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Aktenzeichen / Case Number / N^o du recours : T 444/88 - 3.3.3

Anmeldenummer / Filing No / N^o de la demande : 81 109 804.5

Veröffentlichungs-Nr. / Publication No / N^o de la publication : 0 053 333

Bezeichnung der Erfindung: process for the production of pre-foamed particles
Title of invention: of polypropylene resin
Titre de l'invention :

Klassifikation / Classification / Classement : C08J 9/16

ENTSCHEIDUNG / DECISION

vom / of / du 9 May 1990

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Japan Styrene Paper Corporation

Einsprechender / Opponent / Opposant : BASF Aktiengesellschaft

Stichwort / Headword / Référence : Foam Particles/JAPAN STYRENE PAPER

EPO/EPC/CBE Articles 54, 56 and 112

Schlagwort / Keyword / Mot clé : "Inventive step (no)"
"Documents available to public inspection, but
not actually inspected - prior art"

Leitsatz / Headnote / Sommaire



Case Number : T 444/88 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 9 May 1990

Appellant : Japan Styrene Paper Corporation
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Representative :

Decision under appeal : Decision of the Opposition Division of the European
Patent Office dated 14 June 1988, posted on
15 July 1988, revoking European patent No. 0 053 333
pursuant to Article 102(2) EPC.

Composition of the Board :

Chairman : F. Antony
Members : R. Lunzer
M. Aúz Castro

Summary of Facts and Submissions

- I. European patent No. 0 053 333 was granted on 7 May 1986 on the basis of application No. 81 109 804.5 filed on 20 November 1981, claiming priority from an application filed in Japan on 22 November 1980.

Independent Claim 1 of the patent was in the following form:

"A process for producing substantially non-crosslinked pre-foamed particles of a polypropylene resin, which comprises dispersing substantially non-crosslinked particles of the polypropylene resin composed of an ethylene/propylene random copolymer or a mixture of an ethylene/propylene random copolymer with low-density polyethylene and/or an ethylene/vinyl acetate copolymer and a volatile blowing agent in water in the presence of a dispersing agent within a closed vessel; heating the dispersion to a temperature above a temperature at which the resin particles soften, thereby to impregnate the blowing agent in the resin particles; while maintaining the pressure of the inside of the vessel higher than the vapor pressure of the blowing agent, opening one end of the vessel to release the resin particles and water simultaneously into an atmosphere kept at a lower pressure than the inside of the vessel, thereby to form pre-foamed particles, aging the pre-foamed particles under atmospheric pressure and then aging them further under a pressure of an inorganic gas or a mixture of it with a volatile blowing agent sufficient to apply an elevated pressure to the interior of the particles, thereby the particles become to have an ability to expand by heating."

- II. On 16 December 1986 an opposition was lodged by the Respondent on the grounds of Article 100(a) and (b) EPC, alleging lack of clarity of the claims (Article 84 EPC) and

lack of inventive step (Article 56 EPC). The Opponent relied in particular on the following documents:

(2) DE-A-2 363 923

(3) JP-B-56 1344,

and also at a later stage

(4) DE-B-1 629 296.

III. By its decision posted on 15 July 1988 the Opposition Division revoked the patent in suit. It held that the objection which had been raised under Article 100(b) EPC (insufficiency) was in fact an objection of lack of clarity of the claims (Article 84 EPC). This had to be excluded because it is not a ground of opposition within Article 100(b) EPC. The Opposition Division found, however, that the invention was lacking in inventive step having regard in particular to Example 5 of document (3), which it considered to be the closest prior art.

IV. An appeal against this decision was lodged by the Appellant (Patentee) on 7 September 1988, the appeal fee was paid on the same day, and the Grounds of Appeal were filed on 15 November 1988.

The Appellant seeks the reversal of the decision of the Opposition Division in relation to its finding of lack of inventive step.

On appeal, as before the Opposition Division, the Appellant sought to have Example 5 of document (3) excluded from the documents considered as being part of the state of the art

in accordance with Article 54 EPC. The uncontested facts in relation to Example 5 of document (3) were the following:

- (i) The Japanese patent application was filed on 24 December 1975, and published as an unexamined application on 29 June 1977. At that stage, it did not contain what is now Example 5. From then onwards, interested members of the public were entitled to inspect the file wrapper.
- (ii) Example 5 was introduced on 26 July 1980 as an amendment during examination.
- (iii) There was in fact no application by any member of the public to inspect the file wrapper until 3 October 1981.
- (iv) It was conceded by the Appellant that, between 26 July and the priority date of the patent in suit of 22 November 1980, members of the public had the possibility of inspecting the file wrapper.

V. Irrespective of whether Example 5 of document (3) was considered to be part of the state of the art, the Appellant alleged that it did not render the subject-matter of the patent in suit obvious. It relied on the fact that the claims in issue required that the particles should be substantially non-crosslinked, and also required the use of two distinct aging steps, the first of which was conducted at atmospheric temperature and pressure, which step was not in any way suggested by the cited documents. The expedients proposed in the claimed method overcame the problem of shrinkage of the finished products which had previously been encountered.

