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D E C I S I O N
of 7 November 2002

Case Number: T 0835/00 - 3.3.3

Application Number: 94301107.2

Publication Number: 0611795

IPC: C08J 9/18

Language of the proceedings: EN

Title of invention:
Polypropylene resin expanded particles

Patentee:
MITSUBISHI CHEMICAL CORPORATION, et al

Opponents:
(01) BASF Aktiengesellschaft, Ludwigshafen
(02) JSP Corporation

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes) - determination of closest prior art -
breadth of claim"

Decisions cited:
T 0686/91, T 0939/92

Catchword:

A fatal defect of the choice, as a starting point for the application of the problem/solution method, of a disclosure in the state of the art from which no relevant technical problem can be formulated without inappropriate hindsight is that, without such hindsight, any attempt to establish a logical chain of considerations which could lead to the claimed invention inevitably gets stuck at the start, for want of a relevant identifiable goal or object. If the relevant problem is not derivable, the measures for its solution are *a fortiori* not derivable. In other words, the invention is not obvious in the light of such art (cf. Reasons, point 4.4.5).



Case Number: T 0835/00 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 7 November 2002

Appellant:
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Decision under appeal: Decision of the Opposition Division of the European Patent Office posted 15 June 2000 revoking European patent No. 0 611 795 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: R. J. Young
Members: P. Kitzmantel
J. C. M. De Preter

Summary of Facts and Submissions

- I. Mention of the grant of European patent No. 0 611 795 in respect of European patent application No. 94 301 107.2 in the names of Mitsubishi Chemical Corporation and Mitsubishi Chemical BASF Company Limited (original Applicants: Mitsubishi Petrochemical Company Limited and Mitsubishi Yuka Badische Co., Ltd.), which had been filed on 16 February 1994 claiming a JP priority of 18 February 1993, was published on 2 January 1997 on the basis of 4 claims. Claim 1 read as follows:

"Polypropylene resin expanded particles comprising as a base resin an isotactic propylene polymer obtained by the polymerization of a corresponding monomer or monomers with a polymerization catalyst derived from a metallocene compound."

- Claims 2 to 4 were dependent on Claim 1.

- II. Notice of Opposition requesting revocation of the patent in its entirety on the grounds of Article 100(a) EPC was filed by

BASF Aktiengesellschaft (Opponent I) on 29 July 1997 and by

JSP Corporation (Opponent II) on 29 September 1997.

During the opposition proceedings *inter alia* the following documents were cited (D1' to D4' by Opponent I; D1 to D8 by Opponent II):

D1': EP-A-0 516 018,

D2': Kunststoff-Taschenbuch 25th edn. 1992, pages 272,
273 and 402,

D3': Kunststoffe 79 (1989) 10, pages 1036 to 1037,

D4': EP-A-0 053 333,

D1: EP-A-0 334 313,

D2: Polymer, vol. 30, No. 7, pages 1350 to 1356
(1989),

D3: Chemistry letters, No. 10, pages 1853 to 1856
(1989),

D4: Polymer Preprints, Japan, vol. 39, No. 6 (1990),

D5: JP-A-H3-152 136,

D6: JP-A-H3-254 930,

D7: DE-A-3 539 352,

D8: Japanese Plastics, vol. 44, No. 2, February. 1st
(1993) (translation).

III. By its decision announced orally on 8 May 2000 and issued in writing on 15 June 2000, the Opposition Division revoked the patent.

This decision was based on four amended versions of granted Claim 1 directed to expanded polypropylene particles (main request and auxiliary requests 2 to 4) as well as on five "b" versions of a Claim 1 directed to a method of producing such particles (auxiliary requests (b) and 1(b) to 4(b)).

Claim 1 of the main request contains a first portion identical to granted Claim 1 which is supplemented after the passage "derived from a metallocene compound" by the following process features (hereinafter called "DOKAN" method features):

"... said polypropylene resin expanded particles having been produced by a process which includes the steps of; dispersing the particles of the base resin in water in a closed container, supplying a volatile expanding agent to the container, heating the dispersion to a temperature of at least the softening point of the resin particles; opening an outlet provided in the closed container below the surface of the dispersion; discharging through the outlet the aqueous dispersion containing the resin particles having the expanding agent impregnated therein into an atmosphere having a pressure lower than that in the closed container."

