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D E C I S I O N
of 18 May 2004

Case Number: T 0572/01 - 3.3.6

Application Number: 93870070.5

Publication Number: 0622451

IPC: C11D 3/395

Language of the proceedings: EN

Title of invention:
Perfumed hypochlorite bleaching compositions

Patentee:
THE PROCTER & GAMBLE COMPANY

Opponent:
Unilever N.V.

Headword:
Hypochlorite bleach/PROCTER

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (main and auxiliary request) - no; foreseeable effect (here: reduction of chlorine odour evidently linked with the stability of hypochlorite in the bleach composition)"

Decisions cited:

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Catchword:

-



Case Number: T 0572/01 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 18 May 2004

Appellant: Unilever N.V.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 21 March 2001
rejecting the opposition filed against European
patent No. 0622451 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: P. Krasa
Members: G. Dischinger-Höppler
J. H. Van Moer

Summary of Facts and Submissions

I. This appeal is from the decision of the Opposition Division to reject the opposition and to maintain European patent No. 0 622 451 on the basis of 10 claims as granted, the independent Claim 1 reading:

"1. An aqueous liquid bleaching composition suitable for use in diluted form, said composition having a pH as is of from 11.5 to 14 and comprising:

- a bleach stable perfume, whereby said perfume causes no more than 10 % AvCl₂ loss in 5 days at 50°C,
- from 2% to 10% by weight of the total composition of an alkali metal hypochlorite,
- from 0.2% to 5% by weight of the total composition of a carbonate salt and from 0.02% to 3% by weight of a silicate salt,

and wherein the bleach stable perfume is selected from the group consisting of 1,2,3,4,6,7,8-octahydro 2,3,8,8-tetramethyl-2 acetal naphthalene, octane 1,1-dimethoxy acetal, 1,3-dioxane 2,4,6-trimethyl 4-phenyl acetal, 1,3-dioxolane 2-hexyl acetal, phenylacetaldehyde dimethyl acetal, aldehyde dimethyl acetal, citral diethyl acetal, acetaldehyde, phenyl ethyl propyl acetal, dihydro terpinyl acetate, iso bornyl acetate, tetrahydro linalyl acetate, benzene propanoltrimethyl acetate, ortho tertiary butyl cyclohexanol acetate, ortho tertiary amyl cyclohexanyl acetate, Fenchyl acetate, styrallyl acetate, 4-tert-

butylcyclohexanol, dihydro terpineol, tetrahydro geraniol, tetrahydro myrcenol, tetrahydro linaleol, Fenchyl alcohol, dimethyl octanol, 2,5-dimethyl heptan-2-ol, phenyl methyl ethyl carbinol, dimethyl benzyl carbinol, dimethyl phenyl ethyl carbinol, Menthone, Iso menthone racemic, dimethyl octanon, Fenchone-1,1,3-trimethyl bicyclo-1,2,2-heptanone 2, benzophenone, monoterpenes and cyclic monoterpenes ethers, diphenyl oxide, iso amyl phenyl ethyl ether, paracrasyl methyl ether, phenyl ethyl methyl ether, beta naphthol methyl ether, methyl diphenyl ether, 3-cyclopentane 2,2,3-trimethyl 1-acetonitrile, bicyclo [2.2.1] heptane-2 carbonitrile, 5-phenyl-3-methyl-pentaneacid nitrile, dodecanenitrile, tetrahydro geranyl nitrile, para cymene and terpinolene, eucalyptol, 2,4,6-trinitro-3,5-dimethyl-tert-butyl benzene, essential oils and resins including eucalyptus oil, cistus oil and patchouli oil, and mixtures thereof."

Independent Claims 7 relates to a method of bleaching fabrics by using the aqueous liquid bleaching composition cited in Claim 1.