VI. The Respondent contended that Example 5 of document (3) was plainly part of the prior art, and differed from the

invention solely in that there was no mention of the aging steps. These steps were such as the skilled worker would introduce at will according to whether he encountered problems of shrinkage, and the degree of shrinkage encountered. Reference was also made by the Respondent to three further documents allegedly relevant to the novelty of the patent in suit; DE-A-3 125 024, GB-A-2 080 813, and FR-A-2 484 432 (collectively referred to as (6)).

- VII. Oral proceedings were held on 9 May 1990. The Appellant requested that a legal question be referred to the Enlarged Board as to whether a document, which was available to inspection by members of the public, but which according to the evidence had not actually been inspected, constituted prior art for the purposes of Article 54 EPC. It further requested that the decision under appeal be set aside, and the patent maintained.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.
2. The documents (6) - see point VI. above - were not submitted in due time (Article 114(2) EPC) and are in any event irrelevant in that their dates of publication are such that they do not belong to the state of the art within the meaning of Article 54(2) or (3) EPC. They are, therefore, disregarded.
3. An important question to be decided in this appeal is whether or not Example 5 of document (3) formed "part of the state of the art" within the meaning of Article 54(1) EPC before 22 November 1980. "The state of the art" is

defined in Article 54(2) EPC as comprising "everything made available to the public by means of a written or oral description, or by use, or in any other way, before the date of filing (to be read - in view of Article 87 EPC - as 'date of priority') of the European patent application".

- 3.1 Example 5 was introduced into document (3) when this was already available to public inspection. Therefore, Example 5 shared the fate of document (3), and was also "made available to the public" for the purposes of Article 54(2) EPC on 26 July 1980. It is not necessary as a matter of law that any member of the public has to be aware that Example 5 was introduced into document (3), and therefore available for inspection on request. It is sufficient that the document was in fact available to the public before the priority date of the patent in suit, whether or not this was known by any member of the public, and whether or not any member of the public actually inspected the document. For these reasons, the decision dated 9 July 1987 of the Japanese Patent Office, on Appeal from a previous rejection of the corresponding Japanese Application, which held that the contents of Example 5 were "knowable", but not "known", (page 2, paragraph 4, of the translation of the decision) cannot help in the present case. In direct contrast to the law as expressed in that Japanese decision, under the EPC the question of whether a document forms "part of the state of the art" depends on its availability, i.e. whether it is knowable to third parties; and not on proof that there had been no actual inspection, i.e. that it was not actually known.

A similar situation was already dealt with in the decision T 381/87 "Publication/Research Association", OJ EPO 1990, 213, which reached the same result.

- 3.2 The Appellant requested that the question of whether a document, which was not actually inspected by the public

before the priority date of a given patent (application), nevertheless formed part of the state of the art, be referred to the Enlarged Board of Appeal. According to Article 112(1)(a) EPC, the Board of Appeal shall refer any question to the Enlarged Board of Appeal if it considers that a decision is required in order to ensure uniform application of the law, or if an important point of law arises. Neither of those two requirements is satisfied here. Uniform application of the law is satisfied by the fact that the Board is following an earlier decision of another Board. Furthermore, the legal interpretation of Article 54(2) EPC cannot be regarded here as "an important point of law" because the wording of the Article is unambiguous, and the facts in the present case do not give rise to any new issue of law. Consequently, this request on the Appellant's part must be refused.

4. The patent in suit relates to a process for producing pre-foamed particles of the kind defined in the preamble to Claim 1. Comparable pre-foamed particles, especially those based on polystyrene, are very widely used for moulding into light weight packaging and insulating materials. As indicated in each of the cited documents, pre-foamed particles with comparable properties for use in subsequent moulding can be composed of a variety of polyolefine homopolymers and co-polymers. The pre-foamed particles of the patent in suit are limited to those consisting of non-crosslinked polypropylene random copolymers. The description of the patent in suit includes a comparison with a homopolymer of polypropylene, an ethylene propylene block co-polymer, and a co-polymer with a gel fraction of 30% (i.e. it is crosslinked) to show that none of these three had the property of adhesion which is required when making articles out of pre-foamed particles.

5. In the Board's view, the closest prior art is Example 5 of document (3). This discloses making non-crosslinked pre-foamed particles of an ethylene-propylene random copolymer. The unfoamed particles, according to this Example, are impregnated with a volatile blowing agent, and heated in a container in the presence of water to 135°C for 1 hour. The internal pressure in the container is maintained while a valve is opened to release the particles into an atmosphere at room temperature and pressure. Thus, this prior document discloses all the features of the invention as set out in Claim 1 above, apart from the two aging steps referred to at the end of the claim.