Claim 1 of auxiliary request (b) is directed to a method of producing polypropylene expanded particles but is otherwise identical to Claim 1 of the main request; the further auxiliary requests (2 to 4 and 1(b) to 4(b)) contain amended definitions of the polypropylene resin (homo- or copolymer, comonomer composition, isotacticity).

IV. That decision held that the various requests complied with Article 123(2) and (3) EPC.

It also recognized that the claimed subject-matter was novel over the cited prior art *inter alia* because (i) the disclosure of D1' did not comprise the "DOKAN" method features, (ii) D3, D4 and D8 did not disclose isotactic polypropylene having the required stereoregularity, (iii) the polypropylenes used according to D2', D3' and D4', D1, D5, D6 and D7 had not been prepared in the presence of metallocene

catalysts, and (iv) D2, D3, D4 and D8 only disclosed the use of metallocene catalysts to produce stereoregular polypropylene resins.

However, in the Opposition Division's view, the subject-matter of all requests lacked an inventive step.

Firstly, the application of the "DOKAN" method known from D2' to the manufacture of the foams disclosed in D1' was the result of a "one-way street" situation and was thus not inventive.

Secondly, the subject-matter of the main request which included isotactic polypropylenes prepared with any metallocene catalyst was also non-inventive over D7 because D2 taught that not every metallocene catalyst would be able to solve the existing technical problem, i.e. to provide expanded particles from isotactic polypropylene having good mouldability at low temperature, uniform foam diameter, good surface appearance and excellent energy absorption.

The same lack of inventive step arguments also applied to the subject-matter of auxiliary requests 2 to 4 because the introduced amendments did not affect the above obviousness considerations.

Since the process claims of auxiliary requests (b) and 1(b) to 4(b) comprised the same features as the product claims of the higher ranking requests, they were also devoid of any inventive merit.

- V. Having paid the appeal fee already on 9 August 2000, the Patentee (Appellant) lodged an appeal against the

decision of the Opposition Division on 14 August 2000. The Statement of Grounds of Appeal was submitted on 23 October 2000 and a further written submission was dated 18 May 2001.

The arguments presented by the Appellants in their written submissions and during the oral proceedings held on 7 November 2002 may be summarized as follows:

- (i) D1' was not directed to the same purpose or effect as the invention and did not therefore meet the standard established by the Boards of Appeal for a document to be identified as closest state of the art.
- (ii) The gist of D1' was the provision of polyolefins having a broad or bimodal molecular weight distribution whose melt viscosity was therefore high enough for the extrusion blowing technique. Since this problem was unrelated to the bead blowing "DOKAN" technology, D1' lacked any suggestion for the preparation of foams according to this technique.
- (iii) Even if, arguably, D1' was considered as an appropriate starting point for the assessment of inventive step, the Opposition Division's conclusion of a non-inventive "one-way street" situation was anyway wrong because, at the relevant time, the "DOKAN" method was not the only commercially employed polypropylene foaming method, as was apparent from information contained in Annexes 1, 2, 3 and 4 (the latter referring to a publication in the paper "Kunststoffe" and to WPI abstracts of JP-A-58 76 230, DE-A-1 629 295, DE-A-2 524 196 and DE-A-3 708 291) all attached to the Statement of Grounds of Appeal.
- (iv) Moreover, expanded beads produced from M-PP (= metallocene catalysed polypropylene) exhibited a much higher volume E/A (= energy absorption) than

foamed articles of about the same density having been prepared from extruded beads, as demonstrated by the experiments referred to in Annexe 5 attached to the Statement of Grounds of Appeal.

