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D E C I S I O N
of 6 December 1995

Case Number: T 0937/92 - 3.3.2

Application Number: 90200491.0

Publication Number: 0386833

IPC: B01J 31/24

Language of the proceedings: EN

Title of invention:
Carbonylation catalyst system

Applicant:
SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54

Keyword:
"Novelty"
"Enabling disclosure"

Decisions cited:
T 0206/83, T 0026/85

Catchword:
-



Case Number: T 0937/92 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal 3.3.2
of 6 December 1995

Appellant:

SHELL INTERNATIONALE RESEARCH
MAATSCHAPPIJ B.V.
Carel van Bylandtlaan 30
NL-2596 HR Den Haag (NL)

Representative:

-

Decision under appeal:

Decision of the Examining Division of the European
Patent Office dated 6 May 1992 refusing European
patent application No. 90 200 491.0 pursuant to
Article 97(1) EPC.

Composition of the Board:

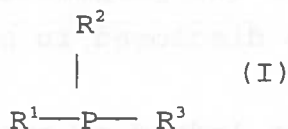
Chairman: P. A. M. Lançon
Members: M. M. Eberhard
R. E. Teschemacher

Summary of Facts and Submissions

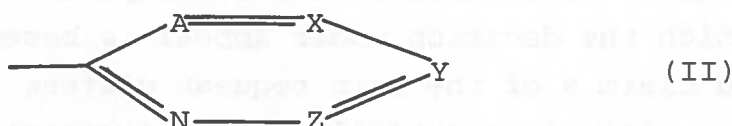
I. European patent application No. 90 200 491.0 was refused by a decision of the Examining Division. The decision was based upon the set of claims as originally filed (main request) and upon the sets of amended claims filed on 3 March 1992 (first and second auxiliary requests). The independent claim 1, which is common to these three requests reads as follows:

"1. A catalyst system, which comprises

- (a) a source of a Group VIII metal, and
- (b) a phosphine of general formula:



in which R¹, R² and R³ are independently selected from an optionally substituted aryl group and a group of general formula:



wherein each of A, X, Y and Z is independently selected from a nitrogen atom, a CH group and a group of formula CR, wherein R represents a hydroxyl group, an amino group, an amido group, a cyano group, an acyl group, an acyloxy group, a halogen atom, an optionally substituted hydrocarbyl group or an optionally substituted hydrocarbyloxy group, it also being possible for two

adjacent CR groups to form a ring, provided that at least one of R¹, R² and R³ represents a group of formula (II), in which at least one of A and Z represents a group of formula CR; or an acid addition salt thereof."

- II. The ground for the refusal was that the catalyst system defined in claim 1 of each of these requests lacked novelty over the disclosure of either of the documents EP-A-0 282 142 (hereinafter D1) and EP-A-0 271 144 (hereinafter D2). The Examining Division held that some of the phosphines belonging to the subgroup of phosphines covered by the definition of claim 1 were individually disclosed in either D1 or D2 and that the phosphines listed in D1 or D2 were clearly phosphines preferred for the preparation of the catalyst compositions disclosed in said documents.
- III. The Appellant lodged an appeal against this decision. Together with the Statement of Grounds of Appeal, he submitted on 10 September 1992 three sets of amended claims as main request, first auxiliary request and second auxiliary request respectively. Claim 1 of the main request is identical to the independent claim 1 upon which the decision under appeal is based. The amended claim 9 of the main request differs from the original claim 9 essentially by the limitation to Z representing a group of formula CR and by the incorporation of a disclaimer excluding phenyl di(4-methoxy-2-pyrimidinyl) phosphine.
- IV. The Appellant's arguments insofar as they concern the novelty of the catalyst system defined in claim 1 of the main request can be summarised as follows:

The Appellant argued i.a. that the claimed invention met the three criteria for assessing novelty of a sub-range selected from a known broader range, which are mentioned

in the decision T 198/84 (OJ EPO 1985, 209). He pointed out in this respect that the additional effect of an improvement of stereoselectivity was observed for the selected sub-range only and that, accordingly, the selection was deemed to be purposive as required in T 198/84. Although this decision dealt with a continuous range of natural numbers, its reasoning was directly applicable to ranges of discrete numbers or entities.

