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Boards of Appeal

Chambres de recours

Case Number : T 305 /85



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D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 11 June 1987

Appellant :
(Opponent)

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Representative :

Respondent :
(Proprietor of the patent)

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Representative :

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Decision under appeal :

Interlocutory decision of the Opposition Division of
the European Patent Office dated 14 November 1985
concerning maintenance of European Patent No. 27 693
in amended form.

Composition of the Board :

Chairman : K. Jahn

Member : R. Andrews

Member : G. D. Paterson

Summary of Facts and Submissions

- I. The mention of the grant of the patent No. 0 027 693 in respect of European patent application No. 80 303 457.8, filed on 1 October 1980 and claiming priority of 18 October 1979 and 22 December 1979 from two prior applications filed in the United Kingdom; was announced on 20 July 1983 (cf. Bulletin 83/29).
- II. On 4 April 1984 the Appellant filed a notice of opposition requesting the revocation of the patent on the grounds of lack of novelty and inventive step. The opposition was supported by the following documents:
- (1) FR-A-2 129 034
 - (2) CH-A-363 329
 - (3) AU-B-417 480.
- III. By an interlocutory decision dated 14 November 1985 the Opposition Division maintained the patent in amended form on the basis of Claims 1 to 3 and 5 to 26 as granted and Claim 4 filed on 21 September 1984. Claim 1 reads as follows:
- "In solid form, the hydrated magnesium salt of:
- Class (1) an aromatic carbocyclic compound substituted around the aromatic nucleus by a carboxylate group and a peroxy-carboxylic acid group both groups being derivable from the corresponding aromatic carboxylic anhydride by reaction with hydrogen peroxide, said aromatic carboxylic compound optionally being further substituted by at least one of the groups selected from alkyl, carboxylate, sulphonate, nitro, chloro and bromo groups or
- Class (2) a cycloaliphatic compound substituted around the cycloaliphatic nucleus by a carboxylate group and a peroxy-carboxylic acid group both groups being derivable

from the corresponding cycloaliphatic carbocyclic anhydride by reaction with hydrogen peroxide, said cycloaliphatic carboxylic compound optionally being further substituted by at least one of the groups selected from alkyl, carboxylate, sulphate, nitro, chloro and bromo groups or Class (3) an olefinically unsaturated aliphatic compound substituted by a carboxylate group and a peroxy-carboxylic acid group, the carbonyl group of the carboxylate substituent being conjugated with the carbonyl group of the peroxy-carboxylic acid via the olefinic unsaturation within the aliphatic compound, both substituents being derivable from the corresponding anhydride by reaction with the hydrogen peroxide".

- IV. The Opposition Division concluded that documents (2) and (3) did not disclose hydrated magnesium salts of the peroxy-carboxylic acids defined in Claim 1 in solid form and that the teaching of document (1) did not lead automatically to the formation of magnesium salts in hydrated form. Furthermore the Opposition Division considered that the conversion of peroxy-carboxylic acids into their hydrated magnesium salts to solve the problem of enhancing the storage stability of the peroxy-carboxylic acid was not obvious in the light of the disclosure of the cited prior art. Document (3) relates to the enhancement of bleaching activity of aqueous bleaching compositions containing certain peroxy-carboxylic acids by the presence of, *inter alia*, magnesium ions. However it is clearly stated on page 4, lines 25 to 28 of the document that the ions do not act as stabilisers. The Opposition Division found that the effect of the present magnesium salts compared to that of the corresponding sodium salts was surprising in view of the disclosure in document (3) that

sodium and magnesium sulphate were equally effective in providing stable granular compositions comprising peroxycarboxylic acids. The Opposition Division therefore concluded that the teaching of documents (1) to (3), either taken alone or combined, did not render the subject-matter of the disputed patent obvious.

