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D E C I S I O N
of 23 August 1994

Case Number: T 0418/91 - 3.3.2

Application Number: 83303910.0

Publication Number: 0100164

IPC: A61K 7/06

Language of the proceedings: EN

Title of invention:
Hair conditioning preparation

Patentee:
UNILEVER N.V.

Opponent:
Henkel Kommanditgesellschaft auf Aktien

Headword:
Hair Conditioner/UNILEVER

Relevant legal norms:
EPC Art. 83, 56

Keyword:
"Sufficiency of disclosure (yes) - definitions considered to be adequate"
"Inventive step (yes) - comparative data acceptable"

Decisions cited:
T 0014/83, T 0226/85, T 0340/88, T 0435/91

Catchword:
-



Case Number: T 0418/91 - 3.3.2

DECISION
of the Technical Board of Appeal 3.3.2
of 23 August 1994

Appellant:
(Opponent)

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

Representative:

-

Respondent:
(Proprietor of the patent)

UNILEVER N.V.
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Representative:

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Decision under appeal:

Decision of the Opposition Division of the
European Patent Office of 17 January 1991 posted
on 5 April 1991 rejecting the opposition filed
against European patent No. 0 100 164 pursuant to
Article 102(2) EPC.

Composition of the Board:

Chairman: P. A. M. Lançon
Members: I. A. Holliday
R. L. J. Schulte

Summary of Facts and Submissions

- I. European patent No. 0 100 164, relating to a hair conditioning preparation, was granted on the basis of eight claims contained in European patent application No. 83 303 910.0.
- II. The Appellant filed an opposition against the granted patent, raising objections under Articles 100(a) and 100(b) EPC. Of the documents cited, only the following remains relevant to the present decision:

(1) US-A-3 313 734

The Opposition Division rejected the opposition, considering that the disclosure of the patent in suit was sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 and 100(b) EPC); Decision T 14/83, OJ EPO 1984, 185 was referred to. Furthermore the Opposition Division held that the subject-matter was both novel and inventive vis-à-vis the closest prior art, document (1).

Both the compositions of document (1) and those of the patent in suit contain an ionised polymer together with an ionic surfactant of opposite charge. According to the patent in suit the polymers and surfactant interact to form a complex which separates on dilution to form a lyotropic liquid crystal phase. Document (1) makes no mention of a lyotropic crystal phase and the Opposition Division considered that the Opponent's allegation that such a phase also exists in compositions disclosed in (1) was unproven. The Opposition Division held that novelty of the compositions of the patent in suit was established by the restriction on the content of neutral surfactant. The compositions known from (1) contained 5

to 20% of non-ionic detergents. The Opposition Division considered that the superior wet combing properties of hair treated with a composition according to the patent in suit was evidence in favour of an inventive step.

III. The Appellant lodged an appeal against the decision of the Opposition Division. Oral proceedings took place on 23 August 1994. At the oral proceedings, the Appellant indicated that the novelty objection would not be pursued.

IV. The arguments of the Appellant both in the written procedure and at the oral proceedings may be summarised as follows:

Although Claim 1 specifies the molar ratio of tenside (T) to polymer (P) and the total weight concentration T+P, the Appellant argued that it remained unclear how one would obtain a lyotropic liquid crystal phase. The description on page 3, lines 49 ff. referred to a test involving a polarising microscope. The appellant referred to the list of possible cationic polymers in the paragraph bridging pages 2 and 3 and stated that by combining five of such polymers with anionic surfactants, experiments had failed to yield a product exhibiting the required liquid crystal phase. The Appellant referred to Decision T 435/91 dated 9 March 1994 (to be published in OJ EPO). According to the said decision, if a "research programme" were necessary to determine if a particular additive achieved a specified purpose, the disclosure would be objectionable under Article 100(b) EPC. The Appellant argued that there was an analogy with the present case. A large number of polymers were disclosed and considerable experimentation would be necessary to determine which combination led to a liquid crystal phase.

The Appellant also objected to the presence of polyvinylpyrrolidone and quaternised poly(vinyl alcohol) amongst the list of suitable polymers arguing that these polymers could not be protonated under the conditions required for a hair rinse composition.

The term "neutral surfactant" used in Claim 1 was considered by the Appellant to be obscure since it could also be construed to include the neutralised forms of the anionic and cationic surfactants disclosed in the patent in suit.

In the written procedure, the Appellant argued that the expression "charge density" was not adequately defined in the patent in suit. In particular, it was not clear whether or not the counterion should be included in the molecular weight of this polymer.