The Appellant further contended that neither D2 nor D1 specifically disclosed the selected sub-group of catalyst systems comprising a phosphine having a N-aromatic 2-substituent carrying a substituent at at least one of the 3- and 6-positions. In the working examples of the citations the catalyst system comprised unsubstituted 2-pyridylphosphines. As regards the list of phosphines reported in D2 or D1, it was argued that the skilled person would not have considered that the phosphines listed were individually suitable for inclusion in a catalyst composition, in particular because some of them were non-existent, such as the di(p-methoxyphenyl)(3-methoxy-2-pyrimidinyl) phosphine. Moreover, according to the Appellant, all the listed phosphines were novel compounds at the publication date of D2 or D1 with no method for their preparation being publicly available. Therefore, according to decision T 206/83 (OJ EPO 1987, 5) the disclosure would not have been enabling, and so not novelty destroying.

- V. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 14 according to the main request filed on 10 September 1992, alternatively on the basis of one of the two auxiliary requests submitted at the same date. Oral proceedings were provisionally requested, should the Board envisage a dismissal of the appeal.

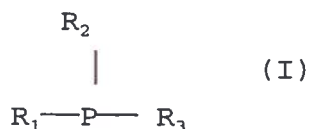
Reasons for the Decision

1. The appeal is admissible.

Novelty of claim 1 of the main request

- 2.1 D2 discloses a catalyst system comprising a palladium compound and an organic phosphine, which, like the claimed catalyst, is used for the carbonylation of acetylenically unsaturated compounds with carbon monoxide in the presence of a hydroxyl-containing compound in the liquid phase. The catalyst system of D2 is formed from:

- (a) a palladium compound
- (b) a protonic acid
- (c) an organic phosphine according to the formula (I)



wherein R_1 represents a heterocyclic 5 or 6 atom ring comprising at least nitrogen as hetero atom which ring is optionally substituted and/or may form part of a larger condensed ring structure that is optionally substituted, and wherein R_2 and R_3 each have the aforesaid meaning of R_1 or may represent an optionally substituted aryl group. Examples of heterocyclic rings according to the definitions of R_1 , R_2 , R_3 are i.a. pyridyl, pyrazinyl, pyridazinyl and pyrimidinyl, the three first mentioned rings being preferred. The heterocyclic and/or aryl groups may be substituted either with one or more electron-repelling groups such as alkoxy or alkyl groups with not more than 5 carbon atoms, dimethylamino or diethylamino groups, or with one

or more electron-attracting groups such as chlorine or fluorine atoms, or trifluoromethyl, trichloromethyl, monochloromethyl or m-methoxy groups (cf. claims 1 to 6, page 1, line 24 to page 2, line 26). D2 further discloses a list of **suitable** phosphines at pages 3, 4 and 5, which list comprises the following phosphines:

- diphenyl(3-methoxy-2-pyridyl) phosphine;
- di(p-tolyl)(3-methoxy-2-pyridyl) phosphine;
- di(p-tolyl)(3-chloro-2-pyridyl) phosphine;
- di(m-methoxyphenyl)(3-chloro-2-pyridyl) phosphine;
- di(m-methoxyphenyl)(3-methoxy-2-pyridyl) phosphine;
- di(m-tert.butoxyphenyl)(3-chloro-2-pyridyl) phosphine;
- di(m-tert.butoxyphenyl)(3-methoxy-2-pyridyl) phosphine;
- di(p-tolyl)(4-methoxy-3-pyridazinyl) phosphine;
- di(p-methoxyphenyl)(4-methoxy-3-pyridazinyl) phosphine;
- di(o-chlorophenyl)(4-methoxy-3-pyridazinyl) phosphine;
- phenyl di(3-methoxy-2-pyridyl) phosphine;
- phenyl di(4-methoxy-2-pyrimidinyl) phosphine;
- phenyl di(4-methoxy-3-pyridazinyl) phosphine;
- phenyl di(4-chloro-3-pyridazinyl) phosphine;

(see respectively page 3, line 27; page 4, lines 7 to 12, 34 and 35; page 5, lines 1, 2 and 13 to 16).

