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Boards of Appeal

Chambres de recours

Case Number: T 0982/98 - 3.3.6

Decision of 5 February 2001
correcting errors in the decision
of the Technical Board of Appeal 3.3.6
of 7 November 2000

Appellant: Midwest Research Institute
425 Volker Boulevard
Kansas City
Missouri 64110 (US)

Representative: Wagner, Karl H., Dipl.-Ing.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 14 May 1998
refusing European patent application
No. 92 913 457.5 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. Krasa
Members: G. N. C. Raths
C. Rennie-Smith

In application of Rule 89 EPC the decision given in case
T 0982/98 on 7 November 2000 is hereby corrected as follows:

Page 6, line 25: "to reform" is replaced by "to perform".

The Registrar:

The Chairman:

G. Rauh

P. Krasa

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen

D E C I S I O N
of 7 November 2000

Case Number: T 0982/98 - 3.3.6

Application Number: 92913457.5

Publication Number: 0592494

IPC: C07D 201/02

Language of the proceedings: EN

Title of invention:

Controlled catalytic and thermal sequential pyrolysis and hydrolysis of mixed polymer waste streams to sequentially recover monomers or other high value products

Applicant:

Midwest Research Institute

Opponent:

-

Headword:

Functionally defined features/MIDWEST RESEARCH INSTITUTE

Relevant legal provisions:

EPC Art. 84

Keyword:

"Clarity of the claim - main and auxiliary request (no)"

Decisions cited:

T 0068/85

Catchword:

-



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C. Rennie-Smith

Summary of Facts and Submissions

- I. This appeal is from the Examining Division's decision refusing European patent application No. 92 913 457.5. The reasons were
- that the set of Claims 1 to 21, filed with the Appellant's (Applicant's) letter dated 27 February 1998, was not admissible under Article 123(2) EPC;
 - that the set of Claims 1 to 44 as originally filed was not admissible under Article 84 EPC;
 - that the request to consider eight auxiliary requests filed during the oral proceedings was not admissible under Rules 86(3) and 71(a) EPC and amounted to an abuse of procedure;
 - that one of these auxiliary requests, namely auxiliary request 3, which was nevertheless considered by the Examining Division, did not meet the requirements of Article 84 EPC
- II. The Appellant filed an appeal against this decision and submitted various sets of claims for consideration by the Board.

In response to a communication by the Board of Appeal questioning the admissibility of these requests and in preparation for oral proceedings, which took place on 7 November 2000 before the Board, the Appellant eventually submitted a main request and four auxiliary requests (fax of 6 October 2000).

III. During the oral proceedings the Appellant was informed in detail of all the Board's objections to the admissibility of these requests. Thereupon it filed a new main request and one auxiliary request, each consisting of one claim only and replacing all the other requests.

The claim of the main request read as follows:

"A process of fast pyrolysis in a carrier gas selected from inert gases, steam, CO₂ and process recycled gases to convert a plastic waste feedstream comprising nylon 6 and polypropylene in a manner such that pyrolysis of a given nylon 6 and polypropylene into its high value monomeric constituent or derived high value products occurs prior to pyrolysis of other plastic components therein comprising:

a) differentially heating said feed stream at a heat rate within a first temperature program range of between 250 to 550°C to cause pyrolysis of said given nylon 6 and polypropylene into its high value monomeric constituent prior to a temperature range that causes pyrolysis of other plastic components in the presence of an acid or base catalyst and a support selected from metal oxides and carbonates and treating said feed stream with said catalyst to affect acid or base catalyzed reaction pathways to maximize yield or enhance separation of said high value monomeric constituent or high value product in said first temperature program range to provide differential pyrolysis for selective recovery of optimum quantities of said high value monomeric constituent or high value product of said nylon 6 and polypropylene prior to pyrolysis of other plastic components therein;

b) separating said high value monomer constituent or derived high value product of said nylon 6 and polypropylene; and

c) differentially heating said feed stream at a second higher temperature program range of 350 to 700°C to cause pyrolysis of different high value monomeric hydrocarbon constituents of said plastic waste to cause pyrolysis of said plastic into different high value hydrocarbon monomeric constituents or derived products; and

d) separating said different high value monomeric hydrocarbon constituents or derived high value products."

The claim of the auxiliary request differs from that of the main request in that the term "optimum" had been deleted.

IV. The Appellant requested that the decision under appeal be set aside and the case be remitted to the first instance for further prosecution on the basis of either the main or alternatively the first auxiliary request filed during oral proceedings.