- (v) Furthermore, the "inventive" use of M-PP as compared to Z-PP (= Ziegler-type catalysed polypropylene) had a critical effect on the "DOKAN" method as was apparent from Annexes 6 and 7 attached to the Statement of Grounds of Appeal which showed that with Z-PP expanded beads having big cells could only be obtained in the case of polypropylene copolymers, not in the case of polypropylene homopolymers, whereas in the case of M-PP big uniform cells which led to foamed articles exhibiting high energy absorption E/A could be prepared with polypropylene homo- and copolymers.
- (vi) In the Appellant's view, the subject-matter of the main request therefore involved an inventive step over D1'.
- (vii) The same conclusion was arrived at if the issue of inventive step was assessed on the basis of document D7 which, in the Appellant's view, represented the correct starting point for this exercise.
- (viii) While D7 disclosed the "DOKAN" process, it failed to emphasize the importance of the tacticity, i.e. of an isotactic structure of the polypropylene base resin as required by present Claim 1. This structure was however essential for the achievement of the desired objects, *inter alia* for the high energy absorption characteristics of moulded bodies prepared from the claimed particles. For this reason alone, it was not obvious to replace the Z-PPs of D7 by the isotactic M-PPs required by the invention.

- (ix) Nor could the reference in D2 to the lower melting points of polypropylenes prepared with certain zirconocene catalysts as compared with polypropylenes prepared with titanium based Ziegler-type catalysts be considered as an incentive to replace the Z-PPs of D7 by M-PPs because the experimental evidence in the patent in suit showed that a lower bead moulding temperature was not necessarily associated with a lower melting point.
- (x) Furthermore, the Opposition Division's finding was wrong that, in the light of D2, an inventive step should not be acknowledged for every product falling within the scope of the main request. Firstly, the Opponents/Respondents had not provided any evidence, experimental or otherwise, for this assertion and secondly it was furthermore at variance with the fact that Claim 1 was indeed restricted to the use of such metallocene catalysts which furnished isotactic polypropylene. The references in D2 and D8 to metallocene catalysts which did not lead to an isotactic structure of the polymerisation product were therefore unsuitable to attack an alleged "non-inventive" breadth of Claim 1.
- (xi) Furthermore, on the basis of its common general knowledge as e.g. reflected in D2 and D8, the skilled person would have had no difficulty in identifying metallocene catalysts for the preparation of isotactic polypropylene, some of these moreover being exemplified in the patent specification itself.
- (xii) The present situation was thus different from that of decision T 939/92 where the inventiveness hinged upon the alleged herbicidal activity of a group of chemical

compounds whose structure was critical for this activity but for which proof existed only with respect to some compounds of the group.

- (xiii) In its written submissions the Appellant also presented arguments in support of its various auxiliary requests.

VI. The Respondents (Respondent I = Opponent I; Respondent II = Opponent II) presented their counterstatements in written submissions dated 20 November 2000 and 20 September 2002 (Respondent I), 13 September 2000 and 26 February 2001 (Respondent II) as well as at the oral proceedings (not attended by Respondent II).

They can be summarized as follows:

- (i) At the oral proceedings Respondent I withdrew its former objection under Article 123(2) EPC against the restriction of Claim 1 to the use of the "DOKAN" method but maintained its criticism of the introduction of new evidence intended to demonstrate a superiority of this method over the extrusion method (cf. Appellant's Annex 5) which, in its opinion, went beyond the patent's original disclosure.
- (ii) In the opinion of Respondent I D1', especially its Example 4, should be regarded as closest state of the art because
- it disclosed isotactic polypropylenes having been prepared in the presence of metallocene catalysts which corresponded to those used according to the patent in suit,
 - D1' furthermore mentioned the use of these M-PPs for the production of foams, and because

- at the relevant time the "DOKAN" method was by far the most common method for the preparation of polypropylene foam mouldings, i.e. the products envisaged by the claimed invention.

- (iii) Apart from the fact that the broad (or bimodal) molecular weight distribution to which D1' was directed was not directly related to a high melt viscosity, the Appellant's conclusion was also wrong that a high melt viscosity would only be of use for the extrusion foaming method; rather an appropriate melt viscosity was also important for the "DOKAN" method.

- (iv) The Appellant's arguments against the existence of a one-way street situation leading to the application of the "DOKAN" method were not convincing:
 - (iv-1) Table 5 of Annex 1 (which itself was published after the present priority date, but whose content has also been published already on 30 July 1989 in "General Survey of Foamed Plastic Technology") demonstrated the manifest superiority of the "DOKAN" method over the extrusion method.

