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D E C I S I O N
of 8 December 1994

Case Number: T 0250/92 - 3.3.1

Application Number: 85201412.5

Publication Number: 0174696

IPC: C07C 1/04

Language of the proceedings: EN

Title of invention:

Process for the preparation of hydrocarbons

Patentee:

SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

Opponent:

Exxon Research and Engineering Company

Headword:

Rim-type catalyst/SHELL

Relevant legal provisions:

EPC Art. 54(1), (2), 112(1)(a)

Keyword:

"Method using a product defined by "obtainable by"
"Novelty (no)"

Decisions cited:

T 0219/83

Catchword:



Case Number: T 0250/92 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 8 December 1994

Appellant:
(Proprietor of the patent) SHELL INTERNATIONALE RESEARCH
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Representative:

Respondent:
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office of 26 November 1991 issued
in writing on 24 January 1992 revoking European
patent No. 0 174 696 pursuant to Article 102(1)
EPC.

Composition of the Board:

Chairman: A. Jahn
Members: P. P. Bracke
R. E. Teschemacher

Summary of Facts and Submissions

I. European patent No. 0 174 696 in respect of European patent application No. 85 201 412.5 was granted on 2 November 1989 (cf. Bulletin 89/44) with 11 claims. The only independent claim read as follows:

"1. A process for the preparation of hydrocarbons by catalytic reaction of carbon monoxide with hydrogen, characterized in that a mixture of carbon monoxide and hydrogen is contacted at elevated temperature and pressure with a catalyst comprising cobalt supported on a carrier, the cobalt being distributed over the carrier in such a way as to satisfy the relation

$$\frac{\Sigma V_p}{\Sigma V_c} < 0.85$$

wherein ΣV_c represents the total volume of the catalyst particles under consideration and ΣV_p is found by totalizing the peel volumina present in the catalyst particles, when the latter is taken to be composed of a kernel surrounded by a peel, the kernel being of such a shape that at every point of the kernel perimeter the shortest distance (d) to the perimeter of the peel is the same, and that d is equal for all catalyst particles under consideration and has been chosen such that the quantity of cobalt present in ΣV_p is 90 % of the quantity of cobalt present in ΣV_c , which catalyst is obtainable by keeping particles of a porous carrier immersed in water for about 30 minutes and, upon dripdrying, keeping the water-saturated carrier several times - each time for about 30 seconds - immersed in a

solution of a cobalt salt in water, with the cobalt-loaded carrier being dried and calcined after each immersion."

II. The patent was duly opposed on the grounds of Articles 100(a) and (b) EPC, a series of documents being submitted in support.

III. By a decision delivered orally on 26 November 1991, with written reasons posted on 24 January 1992, the Opposition Division revoked the patent on the ground of lack of novelty over

D12: GB-A-2 104 405.

The Opposition Division held that the feature "obtainable by ... each immersion" in granted Claim 1 was to be interpreted in such a way that catalysts obtained according to another method, but satisfying the relationship defined in granted Claim 1, are not excluded from the wording of that claim and, consequently, that this feature is non-limiting. It was also held that the inhomogenous distribution of cobalt over the carrier as defined in granted Claim 1 was implicitly derivable from D12. Consequently, D12, describing a method for synthesizing hydrocarbons from carbon monoxide and hydrogen by using catalysts having cobalt inhomogeneously distributed over a carrier, was found to destroy the novelty of granted Claim 1.

IV. An appeal was lodged against this decision on 23 March 1992 with payment of the prescribed fee. In the statement of grounds of appeal, filed on 20 May 1992, the Appellant contested that the term "obtainable ..." was a non-limiting feature and that D12 unambiguously disclosed the claimed subject-matter.

During the oral proceedings held on 8 December 1994 the Appellant conceded that all the structural features of the catalysts used in the claimed method were known from D12. Nevertheless, so he argued, the method for preparing the catalyst according to granted Claim 1 distinguished the present process from that of D12, because catalysts obtained according to the processes described in D12 were not obtainable by the method specified in granted Claim 1.

As evidence of this submission the Appellant provided transparencies of images obtained by transmission electron microscopy which were said to show that catalysts having cobalt distributed over an alumina carrier obtained according to a process described in D12 contain cobalt particles only in the macropores of the carrier, in contrast to catalysts having cobalt distributed over a silica carrier as used in the method of granted Claim 1, which contain cobalt particles also in the mesopores and the micropores of the carrier. As further evidence graphs obtained by microprobe analysis were shown, which were said to indicate that the cobalt particles are inhomogenously distributed on the surface of an alumina carrier in a catalyst obtained according to a process described in D12. It was alleged that the catalysts based on silica and obtained according to a process of granted Claim 1 have cobalt homogenously distributed over the surface. In addition, the Appellant relied upon differences in the performance, i.e. the stability/activity of the catalysts described in the experimental part of D12 on the one hand and those used according to the disputed patent on the other hand.

