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Datasheet for the decision of 19 May 2011

Case Number: T 0411/10 - 3.3.10

Application Number: 99124647.1

Publication Number: 1008581

IPC: C07C 45/50

Language of the proceedings: EN

Title of invention:
Process for producing aldehyde

Patentee:
Mitsubishi Chemical Corporation

Opponent:
OXENO Olefinchemie GmbH
THE DOW CHEMICAL COMPANY

Headword:
Process for producing aldehyde/MITSUBISHI

Relevant legal provisions:
EPC Art. 100(c)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Extension of subject-matter (yes)"

Decisions cited:
-

Catchword:
-

Case Number: T 0411/10 **-** 3.3.10

D E C I S I O N
of the Technical Board of Appeal 3.3.10
of 19 May 2011

Appellant: (Patent Proprietor)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 28 December 2009 revoking European patent No. 1008581 pursuant to Article 101(2) and 101(3)(b) EPC.

Composition of the Board:

Chairman: P. Gryczka
Members: J.-C. Schmid
F. Blumer

Summary of Facts and Submissions

I. The Appellant (Proprietor of the patent) lodged an appeal against the decision of the Opposition Division revoking European patent No. 1 008 581, claim 1 thereof reading as follows:

" 1. A process for producing an aldehyde, which comprises

a reaction step of producing an aldehyde by reacting an olefinic compound with carbon monoxide and hydrogen in the presence of a rhodium complex catalyst comprising at least rhodium and an organic phosphite in a reaction zone,

a separation step of obtaining a catalyst solution, which means a solution containing a solvent and the rhodium complex catalyst, by separating the aldehyde from a reaction solution taken from the reaction zone,

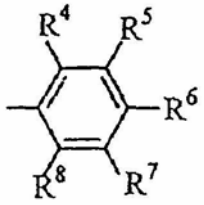
and a recycling step of recycling the catalyst solution into the reaction zone,

wherein the aldehyde is separated from the reaction solution by distillation at a temperature of at most 150°C under a pressure of $1.33 \cdot 10^2$ to $1.004 \cdot 10^5$ (1 to 755mm·Hg) in such a manner as to make an aldehyde concentration from 3 to 99 wt% in the catalyst solution, wherein the organic phosphite constituting the rhodium complex catalyst is expressed by one of (a) the formula (1),

$$P(OR^1)(OR^2)(OR^3) \qquad (1)$$

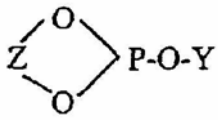
wherein R^1 to R^3 are respectively independently a C_1-C_{30} hydrocarbon group or a C_5-C_{30} hetero-aromatic hydrocarbon group, which may have a substituent,

wherein at least one of R^1 to R^3 of the formula (1) are respectively independently a substituted aryl group expressed by the formula (2),



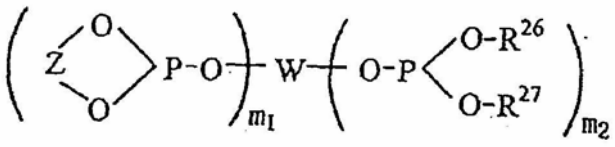
(2)

wherein R^4 is $-CR^9R^{10}R^{11}$ (R^9, R^{10} and R^{11} are respectively independently a hydrocarbon group which may be fluorinated) or an aryl group which may have a substituent, R^5 to R^8 are respectively independently a hydrogen atom or an organic group, and adjacent groups of R^5 to R^8 may be bonded to each other to from a condensed aromatic ring or a condensed heterocyclic ring, (b) the formula (3),



(3)

wherein Z is a divalent hydrocarbon group which may contain a hetero atom in a carbon chain and may have a substituent, and Y is a substituted aryl group expressed by the formula (2), and (c) the formula (9),



(9)

wherein Z is a divalent hydrocarbon group which may contain a hetero atom in a carbon chain and may have a substituent, R^{26} and R^{27} of the formula (9) are respectively independently an aryl group an aralkyl group or a C^5-C^{30} heteroaromatic hydrocarbon group which may have a substituent, W is a is an alkylene group or a divalent group expressed by $-Ar-(CH_2)_n-(Q)_n-(CH_2)_n-Ar-$, wherein
Ar is an aryl group which may have a substituent that will not inhibit hydroformylation reaction, and may be different from each other, Q is a different crosslinking group such as $-CR^{15}R^{16}-$, -O-, -S-, $-NR^{17}-$, $-SiR^{18}R^{19}-$, -CO-, wherein R^{15} and R^{16} are respectively independently a hydrogen atom, a C_1-C_{12} alkyl group, a phenyl group, a tolyl group or an anisyl group, and R^{17} to R^{19} are respectively independently a hydrogen atom or a methyl group, n is respectively independently 0 or 1, and m_1 and m_2 are respectively an integer of 0 to 2, and $m_1+m_2=2$."