- V. An appeal was lodged by the Opponent against this decision on 13 December 1985 together with the statement of grounds and payment of the appropriate fee. The Appellant argued that document (1) clearly discloses magnesium monoperoxyphthalate (MMPP) since there are essentially no differences between the process of document (1) and the present process. Moreover, in view of stoichiometric considerations and the amount of reagents used, a person skilled in the art would realise that a mixture of monoperoxyphthalic acid (MPPA) and its magnesium salt is obtained in Example 1 of this document. From the results of tests in which the storage stabilities of various samples were compared the Appellant has concluded that, since magnesium sulphate has to be ruled out as causing an increase of stability, a skilled person would realise that the cause of the increase in stability of two of the samples obtained by following the teaching of Example 1 of document (1) is the presence of MMPP. The Appellant has also contended that the stabilising effect of MMPP remaining after partially neutralising the reaction mixture prepared by the process of document (1) was recognised, since, in Example 2 of the document in which an excess of sulphuric acid was used in the neutralisation step, dipicolinic acid was added to stabilise the resulting MPPA. Finally the Appellants have argued that if a compound has a stabilising effect on MPPA, that compound must be highly stable itself and its stability cannot be regarded as a surprising property.

VI. The Respondent has argued that if the existence of a substance has to be inferred from an indirect effect, there must be incontrovertible evidence that the effect upon which the inference is based can be explained only by its existence and cannot be explained in any other reasonable way. In view of the teaching in US-A-4 085 133 (4) the Respondent has contended that the skilled person would not draw the conclusions attributed to him by the Appellant with regard to the significance of partial or total neutralisation of the magnesium oxide as taught by document (1). In view of the fact that the Appellant's preparations 1.2 and 1.3 are not exact repetitions of the process described in document (1) there can be no certainty that any conclusions based upon the products of these processes would also apply to the product produced by the process of document (1). From a repetition of the Appellant's preparations 1.2 and 1.3 the Respondent drew the following conclusion: the products obtained contained significant levels of material other than the peroxide; insofar as the results for preparation 1.2 (the closest to Example 1 of document (1)) are concerned there seems to be very little difference between total and partial neutralisation; with respect to the 1.3 results it is observed that at ambient temperature storage they were indistinguishable from the 1.2 results but at 32°C storage some gain was observable for 1.3 and partial neutralisation, however the loss in available oxygen observed was very much greater than the loss for hydrated MMPP. Moreover the Respondent has been unable to detect the presence of hydrated MMPP in the repeat trials of the Appellant's preparations 1.2 and 1.3.

VII. In the oral proceedings held on 11 June 1987 the Board pointed out that amended Claim 4, filed on 21 September 1984, was unallowable in the absence of any

basis in the application as filed for certain of the features referred to therein (Article 123(2)).

The Appellant and Respondent restated their previous arguments regarding novelty and inventive step in view of the teaching in document (1). The Respondent also gave details of the manner in which the presence of hydrated MMPP was determined using X-ray diffraction and infra-red spectroscopy.

VIII. The Appellant requested that the decision under Appeal be set aside and the patent-in-suit be revoked. The Respondent requested that the appeal be dismissed and the patent be maintained in amended form on the basis of the amendments submitted during oral proceedings.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.
2. There are no formal objections under Article 123 EPC to the present statement of claim since it is supported by the original disclosure and does not extend the scope of the protection conferred. Claims 1, 2, 3 and 5 to 25 correspond to Claims 1, 2, 3, 5 and 7 to 26 as granted apart from the renumbering of Claims 7 to 26 and amendment of their dependencies as a consequence of the deletion of Claim 6. The present version of Claim 4 finds support in Claims 4 and 6 as filed and as granted and page 7, lines 33 to 35, page 8, lines 32 to 35 and page 10, lines 2 to 5 of the published patent application (cf. also page 4, lines 40 and 41 and 62 to 64 and page 5, lines 24 to 27 of the printed patent specification).