The Respondent contested that transmission electron microscopy is a suitable method for proving whether cobalt particles are present in the mesopores and the micropores of a carrier. He also regarded these

comparisons as irrelevant due to the fact that different carriers were used. Furthermore, he argued that the decrease in time of the stability/activity of the catalysts described in D12 cannot be regarded as an indication of a difference.

- V. The Appellant requested that the decision under appeal be set aside and that the patent be maintained as granted or, alternatively, on the basis of auxiliary request I or II, both submitted during oral proceedings.

The main claim according to auxiliary request I has the same wording as Claim 1 as granted apart from the addition of the feature "with the proviso that the catalyst is not obtainable by a method comprising the steps of: heating a heterogeneous component composed of platinum or palladium or mixture thereof deposited on a solid phase; immersing said heterogeneous component into a solution of cobalt carbonyl or cobalt carbonyl precursors, which on heating form the cobalt carbonyl, in a stream or under pressure of gaseous hydrogen and carbon monoxide or hydrogen alone for a period sufficient to form the catalyst." at the end of the claim.

The main claim according to auxiliary request II corresponds with the wording of Claim 1 as granted apart from the addition of the feature "with the proviso that the catalyst does not contain palladium or platinum in the range of from about 0.1 to 10 weight percent based on the total weight of the catalyst." at the end of the claim.

As a further auxiliary request the Appellant requested that the following point of law be referred to the Enlarged Board of Appeal according to Article 112(1)(a) EPC, should the Board reject the main request and

auxiliary requests I and II on the grounds that the expression "obtainable by" is not adequate to distinguish the catalyst used in the process of the patent in suit from the catalyst of the process disclosed in the prior art:

"Can the term "obtainable by" be used to distinguish a product from known products even if the product is not claimed per se but is an essential element of a claimed process".

The Respondent requested that the appeal be dismissed. Alternatively he requested he be given the opportunity to file evidence in respect of the meaning of the disclaimers in auxiliary requests I and II. Furthermore, he requested that the question not be referred to the Enlarged Board of Appeal, as requested by the Appellant.

VI. At the conclusion of the oral proceedings the Board's decision to dismiss the appeal was pronounced.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request*
 - 2.1 The only issue raised in this Appeal is that of novelty. The Appellant conceded during the oral proceedings that the cobalt catalyst used in the process according to D12 discloses, via its mode of preparation, all the features of Claim 1 of the disputed patent save the unique catalyst structure which is obtainable by the process of its preparation defined in this claim. Thus it has to be

decided whether the fact that the catalyst is "obtainable by" the method described in this claim is a distinguishing feature.

- 2.2 The Appellant submitted that the term "obtainable by" is ambiguous and may be interpreted in three different ways. On a first interpretation this term is without any meaning and, consequently, not restricting. In its second meaning this term can be interpreted literally as embracing any catalyst having the same properties as a catalyst which has been prepared according to that method. This, of course, does not convey the meaning that the catalysts are restricted to those prepared according to that method. In its third meaning "obtainable by" can be interpreted in its most restrictive way as being synonymous with "obtained by".

The Appellant emphasised that in the present case this term is to be interpreted in its second meaning. In the Appellant's favour, the Board assumes that in the present case this interpretation applies, although this fact could have been more clearly expressed by a formulation, such as, "wherein the catalyst has a structure which can be obtained by".

- 2.3 Following the Appellant's interpretation of Claim 1 the mere fact that Claim 1 defines a specific mode of preparing the catalyst which is not mentioned in D12 cannot on its own distinguish the subject-matter of this claim from the prior art. Therefore, novelty can be established only if evidence is provided that the properties of the catalysts prepared according to the methods described in D12 are different from the properties of catalysts obtainable by the method specified in Claim 1.

2.4 Once, as here, the Patentee has acknowledged that the only difference between the invention and the prior art lies in the structure of the catalyst which difference is not defined by structural features, the burden of proof for the existence of the alleged difference rests on him.

In an attempt to prove such different properties resulting from a structural difference the Appellant provided evidence based upon transmission electron microscopy transparencies and graphs obtained by microprobe analysis tests, wherein catalysts having cobalt distributed over an alumina carrier and being prepared according to a method according to D12 were compared with catalysts having cobalt distributed over a silica carrier and being prepared according to the method defined in Claim 1.

