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**D E C I S I O N**  
**of 28 April 1999**

**Case Number:** T 0168/96 - 3.3.1

**Application Number:** 90301655.8

**Publication Number:** 0384652

**IPC:** C07C 51/12

**Language of the proceedings:** EN

**Title of invention:**

Process for preparing carboxylic acids

**Patentee:**

The British Petroleum Company P.l.c.

**Opponent:**

Hoechst Celanese Corporation

**Headword:**

Acetic acid/BP

**Relevant legal provisions:**

EPC Art. 54, 114(2), 123(2), (3)

**Keyword:**

"Novelty (yes, after amendment) - process feature of adding requires action to be performed"

**Decisions cited:**

G 0002/88

**Catchword:**

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Boards of Appeal

Chambres de recours

Case Number: T 0168/96 - 3.3.1

**D E C I S I O N**  
**of the Technical Board of Appeal 3.3.1**  
**of 28 April 1999**

**Appellant:** British Petroleum Company P.l.c.  
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**Representative:** Barlow, Michael Thomas  
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**Respondent:** Hoechst Celanese Corporation  
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**Representative:** De Minvielle-Devaux, Ian Benedict Peter  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 21 December 1995  
revoking European patent No. 0 384 652 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** A. J. Nuss  
**Members:** R. Freimuth  
R. E. Teschemacher

## Summary of Facts and Submissions

- I. The Appellant (Proprietor of the Patent) lodged an appeal on 19 February 1996 against the decision of the Opposition Division posted on 21 December 1995 revoking the European patent No. 384 652 and filed on 12 April 1996 a written statement setting out the grounds of appeal.
- II. Notice of Opposition had been filed by the Respondent (Opponent), requesting revocation of the patent in its entirety for lack of novelty and inventive step (Article 100(a) EPC) and for lack of sufficient disclosure (Article 100(b) EPC). The following document was submitted *inter alia* in opposition proceedings:
- (3) EP-A-265 140
- III. The decision under appeal was based on two alternative sets of claims, i.e. a main request on claims 1 to 7 as granted and an auxiliary request on claims 1 to 7 as amended during opposition proceedings. The set of claims according to the then pending main request was directed to a process for preparing a carboxylic acid having  $(n + 1)$  carbon atoms by reaction of carbon monoxide with an alcohol having  $n$  carbon atoms in the presence of a rhodium catalyst and the set of claims according to the then pending auxiliary request to the use of a Group VIB metal as costabiliser in that process.
- IV. The Opposition Division decided that the patent was not novel according to either request.

The Opposition Division held in particular that the process disclosed in document (3) comprised all the features as defined in the claimed invention according to the then pending main request. The disclosed process was necessarily effected in the presence of molybdenum and chromium, i.e Group VIB metals, since those metals were corrosion products of the reactor when the operation extended over longer periods of time. Having regard to the patent as amended according to the then pending auxiliary request, the Group VIB metals were claimed to be used as a costabiliser of the catalyst which lead to an enhancement of the productivity of the process. The Opposition Division found that this technical effect as such was already known from document (3). The enhancement of that known effect did not represent a technical feature rendering the subject-matter claimed novel.

- V. At the oral proceedings before the Board, held on 28 April 1999, the Appellant defended the maintenance of the patent in suit in amended form on the basis of a main request submitted during those oral proceedings and an auxiliary request submitted on 3 June 1996, both superseding the respective previously submitted requests. Both fresh requests comprised a set of six claims, wherein claim 1 was the sole independent claim. That claim of the main request read as follows:

"1. A continuous liquid-phase process for preparing a carboxylic acid having (n + 1) carbon atoms by reaction of carbon monoxide with an alcohol having n carbon atoms in the presence of a rhodium catalyst at elevated temperature and pressure which process comprises feeding the alcohol and/or an ester of the alcohol and

the carboxylic acid together with carbon monoxide to a carbonylation reactor and removing the carboxylic acid from the carbonylation reactor; characterised in that the carbonylation reactor contains during the course of the process a liquid reaction medium comprising:

- (a) water at a concentration in the range 0.5 to 5 % by weight of the total weight of the reactor contents,
- (b) a catalyst stabiliser selected from iodide salts which are soluble in the reaction medium at the temperature of the reaction,
- (c) a Group VIB metal costabiliser,
- (d) the iodide derivative of the alcohol,
- (e) the ester of the carboxylic acid and the alcohol,
- (f) a rhodium catalyst, and
- (g) the carboxylic acid

and in which process there is maintained a concentration in the reaction medium of the Group VIB costabiliser by adding to the reaction medium of an effective amount of a Group VIB metal costabiliser or by selectively removing all the corrosion metals with the exception of chromium, molybdenum or tungsten salts from the reaction medium."