Independent Claim 9 reads:

"The use, in an aqueous liquid bleaching composition suitable for use in diluted form, said composition having a pH as is of from 11.5 to 14 and comprising from 2% to 10% by weight of the total composition of an alkali metal hypochlorite, and a bleach stable perfume, whereby said perfume causes no more than 10% AvCl₂ loss in 5 days at 50°C, of a pH buffering means, to reduce the chlorine odor during and after use."

II. The notice of opposition based on the ground of lack of inventive step (Article 100(a) and 56 EPC) cited *inter alia* the following documents:

(8) US-A-4 623 476 and

(12) JP-A-62 205 200 (cited as Derwent Abstract).

During oral proceedings before the Opposition Division, the Appellant (Opponent) further relied on document

(5) US-A-3 876 551

and on an English translation of document (12), filed during that proceedings and hereinafter referred to as document (12').

III. In its decision, the Opposition Division found that the subject-matter of the claims according to the main request was inventive in view of the prior art for the following reasons:

The problem underlying the invention consisted in the reduction of the malodour generated during or after the use of the hypochlorite containing bleaching compositions. This problem was solved by incorporating a particular buffering system into the composition. The effect over a composition comprising no buffer had been demonstrated by way of experimental data filed during opposition. In contrast, documents (5) and (12') merely suggested masking the odour with stable perfumes and the buffers present in the compositions of document (8) were disclosed for the different purpose of improving the stability of the hypochlorite solution.

IV. The Appellant, orally and in writing, maintained that the claimed subject-matter was not based on an inventive step for the following reasons:

- Documents (5) and (12') already addressed the problem of malodour from hypochlorite containing bleaching compositions and proposed a solution to it. This problem was further solved in document (8) which mentioned the importance of buffers to reduce undesirable chemical reactions of hypochlorite and organic material.
- Compared with the prior art compositions, the claimed subject-matter was only a routine optimisation of the buffer system of document (8) in order to provide an alternative solution to that proposed in documents (5) or (12').

V. The Respondent (Patent Proprietor) filed a set of 8 claims in an auxiliary request, Claim 1 of which corresponds to Claim 9 of the main request, and submitted in essence the following:

- It was apparent from the Respondent's experimental data that the technical problem solved by the claimed subject-matter was to reduce the odour of chlorine, not to mask it.
- The cited prior art documents were irrelevant for the proposed solution since none of them related to this particular technical problem.

- D5 might be considered as the closest prior art. It did not, however, disclose any use of a buffer in the compositions. Nor did the other cited documents provide any incentive to the skilled person to add a buffer to a hypochlorite composition in the expectation to reduce the chlorine odour during or after use.

- In particular, document (12') concerned merely masking of the smell and document (8) referred to the different problem of chemical and physical stability of the hypochlorite-containing compositions disclosed therein. Moreover, the effect of reduced chlorine odour in the patent in suit was independent from any reactions between hypochlorite and organic material.

VI. The Appellant requested that the decision under appeal be set aside and that the patent be revoked.

The Respondent requested that the appeal be dismissed or, in the alternative, that the patent be maintained on the basis of the auxiliary request filed with letter of 3 October 2003.

Reasons for the Decision

1. The only issue to be decided in the present case is whether the subject-matter of the claims, having regard to the state of the art according to Article 54(2) EPC, is obvious to a person skilled in the art or whether it is considered as involving an inventive step in accordance with Article 56 EPC.

Main request

2. The patent in suit relates to an aqueous liquid bleaching composition which is based on hypochlorite as the bleaching agent and which is suitable both for laundry and household applications (column 1, lines 5 to 19). So do documents (5), (8) and (12') (document (5), column 2, lines 29 to 32; document (8), column 1, lines 61 to 65; document (12'), page 2, lines 6 to 8).
3. It is further indicated in the patent in suit that a major drawback of such compositions is the malodour of chlorine they generate during or after use which is difficult to mask even if perfumes are present (column 1, lines 19 to 37). It was, therefore, an objective of the invention to provide a chlorine-based bleaching composition wherein the chlorine odour is reduced during and after use (column 1, lines 38 to 40).
4. The same purpose of eliminating the malodour or chlorine smell is explicitly mentioned in documents (5) and (12') (document (5), column 1, lines 58 to 67 and document (12'), page 2, lines 8 to 16).
- 5.1 Both, documents (5) and (12') disclose an aqueous liquid bleaching composition suitable for use in diluted form, comprising alkali metal hypochlorite in an amount of preferably about 5% or respectively 6.3% (document (5), column 5, lines 29 to 36, in particular line 34, and Examples; document (12'), Example 1), and one or more bleach stable perfumes. The pH of the composition is alkaline, in document (5) specifically between 12 and 13.5. Both documents prefer alkali metal