V. At the end of the oral proceedings the Chairman announced the Board's decision.

Reasons for the Decision

1. Main request

1.1 Article 84 EPC

1.1.1 Article 84 EPC requires the claims to be clear. This means that a person skilled in the art should understand what is meant by the language of a claim. This also applies to functional definitions of technical features, where clarity demands that the feature provides technical instructions which are sufficiently clear for the expert to reduce them to practice without undue burden (T 68/85, OJ EPO 1987, 228, reasons No. 8.4.3). This implies that the practical meaning of a functional feature has to be assessed in the light of the general technical knowledge of those skilled in the art as well as of the whole disclosure of the patent application concerned.

1.1.2 The claim contained, inter alia, the following features:

- "differentially heating said feed stream at a heat rate ...to cause pyrolysis",
- "treating said feed stream ... to maximize yield or enhance separation of said high value monomeric constituent or high value product...to provide differential pyrolysis for selective recovery of optimum quantities of said high value monomeric constituent...", and
- "differentially heating said feed stream ... to cause pyrolysis of different high value monomeric hydrocarbon constituents of said plastic waste to cause pyrolysis of said plastic into different

high value hydrocarbon monomeric constituents or derived products..." (emphasis supplied by the Board).

- 1.1.3 The Appellant argued during oral proceedings that the skilled person could run several tests to determine for himself by trial and error, first the maximum yield and the optimum quantities of the high value and monomeric constituent; and second, the measures to achieve this i.e. the heat rate necessary to cause pyrolysis and the adequate treatment of the feed stream.
- 1.1.4 However, the Appellant could not identify any concrete technical teaching in the application in suit as to which measures a skilled person should take in order to determine the adequate heat or the adequate treatment.

In the claim the invention is defined only in terms of desirable features.

In reality the skilled person has to explore several avenues to determine the process conditions leading to the results to be achieved. The parameters of that exploration would, working from the information disclosed, be as follows:

With respect to the pyrolysis conditions

(A) in the first temperature range, the search area comprises the definition of the conditions

- 1) to cause pyrolysis of nylon 6 and polypropylene,
- 2) to cause pyrolysis of other plastic components in the presence of a catalyst,
- 3) to provide differential pyrolysis for selective recovery of optimum quantities of high value monomeric constituent or high value product of said nylon 6 and polypropylene,

(B) in the second temperature range, the search area comprises the definition of the differentially heating conditions to cause pyrolysis of different high value monomeric hydrocarbon constituents of the plastic waste into different high value hydrocarbon monomeric constituents or derived products.

With respect to the yield, the goal of the skilled person inquiry would be to find out the treatment conditions of the feed stream under which the yield is maximum.

With respect to the separation of the high value monomeric constituent or high value product the skilled person would have to search for and ascertain the treatment conditions of the feed stream under which the said constituents are separated.

The workload thus imposed upon the skilled person goes beyond routine experimentation and the testing of feasibility criteria. To take just as an example the feature "to enhance separation" (paragraph (a) of the claim) is obscure in itself since a reference value in respect to which the improvement should be achieved is missing.

If the skilled person has to establish the process steps for himself, then the process features of the claim are not clear enough to reform the process as disclosed in the claim.

- 1.1.5 The description, which should provide concrete information to enable the skilled person to achieve the technical results without exceeding his normal skills and knowledge, does not offer any guidance either. Rather to the contrary, it leaves it completely to the reader's ingenuity how to achieve the desired result by stating: "The invention will henceforth describe how to

utilize detailed knowledge of the pyrolytic process in the presence of catalysts and as a function of temperature and the presence of reactive gases, to obtain high yields of monomers or valuable high value chemicals from mixtures of plastics in a sequential manner. The conditions were found experimentally, since it is not apparent which catalysts and conditions will favour specific pathways for the optimization of one specific thermal path, where several are available and the multicomponent mixture offers an increased number of thermal degradation pathways and opportunities for cross-reactions amongst components (page 15, lines 16 to 23, emphasis added)."

1.1.6 Further, even example 1 offers no guidance to the skilled person since the heat rate of 40°C/min is only valid for a specific mixture of nylon and propylene (50/50 wt%) in specific amounts (15 g), for a specific catalyst (α -Al₂O₃) in a specific amount (10 g), treated with KOH (again in a specific amount). In view of the above quoted passage, it is clear that these specific process conditions disclosed in Example 1 cannot be generalized.

1.1.7 It follows from the above that the functionally defined technical features of Claim 1 lack clarity, contrary to the requirements of Article 84 EPC, so that the main request has to be rejected.

2. *Auxiliary request*

The claim of the auxiliary request differs from the claim of the main request only in that the word "optimum" has been deleted.

The lack of clarity of the main request was not due only to the word "optimum" but also to the other features listed under point 1.1.2 above.

Therefore, the deletion of this word does not render the claim clear.

The auxiliary request has to be rejected for the same reasons (see points 1.1.4 to 1.1.7) as the main request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



G. Rauh



P. Krasa

