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**D E C I S I O N**  
**of 15 March 2002**

**Case Number:** T 0246/97 - 3.3.7

**Application Number:** 89309730.3

**Publication Number:** 0363057

**IPC:** A61K 7/09

**Language of the proceedings:** EN

**Title of invention:**  
Permanent wave solution

**Patentee:**  
L'OREAL, S.A.

**Opponent:**  
Henkel Kommanditgesellschaft auf Aktien  
Goldwell GmbH

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 56

**Keyword:**  
"Inventive step - problem and solution - obvious combination  
of known features"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0246/97 - 3.3.7

**D E C I S I O N**  
**of the Technical Board of Appeal 3.3.7**  
**of 15 March 2002**

**Appellants:** Henkel  
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TTP/Patentabteilung  
D-40191 Düsseldorf (DE)

**Representative:** -

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**Representative:** -

**Respondent:** L'OREAL S.A.  
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**Representative:** Griffin, Kenneth David  
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**Decision under appeal:** Interlocutory decision of the Opposition Division  
of the European Patent Office posted 13 February  
1997 concerning maintenance of European patent  
No. 0 363 057 in amended form.

**Composition of the Board:**

**Chairman:** R. E. Teschemacher  
**Members:** B. J. M. Struif  
B. L. ter Laan

## Summary of Facts and Submissions

I. The mention of grant of European patent No. 0 363 057 with respect to European patent application No. 89 309 730.3 was published on 6 April 1994. Claim 1 read as follows:

"An aqueous permanent wave solution comprising at least one compound for cleaving interprotein disulfide bonds in hair; and characterised by inclusion of at least one biocompatible 1,3-alkyldiol and having a pH of from 3 to about 7".

Claims 2 to 18 were dependent on claim 1.

II. Two notices of opposition were filed on 6 January 1995 and 9 January 1995, respectively, in which the revocation of the patent in its entirety was requested on grounds based on lack of novelty and lack of inventive step (Article 100(a) EPC). The oppositions were supported *inter alia* by the following document:

D1: US-A-3 433 868

During the proceedings further reference was made *inter alia* to the following documents:

D3: DE-A-1 009 765

D4: DE-A-36 10 394

III. By a decision announced at the oral proceedings held on 11 December 1996 and issued in writing on 13 February 1997, the opposition division maintained the patent in amended form on the basis of claims 1 to 18 submitted

as the sole request during the oral proceedings.

Amended claim 1 differed from claim 1 as granted in that the word "about" was deleted.

Claims 2 to 18 as granted remained unamended.

IV. The decision can be summarized as follows:

(a) The amendment of claim 1 was not formally objected to.

(b) Claim 1 was regarded as novel over D1. The presence of an inventive step was accepted having regard to D1 as the nearest prior art document. The objective problem over D1 was to obtain a permanent wave solution having good curling efficiency in a relatively short time under mild pH conditions, which meant avoiding strongly alkaline conditions. In D1, amongst other polyols, 1,3-butylene glycol was mentioned, but only in combination with alkaline conditions. Since the skilled person had to select the 1,3-alkyl diols from a list comprising other polyols not effective for solving the problem posed and since D1 provided no incentive to change the pH value, the claimed subject matter was inventive.

V. A notice of appeal against the above decision was filed by appellant I (opponent I) on 24 February 1997, and by appellant II (opponent II) on 18 March 1997, respectively, the prescribed fees being paid on the same day. Statements of grounds of appeal were filed on 14 April 1997 and 16 June 1997, respectively.

VI. By letter of 12 February 2002 the respondent filed amended claims 1 to 17 (main request) as well as an auxiliary request.

Claim 1 of the main request corresponds to the version as maintained. Claims 2 to 14 as granted remain unamended. Granted claims 16 to 18 are renumbered to claims 15 to 17.

In the auxiliary request claim 1 corresponds to that of the main request, with the difference that the value of "7" was replaced by the value of "6.5". Claim 2 is a further independent claim which differs from claim 1 of the main request in that the feature "from 3 to 7" is replaced by the feature "7". The dependent claims are renumbered accordingly.

VII. The appellants, in writing and during the oral proceedings, argued concerning novelty and inventive step with respect to both requests in substance as follows:

- (i) As to novelty, D1 disclosed permanent wave solutions having a "desirable" pH value of from above 7 to below 10. Thus, D1 also covered a less preferred range at a pH value of 7 or below, which overlapped with the claimed range. Furthermore, it was not possible to adjust a solution at a pH of exactly 7, so that the skilled man would also consider some small deviations above and below 7, for example 6.9 or 7.1, as falling within the meaning of the term "about 7". Consequently, the claimed pH of 7 would not provide a distinction over the term "above about 7".