hydroxide for the purpose of adjusting the pH accordingly (document (12'), page 5, lines 22 to 26 and Example 1; document (5), column 3, lines 17 to 30 and 55 to 64).

Bleach stable perfumes of the group identified in Claim 1 of the patent in suit are mentioned to be suitable and are used in the examples, such as dimethyl benzyl carbinol, dodecyl nitrile, 2-t-butyl cyclohexyl acetate or dimethyloctanol (document (5), Examples I to III) or 2-hexyl-1,3-dioxolane, 2,4,6-trimethyl-4-phenyl-1,3-dioxane, diphenyl oxide, phenyl ethyl dimethyl carbinol (document (12'), page 4, lines 1 to 5 and Examples 2, 4, 7, 8 and 10).

5.2 As a consequence, compositions are state of the art as exemplified in documents (5) and (12') which differ from those according to Claim 1 of the patent in suit only in that they do not in addition comprise a carbonate salt in an amount of 0.2 to 5 wt% and a silicate salt in an amount of 0.02 to 3 wt% for buffering the pH (column 5, line 45 to column 6, line 13 of the patent in suit). Therefore, the Board considers the compositions disclosed in these documents as highly relevant for assessing inventive step.

5.3 Taking into account the above discussion, the Board accepts the Respondent's respective suggestion (see V above) to take document (5) as starting point for the evaluation of inventive step.

6.1 The perfumed hypochlorite solution of document (5) is said to be capable of diminishing or eliminating the disagreeable characteristic "hypochlorite" aroma normally left by a hypochlorite bleaching solution on the laundry and on the hands of the user, provided the perfume is stable in the hypochlorite solution (column 1, lines 14 to 19 and 58 to 67 in conjunction with column 2, lines 32 to 48 and column 6, lines 33 to 40).

Concerning the different terms "hypochlorite aroma" and "chlorine smell" used in document (5) and in the patent in suit for the malodour, the Respondent agreed that these terms designated one and the same odour which was usually emitted by a hypochlorite solution.

Therefore, document (5) already contains a suggestion of how to eliminate the chlorine smell, namely by adding to an alkaline hypochlorite solution a perfume which is stable therein. In particular, the examples of document (5) actually show that after use no "hypochlorite" odour is left on laundry when dried or on the hands of someone handling such laundry.

Thus, document (5) purports to overcome the problem of chlorine smell after use of the bleaching compositions.

6.2 The experimental data filed by the Respondent during opposition on 4 February 2000 suggest that the bleach stable perfume would not reduce the malodour on fabrics when dry if a buffer is present in the composition (Table II, compositions B and E). They even suggest that the malodour would be increased if only perfume was added as compared with an embodiment containing

neither perfume nor buffer (Table II, compositions C and F).

This contradiction may be due to the perfume used in the experimental data which is not specified with respect to its ingredients but only identified as "floral perfume" with respect to its aroma.

According to document (5) not all materials imparting a particular aroma, e.g. floral aroma, are stable enough in a hypochlorite solution (document (5), column 6, lines 33 to 40). In the absence of information on its chemical nature, it is impossible to determine whether the perfume used for the experimental data is as stable as required in document (5). Therefore, the comparative data are not suitable to credibly provide an effect over document (5) as far as the perfume containing compositions are concerned.

- 6.3 The Respondent argued that the invention consisted in the finding that the addition of a buffer reduced the chlorine smell, irrespective of its origin and of any perfume being present or not.