The claims according to the auxiliary request and those according to the main request differed essentially in

dropping the alternative embodiment comprised in the latter of selectively removing all the corrosion metals with the exception of chromium, molybdenum or tungsten salts from the reaction medium.

VI. The **Appellant** submitted in particular that the claims as amended according to the main request satisfied the requirements of Article 123 EPC and were directed to novel subject-matter. He argued that process claim 1 according to this request was delimited from the state of the art since it required the Group VI B metal costabiliser to be added to the reaction medium, a feature which was not disclosed in document (3). Nor was the alternative embodiment of selectively removing all the corrosion metals with the exception of chromium, molybdenum or tungsten salts from the reaction medium disclosed in that document, which, on the contrary, taught to remove all the corrosion metals without exception due to their adverse effect on that process. Therefore neither document (3) nor any other document cited in the proceedings anticipated the claimed invention.

VII. The **Respondent** submitted that the patent in suit according to the main request was not novel, however, maintaining this novelty objection during oral proceedings before the Board exclusively with respect to the sole document (3) and dropping it with regard to any other document cited in the proceedings. He argued that the process disclosed in document (3) comprised all the features as defined in claim 1 of the main request. The feature of adding a Group VIB metal costabiliser to the reaction medium required in the claimed invention was disclosed implicitly in that

document, since the leaching of corrosion metals from the reactor, including metals of the Group VIB, was to be understood as an unintentional adding of those metals. The alternative feature of the subject-matter claimed of selectively removing all the corrosion metals with the exception of chromium, molybdenum or tungsten salts from the reaction medium was also made available by document (3), particularly in view of example 1, Table I on page 7 wherein the metals iron and nickel were removed to a greater extent than the Group VIB metals chromium and molybdenum. For these reasons the subject-matter of claim 1 according to the main request lacked novelty.

VIII. The Appellant requested that the decision under appeal be set aside and the patent be maintained on the basis of the set of claims according to the main request submitted during the oral proceedings before the Board or to the auxiliary request submitted on 3 June 1996.

The Respondent requested that the appeal be dismissed.

IX. At the end of the oral proceedings the decision of the Board was given orally.

### **Reasons for the Decision**

1. The appeal is admissible.

#### *Main Request*

2. *Amendments (Article 123(2) and (3) EPC)*

2.1 In claim 1 the feature of operating the process continuously and of "maintaining a concentration in the reaction medium of the Group VIB costabiliser" is supported by page 4, lines 14 to 21 of the application as filed. The adding of an effective amount of a Group VIB costabiliser to the reaction medium is backed up by original page 2, lines 32 and 33 and page 5, lines 32 and 33. Page 6, lines 10 to 13 of the application as filed provides a proper basis for the feature of selectively removing all the corrosion metals with the exception of Cr-, Mo- or W-salts from the reaction medium. The amount of the water content indicated in feature (a) finds support in claim 3 as originally filed.

Therefore, all the amendments made to claim 1 as granted comply with the requirements of Article 123(2) EPC.

2.2 The amendments of the claims as granted bring about a restriction of the scope of the claims, and therefore of the protection conferred thereby, which is in keeping with the requirements of Article 123(3) EPC.

### 3. *Novelty*

The sole issue arising from this appeal consists in deciding whether or not the subject-matter of the claims as amended is novel over the state of the art.

3.1 During oral proceedings before the Board, the Respondent challenged the novelty of the claimed invention exclusively with regard to document (3), whilst no longer relying on the further documents cited



so far in the proceedings. Therefore, the Board limits its detailed considerations with respect to novelty to that document.

- 3.2 Document (3) discloses in claim 10 a process for the carbonylation of methanol to acetic acid in a reactor by passing carbon monoxide through a reaction medium comprising methanol and a catalyst solution of (a) low water content comprising (f) rhodium, (d) methyl iodide, (e) methyl acetate and (b) lithium iodide to produce (g) acetic acid. Said acetic acid is recovered from the effluent of said reactor by concentrating the effluent into a variety of process streams which contain corrosion metal contaminants. Those metal contaminants are removed therefrom with a cation exchange resin thereby reducing the metal contaminant content in the process streams. On page 5, line 50, that document specifies as contaminants particularly the metals iron, nickel, chromium and molybdenum, the last two being of (c) Group VIB. The carbonylation process is continuously operated in the liquid phase (page 4, line 53; page 5, lines 19 and 20). The water content in the reaction medium is below 14 weight%, preferably as low as 0.1 weight% (page 4, line 35). To that extent, the disclosure of document (3) is not in dispute between the parties.

However, the Appellant and the Respondent had divergent views on the matter whether or not the further alternative features defined in claim 1 as amended of either adding to the reaction medium an effective amount of a Group VIB metal costabiliser or of selectively removing all the corrosion metals with the exception of chromium, molybdenum or tungsten salts

from the reaction medium were disclosed in document (3).