- (ii) Regarding inventive step, appellant I regarded D4 as the closest state of the art, in which a permanent wave solution was used under weakly acid and alkaline conditions. The difference from D4 was the presence of a 1,3-diol. Thus, the problem over D4 was to provide a permanent wave solution which showed an improved curl efficiency. The addition of a 1,3-diol for improving curl efficiency was however suggested by D1.

Appellant II started from D1 as the closest state of the art, since it described enhancing the curl efficiency by using 1,3-dialkyl diols. The claimed subject matter differed from D1 only in that a different pH had been used. As no improved effect had been shown for the claimed pH value compared with a higher pH value, the technical problem over D1 was to provide a similar effect under more hair friendly conditions. The use of lower pH values was however obvious in view of D3.

VIII. The respondent (proprietor), in writing and during the oral proceedings, argued in substance as follows regarding both requests:

- (i) As to novelty, D1 was directed to permanent wave solutions having a pH value above 7 but below 10. The word "desirable" used in connection with the pH range meant that a pH outside that range was undesired and not considered. Thus, a pH value of 7 and below could not be directly and unambiguously derived from D1.
- (ii) The problem to be solved was to provide a non-ammonia permanent wave solution with a pH value

near the isoelectric point of hair, which was quick and efficient. At that pH, the solution was less irritating to the skin and hair. In D4 the pH of the permanent wave solution was 6.0 to 7.5 and it took a relatively long time to provide a curling effect. There was no mention in D4 of improving curl efficiency. In D1 an alkaline solution was used and there was no incentive to lower the pH thereof. It had been shown that most of the polyol compounds used in D1 were not effective in the claimed pH range. Thus, only the combination of pH and the selected 1,3-diols provided an improved and non-obvious curling effect as demonstrated by tables II to IV of the patent in suit.

- IX. The appellants requested that the decision under appeal be set aside and that the patent be revoked.
  
- X. The respondent requested that the appeal be dismissed and that the patent be maintained on the basis of the main request, or, alternatively, of the further auxiliary request, both filed with letter of 12 February 2002, claim 1 of the main request having been amended during oral proceedings before the Board to the effect that the word "about" was deleted.

### **Reasons for the Decision**

- 1. The appeal is admissible

*Admissibility of the main and auxiliary request.*

- 2. The cancellation of the word "about" in claim 1 of the

main request had been allowed in the decision under appeal and has not been objected to by the appellants. Furthermore, no objections have been advanced with respect to the auxiliary request and the board sees no reason to take a different view, as the amendments can be derived from the application as filed and the patent in suit. Consequently, both requests are formally allowable.

*Main request*

*Novelty*

3. A decision on novelty can be left open since, in view of the arguments given below, the board has come to the conclusion that, irrespective of how this question is answered, the claimed subject matter does not involve an inventive step.

*Main request*

*Closest state of the art*

4. The arguments of appellant II and the respondent started from D1 whilst appellant I referred to D4 as the closest prior art document.
  - 4.1 D1 discloses a two-liquid phase pressurized hair waving composition adapted for discharge from its container as a foam, which collapses to a liquid promptly after discharge, consisting essentially of: from 1 to about 10% of a member selected from the group consisting of thioglycolic acid, ammonium thioglycolate and thioglycerol, an alkalizing agent imparting to the composition a pH above about 7 but below 10, from about 2 to about 20 % by weight of a specified propellant, from about 0.05 to about 3.5 % by weight of a specified



surface active agent and from about 0.5 to about 5% by weight of an organic compound selected from propylene glycol, 1,3-butylene glycol, 2-methyl pentanediol-2,4 and mixtures thereof; and the balance substantially water (claim 1).

The wave composition of D1 thus comprises certain polyhydric alcohols, in particular 2-methyl pentanediol-2,4 and 1,3-butylene glycol (1,3-butanediol), to improve the waving characteristics of the expelled foam (column 6, lines 3 to 5 and 15 to 17). In examples 3 and 5, the wave composition comprises 7.65 and 7.90 % by weight, respectively, of thioglycolic acid (70%), 1.8 and 2.3 % by weight, respectively, of 1,3-butylene glycol, as well as various propellants and surface active agents and further 0.41 % by weight of sodium hydroxide and 6.25 % by weight of ammonia solution (28%). According to example 3, the alkalizing agents are used in such amounts that the pH value can be adjusted from 8.5 to 9.6.