This comparison suffers from the defect that an essential parameter was changed arbitrarily. In order to compare in a valid way the structural properties of catalysts having cobalt distributed over a carrier and being prepared according to different methods, it is necessary that such methods are carried out on the same carriers, thus preventing any differences originating from the carrier.

The Appellant argued that the carrier does not have any influence on the distribution of the cobalt over the carrier, which was disputed by the Experts of the Respondent. In this situation the principle laid down in T 219/83 (OJ of EPO, 1986, pages 211-226) applies, according to which, in the absence of evidence, the party whose argument rests on these alleged facts loses. Moreover, the Board is inclined to follow the Respondent's argument, because it is well-known that

absorption effects are influenced by the chemical nature as well as by the physical properties of such material, such as the dimensions and the distribution of the pores.

Consequently, the Board finds that the Appellant has not proven that the catalysts prepared according to the method described in D12 are structurally different from those obtainable by a method as defined in Claim 1.

2.5 The Appellant also fails with the submission that the stability/activity of the catalysts prepared according to a method of D12 decreases very rapidly, as may be concluded from the experimental part of D12, in contrast to the stability/activity of catalysts used in the claimed method. The contested patent is silent about the stability/activity properties of the used catalysts and the difference in stability/activity on which the Appellant relied during oral proceedings and according to which the catalysts used in the claimed method remain active for at least thousand hours remains a mere allegation.

2.6 Consequently, since a method of preparing hydrocarbons by reacting carbon monoxide with hydrogen at elevated temperature and pressure in the presence of a cobalt catalyst having "rim structure" satisfying the relation of Claim 1 is known from D12 (see e.g. example 1) and since a structural difference between the catalysts used according to D12 and those by the disputed patent has not been made credible by the Appellant, the Board holds that Claim 1 according to the main request cannot be regarded as novel.

3. *Auxiliary request I*

The method defined in Claim 1 according to auxiliary request I differs from that of the main request by a disclaimer which excludes a catalyst "obtainable by" the method as phrased in Claim 6 of D12.

However, as set out in section 2 of the reasons, there is no evidence that the process known from D12, in particular that of Claim 6, results in a catalyst distinct from that of the disputed patent. This means that subject-matter is excluded which cannot be distinguished from what was claimed. Thus, the Board concludes that Claim 1 of auxiliary request I does not meet the requirement of novelty.

4. *Auxiliary request II*

Claim 1 according to auxiliary request II differs from that of the main request by the provision that the catalyst employed in the preparation of hydrocarbons contain palladium or platinum in the range of from about 0.1 to 10 weight percent based on the total weight of the catalyst. With other words, catalysts as defined in Claim 3 of D12 are excluded. It is true that present Claim 1 of the disputed patent is silent on palladium and platinum, but the parties agreed that these two noble metals, like ruthenium mentioned in the disputed patent as promoter (Claim 5), are commonly used promoters and, hence covered by this claim.

The Board, following this interpretation, however, emphasises that the teaching of D12 is not restricted to catalysts disclosed in Claim 3 of D12. On the contrary, D12 discloses a catalyst comprising cobalt and palladium or platinum which is highly active in slurry form and is suitable for use in the synthesis of hydrocarbons from

carbon monoxide and hydrogen (see Claim 1 and the paragraph bridging pages 1 and 2). Thus in the absence of any limitation as to the quantitative content of palladium and/or platinum in the catalyst of the prior art and having regard to the fact that structural differences between the known and the presently claimed catalyst have not been established, the prior art is not excluded from the present Claim 1 in toto.

Therefore, the Board holds that Claim 1 according to auxiliary request II fails to meet the requirement of novelty.

5. Further auxiliary request

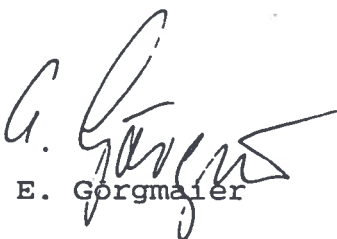
The question of law defined by the Appellant is not relevant to the Board's decision, because no evidence has been provided that any structural difference between the known and the presently claimed catalyst exists. Therefore, this request fails.

Order

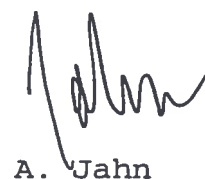
For these reasons it is decided that

The appeal is dismissed.

The Registrar:


E. Gorgmaier

The Chairman:


A. Jahn