BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

A		B		C	X

File No.: T 0054/90 - 3.3.3

Application No.: 83 109 706.8

Publication No.: 0 106 228

Classification: C08B 11/12

Title of invention: Sodium carboxymethylcellulose

D E C I S I O N
of 16 June 1993

Applicant: -

Proprietor of the patent: Daicel Chemical Industries, Ltd.

Opponent: Akzo N.V.
Hoechst Aktiengesellschaft

Headword:

EPC: Art. 54(3),(4), 123(3)

Keyword: "Novelty (yes)" - "Change of category from product to process for its preparation (yes)" (cf. point 3.2)

Headnote
Catchwords

Case Number: T 0054/90 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 16 June 1993

Appellant: (Opponent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office dated 1 December 1989 rejecting the oppositions filed against European patent No. 0 106 228 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: F. Antony
Members: H.H.R. Fessel
M.K.S. Aúz Castro

Summary of Facts and Submissions

I. European patent No. 0 106 228 in respect of European patent application No. 83 109 706.8, which had been filed on 28 September 1983 claiming a priority of 4 October 1982 (JP-174225/82), was granted on 23 July 1986 (cf. Bulletin 85/30) on the basis of a single claim reading as follows:

"Sodium carboxymethylcellulose characterized in that the average degree of substitution ($\overline{DS}$) of carboxymethyl groups per anhydroglucose unit is in the range of 0.4 to 1.6; the number-average degree of polymerization is in the range of 100 to 1,500; and the mobility distribution (ÄU) as measured by electrophoresis is represented by the following formula:

$$ÄU \times 10^5 < (-3.0 \log \overline{DS} + 3.20) \times 10^5 cm^2/sec.V.$$ //

II. Notices of opposition were filed by Akzo N.V., Aqualon GmbH & Co. KG, and Hoechst AG on 18 December 1986, 13 April and 22 April 1987, respectively. Further oppositions filed on 11 April and 21 April 1987 by Bayer AG and Dai-Ichi Seiyaku Co. Ltd., respectively, were subsequently withdrawn.

In the notices of opposition revocation of the patent was requested based on alleged insufficiency (Art. 100(b) EPC), lack of novelty and of inventive step (Art. 100(a) EPC).

The oppositions were *inter alia* supported by:

(1) EP-A-74 631, published 23 March 1983
(2) Polymer Journal, Vol. 8, No. 5 (1976), pages 449-455
(3) US-A-4 063 018.

III. By decision of 1 December 1989 the Opposition Division rejected the oppositions, in effect maintaining the patent as granted subject to a corrigendum requested on 12 December 1986 which consisted in the deletion of "$x10^5$" on the right-hand side of the claim's formula.

The Opposition Division held that the subject-matter of the disputed patent was novel since it was not disclosed in any of the documents cited in the proceedings. The Opposition Division also decided that the disclosure of the invention was sufficient since the mobility distribution reflected the $\overline{DS}$ distribution, and with regard to the disclosure of the disputed patent a skilled person was able to measure the mobility distribution which was not dependent on a specific apparatus.

With respect to inventive step, the Opposition Division considered that the proposed solution to the problem of improving certain properties of carboxymethylcellulose (CMC) when used in aqueous solution, such as e.g. to lower the susceptibility to enzymatic decomposition and reduce changes in its solution viscosity with the lapse of time, was not obvious.

According to the Opposition Division, (1) disclosed a two-stage process for producing an alkali CMC under

specific reaction conditions but was silent as to the mobility distribution of the products thereof. The disclosure of document (3) was limited to a CMC having a degree of substitution and/or polymerisation which might fall within the range as defined in the disputed patent; the specific condition for the mobility distribution as specified in the claim of the disputed patent was, however, not taught by said prior art.

IV. Appeals together with payment of the prescribed fee were lodged against said decision

on 10 January 1990 by Akzo N.V. (hereinafter Appellant 01),
on 19 January 1990 by Aqualon (withdrawn on 15 March 1993), and on 6 February 1990 by Hoechst AG (hereinafter Appellant 02).

