 8-20) or ethoxylated alkylphenolates (b'). The latter are, however, stated to be preferred and the former are not exemplified (cf. (9), page 1, para. 5, page 2, para. 4 and 5). Nothing at all is said about viscosity behaviour.

It is apparent from the experimental data given in relevant Examples IV, VIII, IX and X that the clear points, which are scattered from 1 to 10°C, are largely influenced by the amount and degree of ethoxylation of (b") and (d).

Examples	IV	IX	VIII	X
ethoxylated(n) octylphenol (b')	n = 8,5 (10,5%bw)	n = 8,5 (3,5%bw)	n = 11 (10%bw)	n = 11 (7% bw)
ethoxylated(n) laurylsulfate(d)	n = 1 (7% bw)	n = 3 (10,5%bw)	n = 1 (6% bw)	n = 3 (3,5 bw)
clearpoint (% bw actives)	9°c (35% bw)	10°C (35% bw)	1 (40% bw)	3 (35% bw)

There is no further evidence as to whether or how far b' in the composition (a-b'-d) actually behaves as an equivalent to b.

7.4 It is clear from the above that the skilled person considering the above information would become aware of the inherent sensitivity of these systems to almost any minor alteration. This means that even a slight modification of one of the parameters may give rise to unforeseeable major changes in the properties, in particular the clear points and also the viscosity behaviour of the resulting compositions. This consideration alone renders untenable the proposition of a wholly riskless exchange of active ingredients such as (b') by b and/or (d) by (c) in the detergent products of (9) upon which proposition the decision to refuse chiefly relies.

7.5 Many possible modifications are suggested in the prior art, but none of them point in the direction of the claimed subject-matter.

Accordingly, the claimed subject-matter cannot be derived in an obvious manner from the cited prior art. On the contrary it was entirely the Appellant's inventive initiative to have modified the products known from (4) in such a way as to arrive at the new detergent concentrates of present Claim 1 based on the components (a), (b) and (c) with well balanced properties, thus arriving at a competitive alternative to the existing systems (cf. item 5, para. 1, Table).

7.6 The arguments put forward in the decision for refusal are in contrast to this not conclusive.

7.6.1 In particular, the finding that the exchange of the second and third components in the (a-b'-d) composition of (9), which led - according to the Examining Division - to the claimed subject-matter, was a mere matter of routine, was a typical "hindsight" analysis, not giving any reasons why the skilled person should have made such modifications. In the absence of any incentive to do so, and without any expectation of success, one cannot assume that the practitioner would have made an effort in this area (cf. T 2/83, OJ EPO 1984, 265).

Quite apart from this, it should also be borne in mind that (d) is in any case integrated into the preferred system as a fourth active element, as can be seen from dependent Claims 4, 5 and 10 of the application in suit, and is not therefore susceptible of simple exchange.

7.6.2 Lastly, the position taken by the Examining Division, that only the final viscosity of the products upon dilution is

of importance, fails to take into account commercial reality.

In practice, a concentrate feedstock will be formulated into various products at various concentrations. The user, however, requires each product to meet certain standards, among others that of a syrupy consistency (which he associates with quality). Thus the original concentrate must have a largely uniform and stable viscosity within a given concentration range, because the resulting products must be in a fluid condition, but not watery or gel-like, let alone inhomogeneous, as is the case with the majority of the comparative examples A-C (Table I).

Phemonema such as viscosity behaviour and clear point are here relevant aspects of a complex system, which are influenced not only by a single component but also by the mutual interaction of the various components. One or other aspect therefore cannot be dismmissed from consideration in the assessment of inventive step.

The reasoning given in the decision under appeal, even starting out from (9), therefore, does not support the finding under Art. 56 EPC.

8. From the above it is clear that the subject-matter of Claim 1 of the main request involves an inventive step as required by Article 56 EPC. The claim is therefore patentable. This also applies mutatis mutandis to dependent Claims 2-13 which relate to further elaborations of the detergent concentrates of Claim 1.

In these circumstances the subsidiary request need not be considered further.

Order

For these reasons, it is decided that:

(1) The decision of the Examining Division is set aside.

(2) The case is remitted to the Examining Division for grant of a patent on the basis of Claims 1-13 filed on 24 March 1987 with Claim 1 being amended in that the term "... alcohols ..." in sub-paragraph (c) is replaced by "... alkanols ...".

The Registrar: The Chairman:

F.Klein P.Lançon