In fact, the Respondent's experimental data show that a "reduction" of the chlorine odour during and after use of the bleaching composition in diluted form (17 ml of the composition in 1 litre of water) is achieved in the absence of perfume if the composition contains a carbonate/silicate buffer (composition E) as compared with a diluted composition (composition F) containing no such buffer.

6.4 Considering these experimental data, the technical problem to be solved as against document (5) can, consequently, be seen in providing a hypochlorite-based bleaching composition wherein the chlorine odour is reduced during and after use of the diluted composition.

7. It remains to be decided whether, in view of the available prior art documents, it was obvious for someone skilled in the art to solve this problem by the means claimed, i.e. by the addition of a buffer comprising from 0.2% to 5% by weight of the total composition of a carbonate salt and from 0.02% to 3% by weight of a silicate salt.

8.1 The Respondent argued that the effect of the perfume used in document (5) was only to mask the unpleasant chlorine smell. This was different to the reduction of the odour shown in the experimental data. However, in the Respondent's view, there was no hint in the art nor was it known to a skilled person that such reduction of the smell could be achieved.

8.2 The patent in suit does not indicate a particular mechanism causing the reduced chlorine odour perception by the consumer. Nor does document (5) specify any such mechanism for the elimination of the smell.

However, document (5) starts from a background art according to which it was difficult to obtain a stable perfumed hypochlorite bleach solution and important that the perfume was hypochlorite-resistant for that purpose (column 1, lines 10 to 19). The merit of document (5) is stated to consist in that the perfumed aqueous hypochlorite solutions disclosed therein not

only yield a long lasting perfume aroma, but are also capable of imparting this aroma to laundry and the hands of a user **and at the same time** of diminishing or eliminating the characteristic disagreeable "hypochlorite" aroma therefrom (column 2, lines 32 to 45). This latter effect corresponds according to its literal wording to a reduction of the malodour, i.e. the chlorine smell.

Document (5) does not mention any masking of the chlorine smell. However, the Board accepts the argument that the perfume used in the compositions of document (5) may mask the chlorine smell since this effect is disclosed for comparable compositions (see 5 above) in document (12') to which the Respondent referred.

This citation explicitly discloses that the unpleasant specific "chlorine smell" of a hypochlorite solution is overcome or masked by the incorporation of a perfume which is stable in the hypochlorite containing composition (page 2, lines 8 to 20 in conjunction with page 2, line 30 to page 3, line 10 and page 4, lines 9 to 10).

However, according to document (5), it is critical that the pH of the perfumed hypochlorite solution is in the range of 12 to 13.5 in order to provide a stable hypochlorite containing system which is not unduly corrosive (column 3, lines 17 to 30 and 55 to 64).

A similar statement can be found in document (12') where it is said that the suitable perfumes not only mask the chlorine smell but also do not deteriorate the stability of the hypochlorite. It is explained that

unsuitable perfumes are oxidised in the hypochlorite solution, thereby losing their value as perfume and **reducing the effective chlorine amount** of the bleaching composition (page 4, lines 9 to 30). Document (12'), as a matter of fact, proposes not only to use bleach-stable perfumes (page 2, line 30 to page 3, line 10), but also to further stabilise the hypochlorite by the addition of a substance giving alkalinity to the solution, such as sodium hydroxide, sodium carbonate or sodium metasilicate in an amount of 0.1 to 2% by weight (page 5, lines 22 to 26, page 6, lines 2 to 6 and Examples).

The Board, does not, therefore agree with the Respondent that, for those skilled in the art, there was no link between stabilisation of the hypochlorite and reduction of chlorine smell, the more so as it is apparent from the compositions of documents (5) and (12') as well as of the patent in suit that there is no other source for the chlorine smell than the hypochlorite compound itself. In the Board's opinion, it is evident for someone skilled in the art that the odour is diminished due to the stability of the hypochlorite in the solution at high pH, whereas the effect of the perfume may be both, the masking of the smell and, depending on its stability in the bleach composition, the avoidance of any degradation of the hypochlorite by the perfume.

