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Anmeldenummer / Filing No / N° de la demande : 83 303 714.6

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Bezeichnung der Erfindung: Trihalomethane precursor removal using ion exchange
Title of invention: emulsions
Titre de l'invention :

Klassifikation / Classification / Classement : B01J 41/04

ENTSCHEIDUNG / DECISION

vom / of / du 15 October 1990

Anmelder / Applicant / Demandeur : Rohm and Haas Company

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence : THM precursor removal/ROHM AND HAAS

EPO / EPC / CBE Art. 56

Schlagwort / Keyword / Mot clé : "Inventive step (no) - obvious solution"

Leitsatz / Headnote / Sommaire

Europäisches
Patentamt

Beschwerdekammern

European Patent
Office

Boards of Appeal

Office européen
des brevets

Chambres de recours



Case Number : T 408/87 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal 3.3.2
of 15 October 1990

Appellant : Rohm and Haas Company
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Decision under appeal : **Decision of Examining Division 033**
of the European Patent Office dated
22 May 1987 refusing European
patent application No. 83 303 714.6
pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : P. Lançon

Members : A.J. Nuss

C. Holtz

Summary of Facts and Submissions

- I. European patent application No. 83 303 714.6 was filed on 28 June 1983 and published under No. 0 129 622.

The Examining Division refused this application under Article 97(1) EPC on the ground that the process of Claim 1 did not comply with Article 56 EPC.

The decision was based on Claims 1 to 12 as originally filed, whereby independent Claim 1 was worded as follows:

"1. A process for removing trihalomethane precursors from water containing said precursors which comprises contacting the water, at a rate of from about 1 to about 25 milligrams of resin per liter of water, with submicroscopic emulsion anion exchange resin having an average particle diameter smaller than 1.5 μm ."

- II. In its decision, the Examining Division took the view that only the feature of employing from about 1 to about 25 mg of anion exchange resin per litre of water was not disclosed in document US-A-4 200 695 (1), whereas all other features stated in Claim 1 of the European application were known from this prior document. However, nothing surprising could be seen in this, since it would be within the competence of a skilled person to determine the minimum amount of resin required for effectively removing trihalomethane precursors (e.g. fulvic and humic acids) by carrying out routine experiments, namely measuring the amount of unabsorbed trihalomethane precursor in relation to the amount of resin employed in the purification procedure. Under these circumstances, document (1) created a "one-way street" situation wherein the alleged unexpected effect did not give rise to an inventive step.

- III. The Appellant lodged an appeal against the decision to refuse the European application.

In his statement of grounds of appeal, the Appellant submitted that document (1) made only a very general and passing reference to the possible use of the anion exchange resin for removing fulvic and humic acids from water, but none to the level of resin required for such use. Moreover, as could be seen from the Russian article by A.A. Mazo et al (2), the prior art was such that a skilled person would expect to have to use levels of anion exchange resin considerably higher than the levels now claimed. According to the latter document 700 ml of swollen resin was required to treat 1 m³ of water, this being equivalent to a level of several hundred milligrams of resin per litre of water. The fact that the anion exchange resins of the European application proved to be surprisingly efficient in removing trihalomethane precursors from water had, therefore, to be considered as a surprising technical effect, sufficient to support inventiveness of the claimed process.

- IV. The Appellant requests that the decision under appeal be set aside and a patent be granted on the basis of Claims 1 to 12 as originally filed.

Reasons for the Decision

1. The appeal is admissible.
2. The subject-matter of Claim 1 is novel because none of the prior art documents on file discloses a process having all the features of Claim 1. This was not disputed in the contested decision.

3. The issue to be dealt with is thus whether the subject-matter of Claim 1 involves an inventive step as required by Article 56 EPC.

3.1 After consideration of the prior art documents cited during the proceedings, it is the Board's opinion that document (1) represents the closest state of the art.

This document discloses emulsion ion exchange resins which may be prepared as anion exchange resins having an average particle diameter smaller than 1.5 μm , whereby the distribution of particle diameters about the median value is far narrower than distributions obtained with comminuted resins of small particle diameter. These resins may be used, inter alia, to remove fulvic and humic acids from potable water. Because of the special properties of these resins, they often prove superior to ground ion exchange resins generally used (see column 1, lines 7 to 16; column 3, lines 15 to 24; column 6, lines 3 to 14; column 9, line 59 to column 10, line 3).