D1 aims at a two-phase cold permanent waving composition containing a keratin-reducing agent in one phase and a liquified propellant in the second phase such that the hair waving composition may be discharged from the container as a foam which collapses to a liquid promptly upon discharge (column 2, lines 52 to 59). It is a further object to provide a composition that eliminates or greatly reduces the possibility of skin irritation which may result when a liquid waving lotion is applied to the hair in an amount greater than may be absorbed (column 3, lines 1 to 4). Furthermore, it is desirable to have the pH of the waving lotion above 7 to obtain rapid and effective action and to

have the pH below 10 in order to avoid hair damage (column 3, lines 42 to 44).

4.2 D4 discloses a process for waving the hair by treating it with a wave composition having a pH of from 6.0 to 7.5, containing 1.5 to 12 % by weight of at least one tenside and 2 to 15 % by weight of at least one keratin reducing agent (claim 1, feature a)). The keratin reducing agent includes *inter alia* thioglycerol, mercapto carboxylic acids and their salts such as thioglycolic acid and thiolactic acid and their ammonium salts (column 4, lines 57 to 63). In example 1 a composition having a pH of 6.6 is used and applied to the hair for 20 min at 50°C. According to D4, when using prior art alkaline conditions (pH 7.5 to 9.6), the application time of the composition to the hair should be precisely measured to avoid that the hair and skin be damaged (column 3, line 68 to column 4, line 9). D4 aims at a process by which a permanent hair waving can be achieved resulting in a desirable hair condition (no frizziness) in a relatively short time (5 to 30 min) while avoiding the risk of damaging hair and skin (column 3, line 23; column 4, lines 10 to 14).

4.3 The patent in suit aims at a permanent wave solution which stimulates the rate of reaction and final curl efficiency while leaving the hair soft and lustrous (page 2, lines 3 and 4). For reasons of efficiency it is desirable to accelerate curl formation and stabilization and to have a permanent wave solution that reproducibly processes hair in about 5 minutes instead of the usual twenty, which had previously only been possible with extremely strong solutions of thioglycolate and alkalinity which may compromise hair condition (page 2, lines 25 to 35).

Whilst D1 relates to permanent wave compositions that reduce the possibility of skin irritation, avoid hair damage and also improve the waving characteristics of the hair, D4 does not address explicitly the curl efficiency of the hair, although permanent wave compositions at mild pH conditions are applied that provide permanent waves within a relatively short time.

- 4.4 The closest prior art for the purpose of assessing inventive step is that which corresponds to a purpose or technical effect similar to the invention requiring the minimum of structural and functional modifications, in agreement with established jurisprudence (Case Law of the Boards of Appeal of the European Patent Office, 4th edition 2001, I.D.3.1) it follows from the above analysis that D1 is more closely related to the subject matter now being claimed than D4, so that D1 is regarded as the closest state of the art.

*Problem and solution*

5. Although according to D1 improved waving characteristics of the compositions can be achieved with little damage to the hair or causing irritation of the skin, a further reduction of hair damage was still desirable.

- 5.1 The problem to be solved over D1 may therefore be seen in providing a further permanent wave composition by which a high curl efficiency can be achieved within a relatively short time while reducing damage to the hair, in line with the patent specification, page 2, lines 25 to 26, 51 to 54.

- 5.2 According to the patent in suit this problem is solved

by using a permanent wave composition having a pH of 3 to 7 in combination with a 1,3-alkyldiol, as defined in claim 1.

5.3 From the examples it appears that with the composition according to Claim 1 a high curling efficiency can be achieved within a relatively short time. In particular from Table II it appears that values ranging from 63 to 86 % are obtained for compositions containing ammonium thioglycolate as the keratin reducing agent and various amounts of 2-ethyl-1,3-hexanediol at a pH of 7.0 during 20 minutes at 50°C. Table IV shows that compositions containing various keratin reducing agents at pH 7.0 with 5% by weight of 2-ethyl-1,3-hexanediol during 15 to 20 minutes at 50°C achieve curling efficiencies of 82 to 86 %. In example 2, it is demonstrated that a wave composition comprising 8.97 % by weight of cysteamine and 4.0 % by weight of 2-ethyl-1,3-hexanediol provides a curl efficiency at a pH of 4.1 of from 72 to 75 % when the hair is processed at 50 °C for 5 minutes. Although not directly comparable in view of the differences in waving agent, processing times and temperatures, the values (72 to 79%) given in Table IV for compositions having a pH outside the present range are of the same order as shown for the claimed pH range. Therefore, it can be concluded that the composition is adequate in achieving a high curl efficiency within a relatively short time.