- 2.1. From the decision under appeal it must be assumed that the Opposition Division considered that the amended Claim 4, which was filed on 21 September 1984, was not open to objection under Article 123 EPC. However the Board considered that the mole ratio of from 1:2 to less than 1:1 was not disclosed in connection with the mole ratio of magnesium to carboxylic/carboxylate group and that there was no basis in the original disclosure with regard to the introduction of sufficient water at the neutralisation step for the resultant salt to precipitate as the hydrate.
- 2.2. In the opinion of the Board these formal deficiencies under Article 123 EPC are overcome by specifying that it is the mole ratio of magnesium to acid anhydride that is in the range of 2:1 to less than 1:1 and that the reaction mixture contains sufficient water for all the resultant salt to be hydrated and to be precipitated as the hydrate. The support for these features is to be found on page 7, lines 33 to 35 and page 8, lines 32 to 35 of the published patent application (cf. also page 4, lines 40 and 41, lines 62 to 64 of the printed patent specification).
3. The patent-in-suit relates to the hydrated magnesium salts of peroxy-carboxylic acids of the compounds of Class 1, 2 and 3 as defined in Claim 1. Such compounds are useful as bleaching agents. Although organic peroxy-carboxylic acids, such as MPPA have very acceptable bleaching properties, they possess the disadvantages of relatively poor storage stability and of forming during storage diacyl peroxides which exhibit properties of skin sensitisation (cf. patent-in-suit, page 2, lines 15 to 27). In the light of this, the problem underlying the disputed patent is to be seen in providing compounds with acceptable bleaching properties which are more stable on storage and which have a decreased rate of production of diacyl peroxides than the prior art organic peroxy-carboxylic acids.

According to the patent-in-suit this problem is solved by providing hydrated magnesium salts of the peroxy-carboxylic acids specified in Claim 1.

In view of the results in Tables 1 and 2 and the Examples illustrating the bleaching properties of the claimed compounds the Board is satisfied that the problem underlying the patent-in-suit as defined above is plausibly solved.

4. The first issue to be decided is whether the proposed solution to the technical problem as defined above is novel in the light of the disclosure in document (1). In agreement with the established practice of this Board in the examination as to novelty consideration must not only be given to what has been explicitly described in the prior art but also to the question whether the state of the art is likely to reveal the content of the invention's subject-matter in a technical teaching (cf. Thiochloroformates/Hoechst, OJ 7/1985, 209, 213).

If this concept of novelty is applied to the present case it is found that document (1) discloses a process whereby phthalic anhydride is reacted with hydrogen peroxide having a concentration of preferably 50 to 98% by weight (cf. page 2, lines 21 to 23) in the presence of an alkaline earth as catalyst (page 1, lines 31 to 33) in a halogenated aliphatic hydrocarbon solvent (cf. page 2, lines 13 to 15 and 24 to 26). After the completion of this peroxidation reaction the reaction mixture is partially or completely neutralised (cf. page 2, line 34) and the monoperoxyphthalic acid formed by precipitation is separated (cf. page 1, lines 29 to 31 and page 3, lines 2 to 4). A preferred alkaline earth for use as the catalyst is magnesium oxide (cf. page 1, lines 39 to 40) which may be used in a molar ratio of magnesium to phthalic anhydride

of 0.01 to 1 (cf. page 1, lines 34 to 36). Thus a comparison between this prior art process and the present process reveals that the reaction mixture in both cases may contain the same ingredients, i.e. phthalic anhydride, hydrogen peroxide, magnesium oxide and an inert organic solvent.

