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Bezeichnung der Erfindung: Process for the preparation of ethylene glycol
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : C 07 C 31/20

ENTSCHEIDUNG / DECISION
vom / of / du 10 September 1986

Anmelder / Applicant / Demandeur : UNION CARBIDE CORP.

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 54
"Novelty of overlapping ranges"

Leitsatz / Headnote / Sommaire

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Case Number : T 282 /84

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 10 September 1986

Appellant : UNION CARBIDE CORPORATION
Old Ridgebury Road
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Representative : Rinuy, Santarelli
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Decision under appeal : Decision of Examining Division 002 of the European Patent Office dated 03.07.84 refusing European patent application No 82 400 452.7 pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : K. Jahn
Member : J. Arbouw
Member : G.D.Paterson

Summary of Facts and Submissions

I. European patent application 82 400 452.7 filed on 12 March 1982 and published with publication number 60787 claiming priority of the prior application of 12 March 1981 (US 239 764), was refused by the decision of the Examining Division 002 of the European Patent Office dated 3 July 1984. The decision was based on Claims 1-12 as originally filed.

II. The reason given for the refusal was that the process claimed in Claim 1 is not novel over US-A-4 112 245 and that, consequently, this claim is not allowable under Article 52 together with Article 54 EPC. The decision also stated that the subject-matter of Claim 1 of the application is not defined in a manner sufficiently clear and complete to be carried out by a man skilled in the art.

III. On 24 August 1984 the appellants lodged an appeal against the Decision. The appeal fee was duly paid and the Statement of Grounds was received on 12 November 1984, by telex duly confirmed 15.11.84, a supplement thereto being received on 8 July 1985, together with a set of 9 new claims, of which independent Claim 1 reads as follows:

"1. A process for the preparation of ethylene glycol suitable for use in the manufacture of polyester fiber which comprises reacting in the vapor phase a mixture of hydrogen and at least one of dimethyl oxalate and diethyl oxalate, with a molar ratio of hydrogen to dialkyl oxalate between about 20:1 and about 135:1, at a pressure between about 100 and 1000 psia, a temperature between about 190 and 210°C, a space velocity between about 3,000 and 25,000 hours^{-1} and a

liquid hourly space velocity between about 1.0 and 3.0 $hours^{-1}$ over an effective amount of solid copper-containing hydrogenation catalyst whereby not more than 0.1 per cent by weight of 1,2-butanediol is formed."

This new Claim 1 differs in its characterising part from Claim 1 as originally filed in that narrower ranges for the reaction parameters have been chosen and particularly in that the maximum amount of 1,2-butanediol formed during the reaction is limited from 1.0% by weight to 0.1% by weight.

The appellant submits that, by such limitation, the process is directed to a novel combination of means for obtaining, by reproducible means, a polyethylene glycol practically free of 1,2-butanediol impurity, and therefore suitable for use in the manufacture of polyester fiber.

IV. In a communication dated 14 January 1986 the Board informed the appellant of its opinion that the subject-matter of the Claim 1 would appear not novel over the prior art in that the claimed values for the reaction parameters are almost identical with the preferred values as disclosed in US-A-4 112 245. It further informed the appellant that an indication of a possible use (for the manufacture of polyester fibre) and a result to be achieved (less than 0.1% wt of 1.2-butanediol by-product) without indicating the essential technical features for obtaining this result cannot be seen as a delimitation from the prior art.

V. In a reply filed on 17 March 1986 the appellant reaffirmed his position and requested to set the impugned decision aside and to grant the patent on the basis of the effective claims as filed on 8 July 1985. The original request for oral proceedings was withdrawn on 17 March 1986.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. There is no formal objection to the current version of the claims, since it is adequately supported by the original documents. Claim 1 relies on the Claims 1, 2, 3, 5, 7 and 11 as filed and on page 6, lines 2 to 9 and examples 6 to 9, 13 and 14 of the description. The rest of the claims are based on the claims as originally filed.