As regards the other aspect of the problem to be solved, reducing damage to the hair, only Table I refers to that. It shows that the use of compositions having a pH of 7.0 and containing either glyceryl mono-thioglycolate or ammonium thioglycolate and 2-ethyl-1,3-diol, results in a similar curl pattern, wet

combability, dry texture and sheen. Therefore, no improvement is shown by the use of a composition according to the claimed scope (containing a 1,3-diol) and one outside it (without 1,3-diol). No comparison has been made between compositions having different pH values either. Therefore, it has not been shown that the use of a composition as claimed would reduce hair damage as compared to the use of a composition according to D1.

5.4 Consequently, the technical effects shown in the patent in suit only justify the formulation of a technical problem in relation to D1 which is less ambitious and directed to providing a further permanent wave composition by which a high curl efficiency can be achieved within a relatively short time while not seriously damaging the hair.

5.5 From the discussion of the experimental results of the patent in suit given above, it follows that this problem is effectively solved by the claimed measures.

*Inventive step*

6. It remains to be decided whether the claimed subject-matter is obvious having regard to the documents on file.

6.1 According to D1, certain polyhydric alcohols in particular 1,3-butanediol as a preferred compound, enhance the waving characteristics of the composition which includes keratin-reducing compounds such as thioglycolates (page 6, lines 3 to 5, examples 3 and 5). Thus, the technical effect of the 1,3-alkyldiols, which, according to the patent in suit (page 2,

lines 48 to 51), relies on the synergism between a class of compounds that are essentially ineffective by themselves and the effective compounds that cleave interprotein bonds in the hair, was already known from D1. Although in D1 alkaline solutions are used, the general problem related to such high pH conditions is already mentioned namely to cause hair damage (column 3, lines 42 to 44).

6.2 The information in D1 regarding the pH is to use a pH above (about) 7 for efficiency reasons, but below 10 to prevent hair damage (claim 1; column 3, lines 43 to 45). For the skilled person this implies some deviation from the exact pH value, which in practice cannot be exactly adjusted, to slightly above and below the values indicated, for example a pH of 6.9 or 7.1. Thus, one would not expect that the waving characteristics achieved in D1 would be lost when modifying the pH value of the composition to neutral (pH 7.0) or slightly acidic conditions (pH 6.9). Consequently, there is no prejudice in D1 for the skilled person to consider a pH-range of for example 7.0 or somewhat below to be unsuitable or ineffective, as the respondent argued, nor could any prejudice against the use of a lower pH be deduced from the other documents on file. In particular, in D4 a pH of 6.0 to 7.5 for hair waving compositions is specifically mentioned.

6.3 The respondent's argument that the 1,3-alkyldiols have to be selected from D1 cannot be accepted either. D1 mentions two preferred polyhydric alcohols one of which is 1,3-butanediol (column 6, lines 15 to 17). Furthermore, 1,3-butanediol is used in two out of six examples (examples 3 and 5). There is no basis for any inventive selection by choosing one compound from two

preferred embodiments, all the more since no unexpected technical effect has been shown to be caused by their use (see point 6.1 above).

- 6.4 From the above it follows that the claimed solution is obvious and does not involve an inventive step.
7. Even if one started from D4 as the closest prior art document, no other conclusion would be reached. In that case, the problem to be solved may be seen in providing a composition with improved curling efficiency. From Table IV, runs 5 to 7, it appears that the addition of 5% 2-ethyl-1,3-hexanediol results in a curling efficiency varying from 82 to 86%, as compared to 58 to 73% without the diol. However, such 1,3-diols were known to result in an improvement of the waving characteristics of the composition (D1, column 6, lines 3 to 17), so that it was evident for the skilled person to use them with a view to improving one of the waving characteristics, such as the curling efficiency.

*Auxiliary request*

*Novelty*

8. As regards the novelty of the claimed subject-matter of the auxiliary request, the same conclusion applies as for the main request (point 3. above).

*Inventive step*

9. Independent claim 2 of the auxiliary request differs from claim 1 of the main request in the pH, which is now restricted to a value of 7. Since that value is part of the range defined in claim 1 of the main request, without an additional effect being alleged,

the reasons given above (point 6.3) also apply to the auxiliary request. Apart from that, the board also considers claim 1 of the auxiliary request to be obvious over D1 and D3, because pH conditions similar to the claimed pH of 3 to 6.5 are suggested by D3 (claim 1, pH 4 to 7). Thus, the auxiliary request fails for not complying with Article 56 EPC.

10. It follows from the above that none of the requests meet the requirements of the EPC.

### **Order**

#### **For these reasons it is decided that:**

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

The Registrar:

The Chairman:

C. Eickhoff

R. Teschemacher