- 4.1. Therefore it must be decided whether a skilled person following the teaching of this document would by partially neutralising the reaction mixture after completion of the peroxidation reaction inevitably obtain a hydrated magnesium salt falling within the ambit of Claim 1 of the patent-in-suit. The Appellant has inferred from a comparison of storage stability tests of various samples that the hydrated MMPP is present in samples obtained by generally following the teaching of Example 1 of document (1). However, for such a line of argument to be fully convincing there must be incontrovertible evidence that the effect (in this case an improvement in storage stability) is only brought about by the presence of the said compound. The Appellant has failed to submit any such evidence, particularly any evidence based on reliable analytical methods, such as infra-red spectroscopy and X-ray diffraction. A further weakness in the Appellant's argumentation lies in the fact that the samples upon which the above inference was based had not been obtained by an exact repetition of Example 1 of document (1). Thus, although the conditions applied by the Appellant might fall within the broad teaching of document (1), certain changes were made which were not specified in document (1), and which might be considered as a selection from the teaching of document (1). Moreover, it is clear from the difference in the stability of the samples obtained according to Preparations 1.2 and 1.3, that an increase in reaction time brings about significant differences in the storage stability of the resulting samples. Therefore it is clear

that small changes in conditions for this particular reaction cause a significant difference in the properties of the product obtained and renders it very difficult to draw any useful conclusions from the experimental results submitted by the Appellant.

4.2. However, it is not necessary for the Board to give any detailed consideration to this line of argument in respect of novelty in view of the evidence submitted by the Respondent. The Respondent has carried out an exact repetition of Examples 1 and 2 of document (1) and analysed the resulting precipitates using very sophisticated methods, i.e. X-ray diffraction and infra-red spectroscopy. The analysis confirmed the presence of MPPA but hydrated MMPP could not be detected in either of the precipitates. These analytical results were confirmed by the much lower storage stability at ambient humidity and 32°C of the product obtained according to Example 1 of document (1) as compared to that of the hydrated MMPP of the disputed patent. The Respondent has also not been able to detect the presence of hydrated MMPP in repeat trials of Example 1 of document (1) using the same reaction conditions as the Appellant.

4.3. In the light of this evidence the Board is convinced that a skilled person following the teaching of document (1) would not obtain a compound falling within the scope of the present Claim 1. The subject-matter of this claim and Claims 2, 3 and 19 to 25 is therefore novel in respect to document (1).

4.4. Since the novelty of the hydrated MMPP was discussed in the light of the process disclosed in document (1), it follows from the foregoing that the subject-matter of the present

Claim 4, which relates to a process for the preparation of compounds according to Claim 1, is also novel in respect of document (1). Moreover there is no reference in the disclosure of the precipitation, separation and drying of any intermediate product. The subject-matter of Claims 5 to 18, which relate to preferred embodiments of the main process claim, is also novel.

5. It still remains to be examined whether the facts, evidence and arguments in respect of inventive step presented by the Appellant prejudice the maintenance of the European patent. The Appellant has not submitted that it was possible for the skilled person on the basis of the cited prior art and common general knowledge to predict with any degree of certainty how the present technical problem might have been solved. Furthermore, the Board is also not in a position from its own knowledge to make any such predictions. On the contrary the Appellant's argument is confined to the supposition that a skilled person following the teaching of document (1) could have realised that the effect of increased stability and its cause was the formation of hydrated MMPP.

However this line of argument must fail since, as is set out in paragraphs 4.1 and 4.2 above, the Board is convinced that the alleged effect does not occur if the teaching of document (1) is strictly followed. Moreover the Board is not aware of any other grounds indicating that the present subject-matter does not involve an inventive step. Therefore, the presence of an inventive step for the claimed subject-matter has to be recognised.

- 5.1 Since at the oral proceedings, neither the parties nor the Board referred to documents (2) and (3) which are less relevant than document (1), any discussion of them is

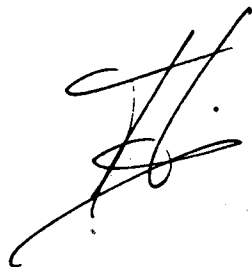
superfluous. It is therefore concluded that the subject-matter of Claim 1 involves an inventive step. Claims 2 to 25 are allowable in view of the patentability of Claim 1.

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 pages 1, 2 and 5 to 19 of the description as granted and pages 3 and 4 of the description and Claims 1 to 25 submitted during the oral proceedings.

The Registrar



F. Klein

The Chairman



K. Jahn