3. The closest prior art is US-A-4 112 245. This document discloses a process for the preparation of ethylene glycol by reacting in the vapor phase a mixture of hydrogen and oxalate ester (cf. column 1, lines 60-68) under the following reaction conditions:

   1. Pressure 15-1000 psia, preferably 150-475 psia (column 5, lines 44-45 and Claims 1 and 4);

   2. Temperature 150-300°C, preferably 200-230°C (column 5, lines 42-43 and Claim 3);

   3. Space velocity 3000-20000 hr^{-1}, preferably 8000-15000 hr^{-1} (column 5, lines 49-50 and Claims 1 and 5);

   4. Liquid hourly space velocity 0.001-5.0 hr^{-1}, preferably 1.0-3.5 hr^{-1} (column 5, line 50-55 and Claims 1 and 6);

   5. An H_2/Oxalate ester ratio at least 4:1, preferably 30:1 (column 3, lines 29-38 and Claim 1);

   6. A copper hydrogenation catalyst (column 3, lines 45-46 and Claim 1).

The reaction conditions listed under (1) to (6) above and particularly the preferred reaction conditions are almost identical or at least overlap to a considerable degree with the reaction conditions as claimed in Claim 1. Therefore the teaching of US-A-4 112 245 in terms of technical means is essentially the same as the teaching of the application.

3.1 In its decision T 198/84, "Thiochloroformates" (OJ, 1985, page 209, 213, 214, 215) the Board has decided that selection of a sub-range of numerical values from a broader range is possible when the following criteria are satisfied:

(i) the selected sub-range should be narrow;
(ii) the selected sub-range should be sufficiently far removed from the known range illustrated by means of examples;
(iii) the selected area should not provide an arbitrarily specimen from the prior art, i.e. not a mere embodiment of the prior description, but another invention (purposive selection).

The criteria given above are not satisfied here for the reasons given below.

3.2 The ranges claimed in Claim 1 of the present application do not as required single out small specimen from the known ranges but are almost identical therewith. Therefore the selected sub-range is not narrow as compared to the state of the art.

3.3 In addition, there is not sufficient distance between the allegedly selected ranges of parameters and the known combined ranges illustrated by means of examples. The examples V, VI and X of (1) demonstrate values for pressure, space velocity and liquid hourly space velocity (LHSV)

within the ranges as claimed in the application. As regards the temperature only one example (IV) describes a temperature falling within the claimed range while the given LHSV is lower than claimed. However the examples are in general only specific embodiments of a broader teaching and must therefore be considered in context therewith. Although none of the examples of (1) realises exactly the combination of reaction parameters as claimed, these examples do not restrict, but support the general teaching laid down in the claims, i.e. that the reaction condition can be varied within certain ranges, particularly within the scope of Claims 11 to 13, also including the ranges as claimed (cf. T 17/85, "Filling material/PLÜSS-STAUFER", to be published). Therefore the selected sub-range is not removed sufficiently far from the known range as illustrated by means of examples.

3.4 It is clear from Example 17 of the application in suit which is an example outside the claimed range (as regards temperature) that similar good results are obtained outside and inside the claimed range. For this reason the selection of the claimed reaction parameters cannot be seen as a purposive selection and therefore does not relate to another invention.

4. The further information in Claim 1, that the ethylene glycol is suitable for the use in the manufacture of polyester fibre and contains less than 0.1% by weight of butanediol, incorporates no new technical teaching, but merely represents the result of a known process already disclosed in all its technical details and therefore cannot be considered as distinguishing technical features delimiting the subject-matter of the application from the prior art, since these features do not teach the skilled man how to select and combine the reaction parameters in order to achieve these goals. This is particularly the case here

since the object US-A-4 112 245 is also to minimize the amount of by-products formed (cf. e.g. column 2, line 4; column 4, lines 38-42 and the examples). It follows that nothing is added to what is already known, because the alleged invention consists solely in following the procedure already disclosed in the prior art. The subject-matter of Claim 1, therefore, lacks novelty.

5. These arguments apply not only to Claim 1, but equally to dependent Claims 2 to 9 based on the main claim, which merely represent preferred embodiments of the process according to Claim 1 and thus fall with it.

Order

For these reasons

it is decided that:

The appeal is rejected.