II. Notices of opposition were filed against the granted patent by the Respondents I and II (Opponents (1), (2) respectively) requesting revocation of the patent-in-suit in its entirety on the grounds of lack of novelty and inventive step (Article 100(a) EPC), of insufficient disclosure (Article 100(b) EPC), and of extending the subject-matter of the patent in suit beyond the content of the application as filed (Article 100(c) EPC).

III. The Opposition Division decided that claim 1 as granted and claim 1 of the then pending auxiliary requests 1 to 5 did not meet the requirements of Article 123(2) EPC. In particular, the Opposition Division found that the

step of the process according to claim 1 as granted where the aldehyde was separated from the reaction solution by distillation at a temperature of at most 150°C under a pressure of 1.33 x 10^2 to 1.004 x 10^5 Pa (1 to 755 mmHg) was not disclosed in the application as filed, thus infringing the requirement of Article 123(2) EPC.

IV. At the oral proceedings before the Board, held on 19 May 2011, the Appellant defended the maintenance of the patent in suit as granted and on the basis of auxiliary requests 1 to 5 filed on 6 May 2010, independent claim 1 of each of these requests comprising the step of separating the aldehyde from the reaction solution by distillation at a temperature of at most 150°C under a pressure of 1.33 x 10^2 to 1.004 x 10^5 Pa (1 to 755 mmHg), which was objected to by the Opposition Division for having no basis in the application as filed.

V. The Appellant referred exclusively to page 44, lines 17 to 23 for the support in the application as filed of the step concerning the separation of the aldehyde by distillation at a temperature of at most 150°C under a pressure of 1.33 x 10^2 to 1.004 x 10^5 Pa (1 to 755 mmHg), A temperature of at most 150°C and a reduced pressure in the range of from 1 to 755 mmHg were disclosed in the same paragraph, and hence should be read in combination. The expression "when the boiling point of an aldehyde product is high" had no precise meaning, since there was no distinction between high boiling point and low boiling point aldehydes. Following the established case law of the Boards of Appeal of the EPO according to which unclear terms had to be construed

broadly the relative term "high" could not be a distinguishing feature, without a basis for comparison. Hence, the passage on page 44, lines 20 to 23 could not be construed in a way to exclude low boiling point aldehydes. Furthermore, from the preceding lines, namely lines 8 to 16 it was clear that the temperature must be kept as low as possible implying therefore a vacuum distillation under reduced pressure for any aldehyde. Anyway, the skilled man for practical and economical reasons would always carry out the distillation of the aldehydes under reduced pressure.

VI. The Respondents submitted that the features defining the claimed compositions were not disclosed in combination in the application as filed. In particular, the feature concerning the distillation under a reduced pressure of 1 to 755 mmHg was disclosed in the application as filed only in combination with aldehydes having a high boiling point, and not for any aldehyde as envisaged in claim 1 of all the requests of the Appellant. The section of page 44, lines 17 to 23 of the application as filed was a clear disclosure that at least some aldehydes did not need to be distilled under pressure. There was no disclosure in the preceding lines that the temperature should be maintained as low as possible. It was merely disclosed that the deactivation of the catalyst was mainly caused in the distillation step and that a temperature of at most 150°C was preferred, thus suitable, to carry out the distillation of the aldehyde.

VII. The Appellant requested that the decision under appeal be set aside and that the case be remitted back to the Opposition Division for the decision on further grounds

of opposition under Article 100 EPC based on the claims as granted and auxiliary requests 1 to 5 as filed on 6 May 2010, or, subsidiarily, that the decision under appeal be set aside and the patent be maintained as granted or on the basis of any one of the auxiliary requests 1 to 5 as filed on 6 May 2010.

The Respondents requested that the appeal be dismissed.

VIII. At the end of the oral proceedings the decision of the Board was announced.

Reasons for the Decision

1. The appeal is admissible.

Main request (patent as granted)

2. *Amendments*

2.1 The patent in suit has been opposed *inter alia* on the ground that the subject-matter of the patent extended beyond the content of the application as filed (Article 100(c) EPC). *Inter alia*, the feature in granted claim 1 relating to the separation of the aldehyde from the reaction solution by distillation at a temperature of at most 150°C under a pressure of 1.33 x 10^2 to 1.004 x 10^5 Pa (1 to 755 mmHg)" was objected to for having no basis in the application as filed.