 - (iv-2) The first two methods referred to in Annexes 2 and 3 related to relatively rigid, chemically blown, crosslinked foam sheets of a density of 0.5 to 0.7 g/cm³ (cf. D2', middle of page 402) whose application would not therefore be contemplated by the skilled person for the moulded bodies having high energy absorption (e.g. car bumpers) envisaged by the patent in suit.

 - (v-3) Nor was the information in Annexe 4 able to cast doubt on the existence of a one-way street situation towards the "DOKAN" method for the preparation of moulded

articles because the document "Kunststoffe" of said Annex was published after the present priority date and because the cited WPI abstracts had never been reduced to practice.

- (vi) Contrastingly, several of the Opponents' citations demonstrated the practical existence of a one-way situation, the most prominent being D2'.
- (vii) But even if the extrusion method was considered a feasible alternative to the "DOKAN" method, an inventive effort could not be recognized in the choice of one from two possibilities because both methods had been regarded as suitable by the Patentee itself (page 5, lines 40 to 42) and because no more than routine experiments would have been required to find out the small advantages afforded by the "DOKAN" method as evidenced by the Patentee's late filed evidence (which was anyway not within the original disclosure).
- (viii) If, alternatively, D7 or D4' were chosen as closest prior art, then the difference from the claimed invention was the use of a metallocene catalysed isotactic polypropylene.
- (ix) The use of such polymers which had been prepared by not further defined metallocene catalysts could not, however, contribute an inventive step because it was apparent from D2 and D3 that the objectives of the patent in suit (expanded particles which can be moulded at low temperature, have uniform foam diameter, good mouldability and surface appearance as well as excellent energy absorption) could not be met with just any metallocene catalyst system. A claim covering embodiments unable to solve the existing technical

problem, a circumstance even admitted by the Appellant's statement that the skilled person would know how to select an appropriate catalyst, did not comply with Article 56 EPC (cf. T 939/92 OJ EPO 1996, 309).

- (x) In the light of the afore-mentioned arguments, the amendments comprised by the various auxiliary requests, including the (b) requests restricted to process parameters, could not invalidate the obviousness conclusion drawn with respect to the main request.

VII. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the claims of the main request filed with the submission dated 22 July 1998 or on the basis of any of the auxiliary requests 2 to 4, (b), or 1(b) to 4(b) all filed with the Patentee's submission dated 7 April 2000.

The Respondents requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

Main request

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

Claim 1 is based on its granted version and on the statement on page 5, lines 43 to 49 of the patent specification and its scope is therefore narrower than that of its granted version (cf. page 11, line 32 to

page 12, line 9 of the original application). Claims 2 to 4 are unamended. The claims of the main request therefore comply with the requirements of Article 123(2) and (3) EPC.

3. *Novelty*

- 3.1 Novelty was not an issue in the appeal proceedings. Indeed none of the citations discloses particles of a metallocene catalyst derived isotactic polypropylene which have been expanded by the "DOKAN" method.

Concerning the most relevant documents D1' and D7 the following conclusions apply:

- 3.2 Claim 1 of document D1' relates to a method for the production of polyolefins, especially isotactic polypropylenes (cf. Examples) with broad, bimodal or multimodal molecular weight distribution (cf. page 2, lines 26 to 28) in the presence of a catalyst system consisting of an alumoxane and at least two different zirconocenes. Rac-dimethylsilylenebis(2-methylindenyl) zirconium dichloride, a catalyst also used according to the patent in suit, is exemplified on page 5, lines 13 to 16 of D1'.

Owing to their broad or bi-/multimodal molecular weight distribution the polymers of D1' are *inter alia* suitable for the production of foams (page 2, lines 4 to 6; page 9, lines 29 to 31).

The disclosure of this document differs from the claimed invention by the missing information therein of foam particles and of the "DOKAN" method for their preparation.

3.3 Document D7 relates to substantially non-crosslinked foam particles from polypropylene resin having an ethylene content of from 20 to 80% by weight and having a main melting peak temperature of from 130°C to 158°C (Claim 1) which are produced by dispersing the resin particles in water in a closed vessel, feeding a volatile blowing agent into the closed vessel, heating the dispersion to a temperature above the softening point of the polypropylene resin particles but not higher than that by 20°C, and opening a discharge port provided in the closed vessel below the water surface to release the aqueous dispersion containing the polypropylene resin particles impregnated with the blowing agent into an atmosphere having a lower pressure than in the closed vessel (e.g., the atmosphere) (cf. page 8, line 34 to page 9, line 16).