The Board, thus, agrees with the Appellant that it is impossible to attribute a different meaning to the terms "reducing" the odour in accordance with the patent in suit and "eliminating", "diminishing" or "overcoming" the odour as in the prior art.

8.3 The effect demonstrated in the experimental data, on which the Respondent relies, only relates to the use of the composition in very diluted form (see above 6.3). The Respondent agreed that - upon dilution - the pH of an aqueous composition would change but indicated that there was no suggestion in document (5) (in particular in column 3, lines 17 ff) that the required pH range of 12 to 13.5 had to be maintained in that case.

This statement is correct. However, in the Board's opinion, there was no reason in document (5) for such an indication since document (5) does not consider using the compositions in a dilution with water of 0.17 : 1 as shown in the Respondent's experimental data. Instead, the composition of document (5) is used in diluted form only in Example XV, where the weight ratio of composition to dilution water is 1 : 1. It is within the common general knowledge of a chemist that the extent of change in pH is largely dependent on the degree of dilution and that the comparably slight dilution in Example XV of document (5) would not significantly lower the pH.

Nevertheless, in document (5), the pH is held to be critical for reasons of stability of the hypochlorite in the composition. Therefore, a skilled person would have considered suitable measures for maintaining the required pH, if the composition was to be diluted to an extent which would significantly lower the pH.

8.4 The problem of stabilising hypochlorite in aqueous bleaching compositions is also addressed in document (8). There it is mentioned that sodium carbonate and sodium silicate are, amongst others, suitable as buffering agents in alkaline hypochlorite containing laundry bleach compositions. The substances are to be used alone or in combination and preferably in an amount of 1 to 5% by weight. According to this document, it is important to use such buffers for maintaining the pH within a range of from 10.5 to 13.5, thereby preserving the chemical and physical stability of the bleaching composition. Such maintenance of the pH of the composition is said to minimise undesirable chemical decomposition of the hypochlorite based bleaching agent, which in particular occurs when such bleaching agents are admixed with organic components in unbuffered aqueous solutions (column 7, lines 10 to 48). The Board agrees with the Appellant that these organic components may include perfumes, textile fibres and even human skin.

8.5 The specific combination of a silicate salt and a carbonate salt, as well as the respective amounts thereof, are not disclosed in the prior art. However, as eventually agreed by the Respondent, nothing on file indicates that a particular effect could be attributed to such combination as compared with other alkalising agents or buffering systems.

8.6 The Board concludes that, at the priority date of the patent in suit, it was known to those skilled in the art of laundry bleaching that buffering a hypochlorite solution at a strongly alkaline pH, for example by adding sodium carbonate and silicate in an amount of 1

to 5% by weight, stabilises the hypochlorite against unwanted reactions with organic material and, hence, results in less decomposition products of the hypochlorite, including those developing chlorine smell.

8.7 The Board, therefore, finds that, the skilled person would have used in the compositions of document (5) one or more of the buffering agents proposed in document (8) in the amounts suggested therein, in the expectation to preserve the stability of the hypochlorite upon dilution and upon contact with organic material, thereby reducing the chlorine odour during and after use of the diluted hypochlorite based bleaching composition. The skilled person would, thus, arrive in an obvious manner at the claimed bleaching compositions.

9. For these reasons the Board finds that the subject-matter of Claim 1 of the main request does not comply with the requirements of Articles 52(1) and 56 EPC.

10. The same reasoning applies the more so to the claims of the auxiliary request. This follows from the fact that Claim 1 thereof refers to the use of an **unspecified** pH buffering means in an alkaline aqueous bleaching composition comprising an alkali metal hypochlorite and a bleach stable perfume, to reduce the chlorine odour during or after use.

Therefore, the auxiliary request must also fail since it too does not meet the requirements of Articles 52(1) and 56 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:

G. Rauh

P. Krasa