2.2 In order to determine whether or not the subject-matter of a claim in a patent extends beyond the content of

the application as filed it has to be examined whether that claim comprises technical information which a skilled person would not have directly and unambiguously derived from the application as filed.

2.3 With respect to support in the application as filed of the step of the distillation of the aldehyde under the required pressure range of from 1 to 755 mmHg, the Appellant referred exclusively to page 44, lines 17 to 23.

This section of the application as filed, however, discloses that when the boiling point of an aldehyde product is high, it is preferable to employ vacuum distillation under a reduced pressure in the range of from 755 mmHg to 1 mmHg. It concerns therefore only the distillation of particular aldehydes, namely those with a high boiling point, and not the distillation of any aldehydes independently of their boiling point.

The disclosure in the application as filed of a feature concerning the distillation of particular aldehydes does not form a proper basis to the claimed feature relating to the distillation of any aldehydes regardless of their boiling point, since a generalisation must be made to arrive at the process of claim 1 covering a process for producing any aldehyde by reacting an olefinic compound with carbon monoxide. To generalise a feature relating to the distillation of specific aldehydes to the distillation of any aldehyde provides the skilled person with technical information which is not directly and unambiguously derivable from the application as filed. The amended claim 1, thus, is

not based on the disclosure of the original application and extends beyond the content thereof.

Hence, the Board concludes that the subject matter of claim 1 as amended contravenes the provisions of Article 123(2) EPC.

2.4 The Appellant argued that the requirement "when the boiling point is high" defining the aldehyde to be distilled under reduced pressure in the application as filed was so unclear that it could merely be ignored.

However, although the expression "when the boiling point of an aldehyde is high" is vague, it makes clear that the feature relating to vacuum distillation under the reduced pressure in the range of 755 to 1 mmHg incorporated into claim 1 is not disclosed for any aldehydes encompassed by amended claim 1, but is restricted to high boiling point aldehydes. Hence, omitting this restriction in the definition of the aldehyde to be distilled under reduced pressure provides the skilled with new subject-matter. This argument of the Appellant must be rejected.

The Appellant further argued that the preceding lines of page 44 taught that the temperature must be kept as low as possible implying therefore that the vacuum distillation under reduced pressure should be used for any aldehyde, and that anyway the skilled man for practical and economical reasons would always carry out the distillation of the aldehydes under reduced pressure.

However, this argument is not supported by the fact since it is clear from the disclosure in passage of page 44, lines 20 to 23 of the application as filed that the distillation under reduced pressure of high boiling point aldehydes is preferred, i.e. optional, and thus not compulsory. Furthermore the finding of whether or not the subject-matter of a claim in a patent extends beyond the content of the application as filed is not a matter of how the skilled man would carry out a teaching, but rather the matter which technical information a skilled person would directly and unambiguously derive from the content of the application as filed. In the present case, the distillation under reduced pressure in the range of from 1 to 755 mmHg is disclosed exclusively for high boiling aldehydes, so that the pressure range now required by claim 1 for the distillation of any aldehyde provides the skilled person with technical information which is not directly and unambiguously derivable from the application as filed.

Thus, the application as filed does not provide a proper basis for amended claim 1.

2.5 For these reasons, the Board concludes that granted claim 1 extends the subject-matter claimed beyond the content of the application as filed thus justifying the ground for opposition pursuant to Article 100(c) EPC.

Auxiliary requests 1 to 5

3. Since claim 1 of the auxiliary requests 1 to 5 contains the same feature concerning the separation of the aldehyde from the reaction solution by distillation at

a temperature of at most 150°C under a pressure of 1.33 x 10^2 to 1.004 x 10^5 Pa (1 to 755 mmHg), the conclusions drawn in paragraph 2 above for the main request apply *mutatis mutandis* also to claim 1 of the auxiliary requests, i.e. the subject-matter claimed extends beyond the content of the application as filed, thus justifying the ground for opposition pursuant to Article 100(c) EPC.

4. In these circumstances, the Appellant's auxiliary requests 1 to 5 share the fate of the main request in that they, too, are not allowable.

Order

For these reasons it is decided that:

The Appeal is dismissed.

The Registrar The Chairman

C. Rodríguez Rodríguez P. Gryczka