Statements of Grounds were filed on 28 March, 9 March and 9 April 1990, respectively.

The Appellants contested the findings of the Opposition Division as to Article 100(a) based on documents (1) to (3) and as to sufficiency (Art. 100(b) EPC).

V. In a communication sent together with summons to oral proceedings, the Board informed the parties of its preliminary views as to lacking novelty over (1) of the then claimed subject-matter.

VI. In response to said communication the Respondent (Patentee) filed a main and two subsidiary requests based on three different claims, which were slightly further amended during oral proceedings held on 16 June

1993, whereafter the claim of the main request reads as follows:

"A process for preparing a sodium carboxymethylcellulose having an average degree of substitution ($\overline{DS}$) of carboxymethyl groups per anhydroglucose unit in the range of 0.4 to 1.08; a number-average degree of polymerization in the range of 100 to 1500; and a mobility distribution (ÄU) as measured by electrophoresis represented by the following formula

$$ÄU \times 10^5 \prec (-3.0 \log \overline{DS} + 3.20) cm^2/\text{sec}.V$$

consisting of the following sequence of steps:

reacting sodium hydroxide with powdered cellulose in the presence of a mixture of isopropyl alcohol and water to obtain alkali cellulose,
adding isopropyl monochloroacetate as an etherifying agent and optionally isopropyl acetate to neutralize an excess of sodium hydroxide,
agitating the mixture to effect etherification, and isolating the reaction product."

The claims according to the auxiliary requests were further limited with regard to reaction conditions and amounts of the reactants.

VII. During oral proceedings, which Appellant 01 did not attend, neither the admissibility of the proposed amendments, nor the novelty of the resulting claims of the main and the subsidiary requests were disputed.

The existence of sufficiency (Art. 83 EPC) and of inventive step was denied by Appellant 01 by a mere reference to his arguments in the notice of opposition.

Appellant 02, as to inventive step, argued that the man skilled in the art seeking to improve the etherification of cellulose and having become aware that CMC produced by hitherto known processes, as e.g. etherification with monochloroacetic acid or sodium monochloroacetate as known from (3), did not show the desired properties, would immediately try to change the said etherifying agents. Further well-known etherifying agents were esters and a man having ordinary skill would not only immediately try to use esters of monochloroacetic acid, but in view of the preferred solvent, viz. isopropyl alcohol, give preference to the isopropyl ester thereof. In the light of the prior art he would thus not hesitate to use the claimed process in order to avoid the known drawbacks.

VIII. The Respondent contested these arguments stating that they were based on the knowledge provided by the patent in suit, i.e. on hindsight analysis. He argued that Samples A to E of the disputed patent showed an effect as to resistance to salinity over the prior art represented by comparative Sample F, and nowhere in the cited prior art was there any hint to such an effect.

IX. The Appellants requested that the decision under appeal be set aside and that the patent be revoked.

The Respondent requested that the appeal be dismissed and that the patent be maintained on the basis of the single claim filed during oral proceedings as main

request or on the basis of the claims filed also during oral proceedings as auxiliary requests I and II.

Reasons for the Decision

1. The appeals are admissible.

2. Having checked the contents of the priority document (JP-174 225/82 of 4 October 1982), the Board is satisfied that the claim of the Main Request is entitled to the priority claimed (Art. 88(3) and (4) EPC). This matter is not in dispute.

3. The Board is equally satisfied that the claim was not amended in such a way as to contain subject-matter extending beyond the contents of the application as filed.

3.1 The amendments are clearly supported by the disclosure given on pages 11, last paragraph, to 14 of the original documents, corresponding to page 4, line 35 to the end of page 5 of the patent specification. Though the claim of the Main Request specifies neither the amounts of the reactants, nor the temperatures at which the various process steps are performed (as disclosed in Samples A to E), this is admissible since the said process features are defined as functional technical features, it being general technical knowledge how to obtain alkali cellulose and how to effect etherification.