- 3.2.1 With respect to the feature of adding a Group VIB metal costabiliser to the reaction medium, the Respondent conceded that "deliberately" adding that particular metal costabiliser lacked disclosure in document (3), but argued that leaching of corrosion metals from the reactor, including metals of the Group VIB, was to be interpreted as an "unintentional" adding of those metals to the reaction medium.

This leads the Board to observe that there are basically two different types of claim, namely a claim to a physical entity, e.g. a product, and a claim to a physical activity, e.g. a process for preparing a product (see decisions G 2/88, OJ EPO 1990, 93, point 2.2. of the reasons). In the present case, claim 1 is directed to a process, i.e. to a physical **activity**. This means that the feature in that claim of adding a Group VIB metal to the reaction medium requires an **action** to be performed. That action of adding consists in putting **actively** a Group VIB metal into the reaction medium so as to increase the quantity of that metal therein. This is in line with all the examples of the patent in suit wherein a separate solution containing the Group VIB metal is added to the reactor containing the reaction medium.

However, according to the process of document (3) the Group VIB metals are automatically present in the reaction medium due to corrosion of the reactor which does not require any physical activity. In view of the absence in that document about any action to be

performed with respect to putting the Group VIB metals into the reaction medium, that document does not reveal to the skilled person the physical activity of adding those metals to that medium as defined in claim 1.

3.2.2 With respect to the feature of selectively removing all the corrosion metals with the exception of chromium, molybdenum or tungsten salts from the reaction medium, document (3) disqualifies the corrosion metals in the reaction medium by describing them as metal contaminants, which have an adverse effect on the process for preparing acetic acid, and specifies particularly the metals iron, nickel, chromium and molybdenum as contaminants (page 2, line 46 to page 3, line 2; page 5, lines 50 to 52). Therefore that document discloses removing those metal contaminants from process streams originating from the effluent of the reactor, without making any distinction, however, between the different corrosion metals to be removed (page 5, line 54; claim 10). Thus, the process for removing corrosion metals disclosed in document (3) is directed at removing all the metal contaminants regardless of their nature, which is at variance with the feature as defined in the claimed invention of **selectively** removing all corrosion metals, but chromium, molybdenum or tungsten.

The Respondent argued that the results indicated in Table I of example 1 of document (3), referring to a process for removing corrosion metals from a process stream, showed that the metals iron and nickel were removed to a greater extent than the metals chromium and molybdenum; this amounted to an implicit disclosure of selectively removing all corrosion metals, except

chromium or molybdenum as defined in the claimed invention. However, on the one hand, that example in document (3) exemplifies a process for removing the corrosion metals from a particular **process stream** which originates from splitting up the effluent of the reactor into a variety of process streams, whereas the subject-matter claimed requires on the contrary the corrosion metals to be removed from the **reaction medium**. On the other hand, according to the footnote (b) on page 7 of document (3), the process stream feeding in example 1 the cation exchange resin to remove the corrosion metals from that stream contains a greater amount of iron and of nickel than of chromium and of molybdenum. This difference in metal content necessarily results in the fact indicated in Table I of that example that a greater amount of iron and of nickel than of chromium and of molybdenum is removed. Hence, example 1 as it stands does **not** support the Respondent's allegation of a **selective** removal of all the corrosion metals with the exception of chromium, molybdenum or tungsten as required in claim 1; he appears to interpret the disclosure of example 1 of document (3) with the knowledge of the present invention, which the Board cannot accept.

3.2.3 For these reasons, the Respondent's arguments do not convince the Board.

3.3 To summarize, in the Board's judgement, document (3) does not anticipate the claimed invention.

3.4 The Board is satisfied that the subject-matter claimed of the patent in suit as amended is not disclosed in any of the further cited documents either. This not

being in dispute between the parties, it is not necessary to give detailed reasons for this finding.

- 3.5 For these reasons, the Board concludes that the subject-matter of claim 1, and by the same token that of dependent claims 2 to 6 is novel within the meaning of Articles 52(1) and 54 EPC.

4. *Remittal*

Having so decided, the Board has not taken a decision on the whole matter since the Opposition Division has solely ruled on the issue of novelty and has not yet concluded the examination of whether, taking into consideration the amendments made, the patent and the invention to which it relates meet the other requirements of the European Patent Convention as called for by Article 102(3) EPC. Under these circumstances the Board considers it appropriate to exercise the power conferred on it by Article 111(1) EPC to remit the case to the Opposition Division for further prosecution on the basis of the claims according to the main request in order to enable the first instance to decide on the outstanding issues.

*Auxiliary request*

5. Since the main request is novel for the reasons set out above, there is no need for the Board to decide on the lower ranking auxiliary request.

**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 for further prosecution on the basis of claims 1 to 6 according to the main request submitted during oral proceedings before the Board of Appeal.

The Registrar:

The Chairman:

E. Görgmaier

A. Nuss