The subject-matter of document D7 essentially differs from the claimed invention by the undisclosed stereoregularity/tacticity of its propylene-ethylene copolymers and by their preparation with a polymerisation catalyst system different from a metallocene catalyst system: the single polymer preparation example of D7 (page 13, line 19 to page 14, line 17) employs a Ziegler-type catalyst on the basis of diethylaluminium monochloride and titanium trichloride.

Concerning the issue of the stereoregularity/tacticity of the resins of D7 the Board notes that, in spite of the reference in D7 to the preparation of the copolymers according to several Japanese patent publications (cf. page 6, lines 21 to 32), the Respondents/Opponents failed to provide any evidence able to refute the Appellant's/Patentee's assertion that the copolymers used by D7 are not isotactic.

Contrastingly, the conclusion that D7 does not relate to isotactic polypropylene is rather supported by the argument of Respondent I (submission dated 20 September 2002) that the first disclosure of isotactic polypropylenes occurred by Ewen in 1984 (cf. document D2, page 1350, "Introduction", literature reference No. 7), i.e. in the year whose priority is claimed by document D7.

In view thereof and considering the clear requirement of isotacticity set out in Claim 1, any argument with regard to the capability of metallocene catalyst systems of yielding non-isotactic polypropylenes (in this respect documents D2, D4 and D8 have been cited *inter alia*) is not relevant.

4. *Closest state of the art*

4.1 The determination of the disclosure which is nearest to the claimed invention and which therefore presents the most promising springboard for its development is essential to the assessment of inventive step.

4.2 A host of jurisprudence has emerged from the Boards of Appeal on that issue according to which that disclosure qualifies as closest prior art which relates to the same or at least a similar purpose (or objective) as the claimed invention and has the most relevant technical features in common (cf. Case Law of the Boards of Appeal, 4th edn. 2001, pages 102 to 105, Section 3).

It follows that a prior art disclosure not mentioning a technical problem which is at least related to that derivable from the specification under examination does

not normally qualify as the closest prior art, however many technical features it may have in common with the claimed subject-matter (cf. T 686/91, not published in the OJ EPO).

It goes without saying that the term "problem" as it is used in this context relates to a problem to which a solution is provided by the claimed (alleged) invention.

- 4.3 In the present case the problem the invention sets out to solve is the provision of polypropylene expanded particles from which there can be prepared an expanded moulded product having a uniform diameter, good mouldability and surface appearance and excellent physical properties, particularly energy absorption properties (page 2, first section of patent specification and of original application).
- 4.4 In view of the principles referred to in section 4.2 *supra*, document D1' which was considered as closest prior art in the decision under appeal cannot be accorded that status because:
 - 4.4.1 the only disclosure therein of expanded products is the reference on page 9, lines 29 to 31 to polyolefin foams ("Polyolefinschäume") as one of several possible utilities of the polyolefin resins of this document, and because
 - 4.4.2 D1' does not mention any of the problem aspects of the claimed invention but instead relates to the development of a catalyst system of high activity and of a method for the preparation of polyolefins with broad, bi- or multimodal molecular weight distribution (page 2, lines 26 to 28; page 9, lines 25 to 28).

4.4.3 No incentive can thus be gained from D1' by the skilled person with regard to the achievement of the objectives of the patent in suit. On the contrary, the recognition, starting from D1', of such objectives is itself an element of a solution to whatever problem is made available by that disclosure.

4.4.4 This is apparent from the Opposition Division's focus, concerning the problem to be solved on the basis of D1', on the provision of expanded particles, a feature completely alien to D1', and by disregarding other polyolefin foam products encompassed by the generic term "polyolefin foams" disclosed in D1' and which are known to the skilled person, including the structural foam films/sheets mentioned in document D2' which are produced by thermoplast foam extrusion TSE ("Thermoplast-Schaum-Extrusion") (page 402, third section).

As a consequence, a technical problem was created which was unrelated to the actual disclosure of D1' but whose solution was then found to be obvious in the light of the disclosure of document D2'.