The Appellant's arguments in respect of inventive step were based on comparative experiments. The Opposition Division recognised inventive step on the basis of combing tests described on page 5 of the specification. The tests carried out by the Appellant were based on an article by Newman et al., J. Soc. Cosmet. Chem., 24, 773-782 (1973), hereinafter document (5). According to the Appellant's tests better "combability" was obtained when operating outside the range of (0.9 - 2.0)S moles of ionic surfactant specified in Claim 1 of the patent in suit. Since document (1) satisfied all the parameters of Claim 1 of the patent in suit, except the range of (0.9 - 2.0)S moles of surfactant, the basis on which the Opposition Division recognised inventive step was, in the Appellant's view, invalid.

- V. In the written procedure and at the oral proceedings the Respondent (proprietor of the patent) argued essentially as follows:

In the Respondent's view the test to determine the presence of a lyotropic liquid crystal phase was relatively simple. The circumstances were different from those of T 435/91 in which the additive required to force the surfactant system into hexagonal phase was defined only in functional terms.

Although the Respondent's main request was the maintenance of the patent as granted, as a first auxiliary request the Respondent requested maintenance with the claims as granted but with the references to polyvinylpyrrolidone and quaternised poly(vinyl alcohol) deleted from the description.

The Respondent denied that neutralised forms of anionic and cationic surfactants would be embraced by the term "neutral surfactant". Amphoteric materials, such as betaines were, however, included.

The Respondent maintained, in response to the statement of appeal, that the expression "charge density" was adequately defined, referring in particular to page 2, lines 49 to 50 of the description.

In respect of inventive step, the Respondent argued that the experiments relied upon by the Opposition Division, relating to the removal of tangles from hair by combing, were more relevant than those filed by the Appellant which were carried out on wet untangled hair.

VI. Claim 1 according to the main request reads as follows:

"1. An aqueous clear single-phase liquid hair rinse conditioner composition comprising a water-soluble ionised polymer and an ionic surfactant of opposite charge which interact with each other to form a complex which separates out upon dilution of the composition as

a lyotropic liquid crystal phase, the composition also comprising a clarifying agent to maintain the composition in the form of a clear single-phase solution prior to dilution, the amount of the ionic surfactant being 0.9 to 2.0 S moles where S Moles is the amount of the surfactant required to completely neutralise the charges on the polymer, the combined weight of the ionised polymer and the ionic surfactant being 0.1 to 5% by weight of the composition, and said composition comprising not more than 5% by weight of neutral surfactant."

The first auxiliary request as noted above relates to the same claim with the references to polyvinylpyrrolidone and quaternised poly(vinyl alcohol) deleted from the description.

The second auxiliary request relates to Claim 1 as above with the addition after "prior to dilution" of "the polymer having regions with a charge density of at least 0.006 and a degree of ionic character of at least 0.7" (claims filed on 28 July 1994).

The third auxiliary request relates to maintenance with Claim 1 according to the main request with the addition after "prior to dilution" of "the polymer overall having a charge density of at least 0.006 and a degree of ionic character of at least 0.7" (claims filed on 28 July 1994).

The fourth auxiliary request involves maintenance with claims according to the second auxiliary request with the polymers according to the first auxiliary request deleted from the description.

The fifth auxiliary request involves maintenance with claims according to the third auxiliary request with the polymers according to the first auxiliary request deleted from the description.

- VII. The Appellant requested that the decision of the Opposition Division be set aside and the patent be revoked.

The Respondent requested either dismissal of the appeal or maintenance of the patent in accordance with the auxiliary requests referred to above in descending order.

Reasons for the Decision

1. The appeal is admissible.
2. Claim 1 of the main request and of the first auxiliary request corresponds to the claim as granted (see VI above). The Board sees no reason to doubt that the requirements of Article 123 have been satisfied.
3. *The main request*

The Appellant has objected that polyvinylpyrrolidone and quaternised polyvinyl alcohol would be unsuitable for use in a hair treatment composition. At the oral proceedings the Respondent also admitted that unrealistically low pH would be necessary to protonate such polymers, a figure of about pH 1 being mentioned. Such acidic conditions could not be tolerated contact with hair. Accordingly, in the Board's judgement, the

references to the said polymers should be deleted from the description and the main request rejected (Article 83 EPC).