3.2 As explained in the present European application, chlorine used as a disinfectant in public waters is known to react with humic substances present in such waters, whereby carcinogenic trihalomethanes (THM) such as chloroform are produced. Therefore, the levels of such THM precursors in drinking water must be reduced to a contaminant level of maximum 0.10 mg/litre (100 ppb) for total THM in community water systems (see page 1, second paragraph et seq.).

3.3 The technical problem to be solved in respect of said closest prior art is thus to be seen in finding the effective amount of known resin to be employed when trying to remove humic substances from (drinking) water.

According to Claim 1 of the subject patent application, this problem is solved by contacting the water with an amount of from about 1 to about 25 milligrams of known resin (i.e. submicroscopic emulsion anion exchange resin having an average particle diameter smaller than 1.5 μm) per litre of water to be processed.

In view of the examples disclosed in the European application (see page 7, line 19 to page 16, line 24), the Board is satisfied that said technical problem is indeed solved by this proposal.

3.4 In the Board's judgment, the claimed solution is to be considered as obvious for the following reasons:

- The technical teaching of document (1) is in no way diminished because no particular emphasis is put on the disclosed use of anion exchange resins, having an average particle diameter smaller than 1.5 μm , for removing fulvic and humic acids from potable water (see decision T 24/81, "Metal refining/BASF", OJ EPO 1983, 133, in particular point 14 of the Reasons for the Decision). The man skilled in the art was fully aware that the known resins are suitable for removing humic substances from (drinking) water. He would, therefore, not have ignored this teaching, but tried to apply it in practice, whereby of course the suitable amount of resin had to be determined first.
- It is true that the exact amounts of resin to be used in the processing of drinking water are not mentioned in document (1). This is however not relevant, since in the present case, the determination of the amounts necessary for putting the known teaching into practice is manifestly a matter of mere routine experimentation,

whereby it suffices to determine in pilot tests the amount of unabsorbed humic substances in relation to the amount of resin employed for processing water, a common way of proceeding in the field of chemistry when trying to find out the suitable amount of reactant to be used in a given process or reaction. For the rest, the most salient argument of the Appellant does not concern any undue difficulty in determining the effective amounts of known resin to be used for the treatment of water, but a surprising effect in respect of the required amount of resin as such, since the Appellant's contention is that a skilled person would expect to have to use considerably larger quantities of anion exchange resin than the level claimed in the present application to achieve effective removal of THM precursors from water.

- As already set out in the preceding paragraph, the teaching of document (1) together with routine experimentation will inevitably lead to the amounts of resin required for effective removing of humic substances from water. Under these circumstances, the Board has no reason to disagree with the conclusion of the Examining Division. Therefore, the determined amounts of resin have to be considered as obvious despite the fact that a skilled person could possibly expect, on the basis of results obtained with other known resins, that a larger quantity of resin would be required (cf. decision T 192/82, "Moulding composition/BAYER"; OJ EPO 1984, 415, in particular point 16 of the Reasons for the Decision). It is thus irrelevant that in the process known from document (2) several hundred milligrams of ion exchange resin powder (particle size: 40 to 60 μm - see page 1, last paragraph) is used per litre of water, whereas in the refused application only 1 to 25 milligrams of anion

exchange resin (average particle diameter smaller than 1.5 μm) per litre of water is required. For the rest, the man skilled in the art may well expect that different resins showing in addition a notable difference in particle size do not necessarily lead to comparable results when used for the same purpose. Furthermore, the alleged surprising efficiency of the resin used in the present application cannot be said to be fully unexpected, since it was already known from document (1) that anion exchange resins having an average particle diameter smaller than 1.5 μm often prove superior to ground ion exchange resins generally used.

4. It follows from the foregoing considerations that Appellant's request has to fail.

5. In response to a summons to oral proceedings, scheduled at the Appellant's request, he replied in a letter dated 24 July 1990 that in his statement of grounds of appeal the arguments against the rejection of the application had been fully set out and that it was, therefore, considered to be unnecessary for the Appellant to attend the oral proceedings because he would merely be reiterating the arguments already put forward in writing. At the end of the letter, the Appellant stated that his previous request for oral proceedings was no longer maintained.

The Appellant is of course free not to use his right to be heard orally before a final decision is taken. The arguments presented in the statement of grounds of appeal are essentially the same as those developed before the first instance. The Board has not raised any other issues, but has followed the Examining Division's line of argumentation. The Appellant was thus already acquainted with all the reasons on which the present decision is

based. Consequently, the requirements of Article 113(1) EPC have been met.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Beer

P. Lançon