4.4.5 In the Board's judgment, a fatal defect of the choice of D1' as a starting point for the application of the problem/solution method, is that no relevant technical problem can be formulated without inappropriate hindsight. Without such hindsight, any attempt to establish a logical chain of considerations which would lead to the claimed invention inevitably gets stuck at the start for want of a relevant identifiable goal or object. If the relevant problem is thus not derivable, the measures necessary for its solution are a *fortiori* not derivable. In other words, the invention is not obvious in the light of such art.

- 4.4.6 No further examination is therefore to be made of the various arguments put forward with respect to D1' as closest prior art.
- 4.5 In application of the principles set out in section 4.2 above, D7 is considered by the Board to represent the closest state of the art because it relates to the preparation of expanded polypropylene particles by the "DOKAN" method for the preparation of moulded products which exhibit a good balance of low temperature melting, heat resistance and compression set (related to energy absorption properties) as well as a smooth and glossy surface appearance (sentence bridging pages 5 and 6; Table II (pages 21, 22) in combination with page 16, line 5 to page 17, line 7).

5. *Obviousness*

- 5.1 With respect to the closest prior art disclosed in D7 which uses Z-PPs and in accordance with the statement on page 2, first section of the patent specification, the technical problem objectively to be solved by the patent in suit is the provision of polypropylene expanded particles for the preparation of moulded foam products which are improved with regard to cell diameter (i.e. bigger), cell diameter uniformity, mouldability, surface appearance and energy absorption properties (cf. section 4.3 *supra*).
- 5.2 According to Claim 1 of the operative main request this problem is to be solved by the replacement of the propylene-ethylene copolymers of document D7 by isotactic polypropylene resins obtained by polymerisation in the presence of a metallocene catalyst system.

5.3 Examples 2 and 3 and Comparative Examples 2 and 3 of the patent specification which relate to polypropylene copolymers (i.e. evidence comparable with the copolymers of D7) demonstrate that Z-coPPs, which are not isotactic, are inferior to the corresponding "inventive" M-PPs with regard to their expanding temperature and steam pressure (= mouldability), cell diameter, cell diameter uniformity, surface appearance and volume E/A (= energy absorption).

The Board is therefore satisfied that the existing technical problem has effectively been solved by the subject-matter of Claim 1 of the main request.

5.4 The issue of inventive step thus turns on the question whether this solution is obvious, i.e. whether the skilled person has any reason to expect that expanded particles from isotactic M-PPs and moulded products made therefrom would solve the existing technical problem.

5.5 In D7 itself there is not only no suggestion of any advantage to be gained from the technical solution offered by the claimed invention but the passage on page 5, lines 29 to 35 of D7 even states that a cell diameter in the range of 100 to 300 μm , i.e. of the size achieved with the M-PPs of "inventive" Examples 2 and 3, is too coarse and leads to a bad appearance ("schlechtes Aussehen").

5.6 None of the further documents in the proceedings contains any information from which the skilled person could infer the advantages gained from the change of the Z-PPs of D7 to the M-PPs of the patent in suit. For the following reasons this conclusion pertains in particular to documents D1' and D2:

5.6.1 The reference in D1' to polyolefin foams is not supplemented by any properties such foams may exhibit.

5.6.2 Nor does document D2 contain any information which might be relevant to this issue.

This document is concerned with the study of the influences of polymerisation temperature and ethylene comonomer content on the microstructure of propylene polymers prepared with a catalyst system comprising rac-ethylenebis(1-indenyl)zirconium dichloride and methylaluminoxane, and with the comparison of these results with those of the polymerisation of polypropylene with an $MgCl_2/TiCl_4-Et_3Al$ catalyst system.

D2 states on page 1353, right hand column, middle: "Tm values of the Zr system were always more than 10°C or even 20°C lower than those of the Ti system having the same mm values".

The Respondents' interpretation of this statement, namely that - because of the desirability of lower polymer melting and particle fusion (= moulding) temperatures of "DOKAN"-prepared particles - it suggested the use of M-PPs (~ Zr system) instead of Z-PPs (~ Ti system) is however refuted by the evidence in the patent specification:

In spite of the very similar melting temperatures of "inventive" Example 1 (150°C) and Comparative Example 2 (149°C) as well as of "inventive" Example 5 (154°C) and Comparative Example 3 (155°C) the steam pressures (~ fusion temperatures) required by the "inventive" products is lower in both cases: Examples 1 vs. Comparative Example 2: 2.8 vs. 3.0 kg/cm².G; Example 5 vs. Comparative Example 3: 3.0 vs. 3.3 kg/cm².G.