4. *The first auxiliary request*

4.1 Sufficiency of disclosure.

4.1.1 In Decision T 435/91, the requests which were rejected by the Board related to a component of a composition defined in functional terms. The main request thereof related to "an additive which is a water-soluble non-micelle forming or weakly micelle forming material". According to the first auxiliary request, the material is further defined as "a hydrotrope". The list of actual compounds forming the subject-matter of the accepted fourth auxiliary request do not appear to be a homogeneous chemical group but are characterised by the ability to force the surfactant into hexagonal phase. It was the opinion of the Board that a "research programme" would have been necessary to select compounds which might be suitable from the broad functional definitions of the rejected requests.

4.1.2 The circumstances of the present case are different to those applying to T 435/91. The description of the patent in suit lists suitable cationic polymers in the paragraph bridging pages 2 and 3 and anionic polymers in the paragraph at lines 12 to 14 on page 3. Examples of specific anionic and cationic surfactants are given on page 3, lines 34 to 38. Furthermore, the specification contains 13 worked examples which indicate suitable combinations of materials relating to both cationic and anionic polymers complexed respectively with anionic and cationic surfactants. It is admitted that having prepared the polymer/surfactant complex some testing involving a polarising microscope is necessary in order

to detect the presence of a lyotropic liquid crystal phase. However, the board considers such experimentation to be well within the degree of trial and error deemed to satisfy the requirements of Article 83 EPC as, for example, in Decision T 14/83 (OJ EPO 1984, 105, esp. Reasons Points 8 and 9).

4.1.3 Decision T 340/88 (1990, EPOR, 377) referred to by the Respondent relates to the use in a polymerisation process of a surfactant defined only by a range of HLB values. The disputed patent (EP-B-0 062 285) did not contain any information regarding how to determine the HLB and it was also admitted that such determinations were subject to a considerable margin of error. However, it was held that referring to a surfactant "having an HLB in the range 9 to 16" would have been sufficient to enable one skilled in the art to select an appropriate material. This decision seems closer to the circumstances of the present appeal.

4.1.4 It is established jurisprudence of the Boards of Appeal that in order to satisfy the requirements of Article 83 EPC, substantially any embodiment of the invention, as defined by the broadest claim, must be capable of being realised on the basis of the disclosure (e.g. T 226/85, OJ EPO, 1988, 336, Reasons Point 2). At the oral proceedings the Appellant indicated that experiments had shown that no fewer than five polymer/surfactant complexes selected from the lists of the patent in suit had failed to yield a lyotropic liquid crystal phase. However, the Appellant did not make clear which groups of substances had been tested. In opposition procedure, including an opposition appeal, the burden of proof lies with the opponent. In the circumstances, the Appellant's statement can only be regarded as an unsubstantiated allegation. The Appellant also argued at the oral proceedings that a liquid crystal phase only had a

limited range of stability especially relating to temperature but again failed to support this assertion with documentary evidence.

- 4.1.5 Although some experiments involving trial and error are necessary in order to determine which combinations of materials are capable of forming a lyotropic liquid crystal phase, such experimentation would not amount to "a research programme" as envisaged in Decision T 435/91. The Board is thus satisfied that the description contains sufficient information to enable the person skilled in the art to operate the invention.
- 4.1.6 The Appellant also objected to the expression "charge density" (Ladungsdichte) which, although not present in the claims presently under consideration, is used in the description to define the ionic polymer. It is to be noted that "charge density" is used in a different sense to that which appears for example in Römpp Chemie Lexikon, 9 Auflage, page 2431. However, the expression is defined in the patent in suit on page 2, lines 49 to 50 as the ratio of the number of charges on a polymer to the molecular weight of said polymer unit. As noted by the Opposition Division, the charge density of poly(methyldiallyl-ammonium chloride) is given on page 2, line 57 as 0.008. This is clearly based on the molecular weight of the cation $C_8H_{16}N^+$, i.e. $1/126 = 0.008$. Since this is a measure of the positive charge, it seems entirely reasonable to the Board that the weight of the counterion should not be taken into consideration.
- 4.1.7 Accordingly the Board are satisfied that the opposition under Article 100(b) EPC can be dismissed. In other words, the requirements of Article 83 EPC are satisfied.

4.2 Novelty

The Board is satisfied that neither document (1) nor any other document cited in the opposition and examination procedure discloses all the features of Claim 1 of the first auxiliary request. In any event, novelty is no longer in dispute.