These specific phosphines all fall within the general formula as defined in claim 1 of the main request. Moreover, it directly derives from D2 that the listed phosphines represent examples of phosphines which can be used in the catalyst system containing the palladium compound and the protonic acid (see in particular the statement at page 3, line 8, read in the context of pages 2 and 3). Therefore, the specific catalyst systems

comprising a palladium compound, a protonic acid and one of the phosphines recited above and individually identified in D2 would prima facie seem to be novelty destroying to the subject-matter of claim 1 of the main request.

The preceding considerations apply analogously to D1 since this document discloses the same list of phosphines which are suitable for use in the same catalyst composition based upon a palladium compound, a protonic acid and an organic phosphine, the main difference between D1 and D2 being that the catalyst compositions of D1 are used for the carbonylation of olefinically unsaturated compounds instead of acetylenically unsaturated compounds (cf. D1, claims 1 to 3 and 5 to 9; col. 2, lines 29 to 37; col. 3, lines 2, 18 to 26 and 54 to 58; col. 4, lines 1 and 13 to 15).

- 2.2 However, as already pointed out by the Appellant in the course of the examining procedure (cf. letter dated 5 December 1991), no method for the preparation of any of the listed phosphines is described in D2 or D1. Furthermore, it is indicated in the present application in connection with D1 that the preparation of these phosphines has not been described in D1 and that they are accordingly believed to be novel. In the Statement of Grounds of Appeal it was further argued that the listed phosphines were, to the best knowledge of the Appellant, novel compounds at the publication date of D2, with no method for their preparation being publicly available. These declarations have a particular weight in view of the fact that both citations are the Appellant's own published patent applications.

In these circumstances, the question arises whether the disclosure in D1 or D2 is effective as novelty destroying, since a product can be considered as having

been made available to the public by a written description in a document in so far as the information given to the person skilled in the art is sufficient to enable him to perform the technical teaching described in the said document, also taking into account the common general knowledge. In other words, the prior disclosure in the document can be regarded as destructive of novelty only if it is an "enabling disclosure" (cf. T 206/83, OJ EPO 1987, 5 and T 26/85, OJ EPO 1990, 22).

In the present case, although the Appellant argued in the course of examining procedure that neither D1 nor D2 contains instructions about the preparation of the phosphines falling under the scope of claim 1 and that, according to the relevant case law in T 206/83, the requirements for novelty were thus met, the decision under appeal does not indicate the reasons why the disclosure of D1 or D2 was considered as an enabling one as regards the listed phosphines. In particular, the decision does not mention any document illustrating the common general knowledge, such as an article of a basic handbook or textbook or a well-known work of reference, from which it could be derived that a method for the preparation of said phosphines formed part of the common general knowledge at the relevant date. In these circumstances the findings of the Examining Division that the catalyst system of claim 1 lacks novelty over the disclosure of D1 or D2 cannot be followed by the Board and the decision under appeal has to be set aside for this reason.

2.3 However, the Board cannot conclude that the catalyst system according to claim 1 of the main request is novel over the disclosure of D1 or D2 since this issue depends on whether or not a method of preparation of the listed phosphines formed part of the common general knowledge

at the relevant date and no search seems to have been carried out in the technical field of the organo-phosphines (cf. the European search report).

Taking into account that the main request also includes an independent claim directed to the organo-phosphines (claim 9) and that, as indicated above, a search in the corresponding technical field appears not to have been made, the Board finds it appropriate, in accordance with Article 111(1) EPC, to remit the case to the Examining Division for further prosecution.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division for further prosecution.

The Registrar:

P. Martorana

The Chairman:

P. A. M. Lançon