The Respondents' argument that, because of their different nature (homo- and copolymers, respectively), these examples could not be compared is not convincing because for the purpose of analysing the relationship between melting and fusion temperature of polymers their nature need not be considered.

Furthermore, document D2 is silent about all the other aspects of the existing technical problem.

5.7 The subject-matter of Claim 1 of the main request is therefore non-obvious over document D7 alone or in combination with other relevant citations.

5.8 No other conclusion is arrived at if D4' is taken as starting point for the assessment of inventive step.

Similarly to D7, this document describes the manufacture of pre-foamed particles from a propylene copolymer resin of undisclosed tacticity according to the "DOKAN" method (cf. Claims 1 and 7) but, differently from D7, does not contain any information about the preparation method of the propylene copolymer resins used. D4' is therefore less relevant than D7 for the assessment of inventive step of the present subject-matter.

5.9 Nor is the further argument of the decision under appeal, namely that relating to a non-inventive breadth of Claim 1 as referred to in T 939/92, prejudicial to the maintenance of the patent in amended form (main request).

5.9.1 The essence of this argument is that the effective solution of the existing technical problem is not guaranteed for all M-PPs covered by Claim 1 because the claim failed to specify the "particular process conditions and catalyst employed to prepare the

polypropylene in order to yield a polymer with the appropriate related properties of stereoregularity, crystallinity, heat of fusion and melting point" (Reasons 2.6.1 of decision under appeal).

5.9.2 Apart from two of these allegedly missing features, i.e. stereoregularity and melting point, the Respondents/Opponents have not brought forward any argument, and even less evidence, to discharge the onus of proof resting on them as opponents. Mere unsubstantiated assertions which are not *prima facie* convincing for the expert but require supplementary evidence are insufficient to overrule the presumption of rightness of the subject-matter of a granted patent.

Moreover, patents are directed to readers who are skilled in the respective technical field and know the general conditions (e.g. polymer molecular weight) to be respected in order to avoid failure.

5.9.3 As to the issue of stereoregularity, it is already set out in the last paragraph of section 3.3 *supra* that the theoretical suitability of metallocene catalyst systems for the preparation of non-isotactic polyolefins is of no consequence for the present case because Claim 1 is restricted to isotactic polypropylenes and thus to the use of such metallocene catalyst systems which deliver isotactic polypropylenes. The skilled person is furthermore aware of the requirements for a metallocene catalyst system to yield isotactic polypropylene. This is particularly clear from documents D2, D3 and D8. Further guidance is also present in the patent specification itself (experimental section).

5.9.4 The further contention of the Respondents' that Claim 1 encompassed polypropylene resins having melting temperatures which were too high for a successful realisation of the claimed invention is refuted by the experimental evidence referred to in section 5.6.2 *supra*.

5.10 It can therefore be recognised that, with regard to the citations on file, the subject-matter of Claim 1 of the main request involves an inventive step within the meaning of Article 56 EPC.

5.11 The same conclusion applies a *fortiori* to the subject-matter of Claims 2 to 4 which are dependent on Claim 1.

6. The grounds of opposition under Article 100(a) EPC do not therefore prejudice the maintenance of the patent in the form as amended according to the main request.

7. In these circumstances, there is no need to deal with the auxiliary requests.

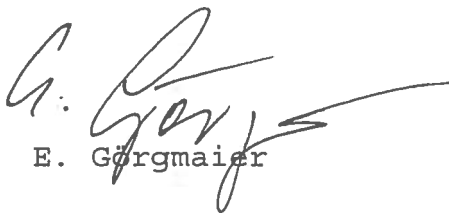
Order

For these reasons it is decided:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent on the basis of Claims 1 to 4 of the main request filed with the submission dated 22 July 1998 and after any necessary consequential amendment of the description.

The Registrar:


E. Görgmaier

The Chairman:


R. Young