4.3 Problem and solution

4.3.1 The Board agrees with the Opposition Division that document (1) can be regarded as closest state of the art. Although Claim 1 of (1) relates to an aqueous detergent composition especially adapted for use in shampooing hair, it is also characterised by its capacity to improve the condition of hair (column 1, lines 11 to 13). In other words, it functions as a hair conditioner. The compositions according to (1) contain a cationic polymer, e.g. quaternised poly(diethylaminoethyl methacrylate) together with an anionic surfactant, suitable materials being listed in the description (column 5, line 43 to column 6, line 4). There is no mention in (1) of a liquid crystal phase in the complex formed from polymer and surfactant, nor has any documentary evidence been produced which might support the existence of such a phase. In addition the compositions in accordance with (1) contains 5 to 20% by weight of a non-ionic surfactant.

4.3.2 Starting from (1), the problem to be solved lies in preparing an improved clear hair conditioner. The problem is solved by the composition according to Claim 1. Having regard to the comparative experiments relating to the ease of removing tangles from hair, which appear in the description of the patent in suit, the Board is satisfied that the problem has been plausibly solved.

4.4 Inventive step

4.4.1 The compositions of the patent in suit differ from those of document (1) in two respects. Firstly, the compositions contains less neutral surfactant and secondly by operating within the range of (0.9 - 2.0)S moles of ionic surfactant in relation to a mole of ionic polymer, a lyotropic liquid crystal phase is formed.

4.4.2 It might seem prima facie obvious when seeking to develop a conditioner from a shampoo/conditioner merely to reduce the amount of surfactant since a washing function is no longer required. There is, however, no suggestion in the prior art that by not only reducing the amount of neutral surfactant but by also operating within the range (0.9 - 2.0)S, whereby a liquid crystal phase is obtained, superior results in respect of removing tangles from freshly washed hair would be obtained. As indicated above (point 4.3.1), document (1) gives no hint of a liquid crystal phase nor that any potential benefit might derive therefrom.

4.4.3 The Appellant has argued that, by operating outside the range (0.9 - 2.0)S, superior wet combing properties are obtained in comparison with a composition within the said range. The tests described by Newman et. al. in document (5) measure the force (in g.) required to comb both wet and dry untangled tresses. According to the tests supplied by the Appellant, which accompanied the statement of appeal, hair is treated with two compositions. Composition R1 is in accordance with the patent in suit having 1.0S moles of ionic surfactant per mole of polymer. The comparison, composition R2 has only 0.5S moles of surfactant and was stated at the oral proceedings to be in accordance with document (1). The

tests according to document (5) showed that notably less force was required to comb hair treated with composition R2 than the tress treated with R1.

- 4.4.4 The test set out on page 5 of the patent in suit measures another property. Tresses of hair which have been washed and rinsed twice under specified conditions are combed until free of tangles, the time taken, T1 being recorded. A corresponding tress is then treated with a specified amount of hair conditioner which was massaged into the hair. After leaving for a specified time, the tress was rinsed with water and the time, T2 required to comb it free from tangles was recorded. A "wet combing value" was obtained by means of the calculation $(T1/T2) \times 100$. By means of this test, compositions demonstrating liquid crystal phase and having surfactant/polymer molar ratios within the range (0.9 - 2.0)S showed superior wet combing properties to those having S values outside this range.
- 4.4.5 It is thus apparent that the tests carried out by the Appellant measure different properties than those recorded in the tests which appear in the description of the patent in suit. The tests of the patent show that by operating within the ranges and conditions therein defined, the products give superior wet combing properties in comparison with a commercial clear conditioner which is unspecified but of the type known from document (1) and approximately the same combing properties as a commercial opaque conditioner. The above tests were confirmed in an *in-vivo* evaluation in a hair salon (page 6, lines 12 to 17). The specification also contains comparative experiments which show that outside the ranges of Claim 1, the same advantageous properties are not obtained (comparative Examples A to F on pages 9 and 10). Accordingly, insofar as the problem to be solved is to prepare an improved hair conditioner which

is the case with a product which reduces the time required to wet comb tangled hair, the Board is satisfied that these results were not to be foreshadowed by the prior art and confirm the decision of the Opposition Division that an inventive step can be recognised. The fact that the Appellants tests show different results when measuring another property of wet combing does not nullify this conclusion. The dependent claims derive their patentability from Claim 1.

5. Since the Board is able to accept the first auxiliary request it is not necessary to consider the Respondent's other requests.

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 on the basis of the first auxiliary request, according to which the reference "quarternised poly(vinyl alcohol) in the sentence bridging pages 2 and 3 and the reference poly(N-vinylpyrrolidone) in line 6 of page 3 are to be deleted.

The Registrar:



E. Gorgmaier

The Chairman:



P. A. M. Lançon