6. In relation to this document, reflecting the closest state of the art, the problem with which the present invention is concerned is overcoming the shrinkage which sometimes occurs after an article has been moulded from pre-foamed particles. This problem arises from the presence of residual amounts of the volatile blowing agents, which can remain within the pre-foamed particles. It was not disputed by the Respondent, and it is accepted by the Board, that the provision of these aging steps, especially the first aging to allow for residues of the volatile blowing agent to escape, is capable of overcoming problems of shrinkage, i.e. to solve the aforementioned problem.

7. Having reviewed the documents which are in the proceedings, the Board is satisfied that none of them discloses a process for producing pre-foamed particles having all the features defined in Claim 1. Therefore the subject-matter of Claim 1 is novel within the meaning of Article 54 EPC. As, apart from the disregarded documents identified in point VI. above, novelty is not in dispute, no more detailed discussion is necessary.

8. Turning to the issue of inventiveness, the question to be considered is whether a skilled person, confronted with problems of shrinkage arising in forming moulded products produced from pre-foamed particles, such as those described in Example 5 of document (3), would have found it obvious to minimise that undesired effect by subjecting the particles to the two aging treatments defined in Claim 1 of the patent in suit.
- 8.1 Both of the cited documents (2) and (4) are concerned with the control of the residual amounts of blowing agents in pre-foamed particles, and the diffusion into the closed cells of the particles of inorganic gases, and more specifically with the problem of shrinkage of the products moulded from these particles. These documents confirm the fact, which was not disputed, that it was well known that pre-foamed particles of the kind here in question are permeable to gases. Consequently the Board concludes that the skilled worker would appreciate that the composition of the gases within the closed cells of the particles can be controlled at will, depending on the time, pressure and temperature of exposing the particles to any gaseous atmosphere.
- 8.2 Document (2) proposes subjecting the pre-foamed particles to air under a pressure of 20 kg/cm² for a period of more than 20 minutes and at temperature below the melting point of the resin (page 14 - original typed numbering - lines 6 to 8). It observes that residues of blowing agent in the pellets are undesired (page 14, paragraph 3), and demonstrates at Table II on page 18 that if the step of subjecting to air pressure is left out, there is serious shrinkage. It does not make any specific reference to aging in the atmosphere.

- 8.3 Document (4) is concerned with the known problem of shrinkage of the moulded products made from pre-foamed particles of ethylene homopolymers or co-polymers. It teaches that this problem can be overcome if the pre-foamed particles are subjected to a gas under pressure and at a temperature of up to 20°C below the melting point of the resin, the gas being one which has a permeability through the cell walls of the pellets which is the same as, or less than, that of air (column 1, lines 53-59). Air or nitrogen are the preferred gases (column 2, lines 49, 50). At column 3, lines 5 to 10, it is observed that the particles can be subjected to the step of applying gas pressure directly after foaming, or at will, the step can be postponed.
- 8.4 These two citations, read in the light of the facts as accepted by the Appellant, indicate to the Board that not only was the problem of shrinkage well known, but that it was known that the pre-foamed particles are permeable to gases, and that by suitable control of the gas composition within the particles, the problem of shrinkage can be overcome. While there is no prior disclosure of the exact combination of aging steps here proposed, the claimed combination exemplifies the kind of process steps which are likely to occur to the skilled worker, for the reasons given under paragraph 8.1 above.
- 8.5 It is observed that both of documents (2) and (4) already proposed an aging step under pressure in an inorganic gas. Thus, leaving aside for the moment the limitation as to composition, the sole distinction of the invention over these proposals is the introduction of a deliberate aging step at atmospheric temperature and pressure, of the kind which is mentioned as an option in document (4).

- 8.6 Turning to the limitation on the composition of the pre-foamed particles according to Claim 1 in suit, in view of the similarity in the properties of polyolefines, and in particular the resemblance of polypropylene in many respects to other polyolefines, the Board does not consider that the restriction of the claim to substantially non-crosslinked polypropylene resins introduces any inventive feature. This is confirmed by documents (2) and (4), which show that permeability to gases is a common feature of pre-foamed particles made of polyolefine resins.
9. The subject matter of Claim 1 of the patent in suit, therefore, does not involve any inventive step, contrary to the requirements of Article 56 EPC. As a party's request must be decided as a whole, Claims 2 and 3 must share the fate of Claim 1. The appeal against the decision of the Opposition Division revoking the patent must, therefore, be dismissed.

Order

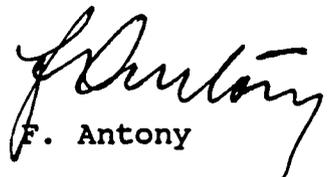
For these reasons, it is decided that:

1. The Appellant's request that a legal question be submitted to the Enlarged Board is rejected.
2. The appeal is dismissed.

The Registrar:


M. Beer

The Chairman:


F. Antony