3.2 The Board sees no problem either under Article 123(3) EPC with regard to the change of category, from a

product as claimed by the patent as granted, to a process of producing the same. A product claim covers all methods for making the same; when it is replaced by a process claim directed to a single method it does not extend the protection conferred thereby.

4. The process features indicated in the claim of the Main Request now on file are, in the context with Samples A to E given in the application of the patent in suit, sufficiently clear and complete for the process to be carried out by a person skilled in the art.

Said person having ordinary skill is also given sufficient information to determine the parameters specifying the CMC, viz. degree of substitution ($\overline{DS}$), number-average degree of polymerization and mobility distribution ÄU.

As set out in detail in the decision under appeal, the mobility distribution reflects the $\overline{DS}$ distribution and its measurement does not depend on a specific apparatus. Only Appellant 01 contested these findings, without however giving substantiated arguments traversing the reasons given in that decision; he merely referred to the grounds indicated in his opposition brief.

On the basis of Samples A to E, the methods to determine the product parameters specified in the application of the patent in suit, and the general knowledge of a man skilled in that art, the Board is satisfied that the provisions of Art. 83 EPC were met.

5. As to novelty, due to the change of category the previously expressed doubts of the Board in relation to document (1) have been removed. Document (2) concerns the determination of the charge density distribution of polyelectrolytes such as CMC by electrophoresis, but is silent on the production of the CMC as specified in the claim. The difference over (3) is set out in the following paragraph 6. The claimed subject-matter is, therefore novel.

Since novelty of the process claim has not been disputed by the parties there is no need to discuss this item in greater detail.

6. The Board considers (3) to represent the closest prior art. This document discloses CMC having improved flow properties in aqueous solutions being especially suitable for use in printing pastes. The claims concern a process for preparing an alkali metal salt of CMC comprising the steps of producing an alkali cellulose in a first step and then adding monochloroacetic acid or sodium monochloroacetate under conditions effective to transform said alkali cellulose to an alkali metal salt of the respective carboxymethyl cellulose ether, with subsequent isolation (cf. Claim 1 in conjunction with column 1, lines 11 to 14).

6.1 The problem to be solved by the process as claimed in the patent in suit may be seen in producing CMC having improved resistance to salinity.

6.2 On the basis of the specification of the patent in suit, especially the results of Samples A to E versus Sample F indicated in Table 2 on page 7, the Board is satisfied that said problem is effectively solved when

using isopropyl monochloracetate instead of the corresponding acid or of the sodium salt thereof.

7. It remains to be considered whether the claimed solution to said problem involves an inventive step with regard to the cited prior art.

7.1 Document (1), being prior art within the meaning of Article 54(3) EPC, is not to be considered in this context.

7.2 Document (3) is silent as to the use of etherifying agents other than monochloroacetic acid or the sodium salt thereof. It does not mention any esters as etherifying agents, especially not isopropyl monochloroacetate. Moreover nothing is said therein about improved resistance to salinity, so that there is no link between the problem specified above and the etherifying agent used.

The same applies to the teaching given in (2).

7.3 The Board cannot follow the arguments of Appellant 02, which were based on the unproved assertion that a man skilled in the art would have been aware, at the filing date of the patent in suit, of the disadvantages of the process disclosed in (3), and would therefore have tried to avoid its drawbacks by using an etherifying agent different from those specified therein (cf. point VII hereinabove).

Neither is there any evidence before the Board that the drawbacks concerned were at all previously known, nor is there any evidence to the effect that precisely

isopropyl monochloroacetate was known to be a good etherifying agent in such a multistep process.

7.4 The Board is therefore satisfied that the subject-matter of the claim of the main request involves an inventive step.

8. Since the subject-matter of the claim of the main request is allowable, there is no need to deal with the auxiliary 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 single claim filed during oral proceedings as main request and a description yet to be adapted.

The Registrar: The Chairman:

M. Beer F. Antony