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File Number: T 513/90 - 3.2.2
Application No.: 82 107 059.6
Publication No.: 0 072 499
Title of invention: Process for producing foamed and molded article of polypropylene resin

Classification: B29C 67/22

D E C I S I O N
of 19 December 1991

Applicant: Japan Styrene Paper Corporation

Opponent: BASF Aktiengesellschaft, Ludwigshafen

Headword: Foamed articles/JAPAN STYRENE

EPC Article 56

Keyword: "Inventive step (denied)"
"Obviousness - inevitable choice in practice"

Headnote

"If, for a particular application of a known process, the skilled person could obviously use a material generally available on the market and suitable for the purpose, and were also highly likely to use it for reasons irrespective of its characteristics, the usage should not be considered as inventive on the account of those characteristics alone." (cf. point 4.4 of the Reasons).

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Headnote

Headnote to follow.



Case Number : T 513/90 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 19 December 1991

Appellant : Japan Styrene Paper Corporation
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Decision under appeal : Decision of Opposition Division of the European
Patent Office verbally on 5 April 1990 and in
writing dated on 28 May 1990 revoking European
patent No. 0 072 499 pursuant to Article 102(1)
EPC.

Composition of the Board :

Chairman : G.S.A. Szabo
Members : J. de Pouget de Nadaillac
F. Benussi

Summary of Facts and Submissions

- I. European patent No. 0 072 499 comprising three claims was granted on 27 March 1983 in response to European patent application No. 82 107 059.6 filed on 4 August 1982.

Claim 1 of the patent reads as follows:

"1. A process for producing a foamed and molded article of a polypropylene resin, which comprising pressurizing preliminarily-foamed particles of an ethylene/propylene copolymer having a melt index value of from 0.1 to 25, a latent heat of crystallization of not more than 28 cal/g (117.2 J/g) and an ethylene content of from 1 to 30% by weight as a base resin with an inorganic gas or a gaseous mixture of the inorganic gas and volatile blowing agent thereby to impart an elevated pressure to the inside of said particles, thereafter filling said particles in a mold capable of enclosing the particles but allowing escape of gases therefrom, and then heating said particles to expand them to the configuration of the mold."

- II. Oppositions were filed against the grant of the patent. In a decision given verbally on 5 April 1990 and in writing on 28 May 1990, the Opposition Division revoked the patent on the ground that the subject-matter of the claims did not involve an inventive step in view of the following publications:

(D1) DE-A-2 363 923,

(D6) EP-A-0 053 333;

(D8) Ullmann's Encyclopädie der technischen Chemie,
4th Ed., Vol. 19, 1980, pp. 206-207;

(E1) Two Study Reports "Analysis of commercially available polypropylene resins (Reports 1 and 2)", 20.12.84, prepared by Torey Research Center, Inc; and

(E3) Catalog of Polypropylene Resin, "Sumitomo Noblen", published by Sumitomo Chemical Co, Ltd.

- III. The decision relies on document (D1) as the closest state of the art. The disclosure therein refers to formed and molded polyolefin resins of reduced density and complex shape, including inter alia such which are based on ethylene/polyolefin resins. The task of the skilled person was therefore to adapt the disclosure to commercially available ethylene/polypropylene resins. According to common knowledge at the relevant time, such materials had characteristics specified in the claim of the patent-in-suit for the purpose and it was therefore obvious to utilise the process in question in practice.
- IV. A Notice of Appeal was filed by the Appellant (Proprietor of the patent) against the decision on 26 June 1990 together with the fee, and a Statement of Grounds was submitted on 8 October 1990.
- V. The Appellant argued in his submissions and at the oral hearing on 19 December 1991 substantially as follows:
- (a) If anything, document (D1) preferred crosslinked polyolefin resins whilst the patent-in-suit was particularly concerned with non-crosslinked materials. Before the priority date of the latter, there had been a general understanding that cross-linking was indispensable for foaming the particles.
 - (b) Crosslinking caused a decrease in fluidity and a lower melt-index value in comparison with non-crosslinked variants. Such materials would not necessarily correspond to polymers with a melt-index value from 0.1 to 25 according to the patent.

- (c) The documents, relied upon to establish general knowledge or availability of materials, were of a date later than the priority date of the patent or referred to circumstances other than those relevant to the preparation of foamed articles.
- (d) Generally, there was no good reason for assuming that the suggested change from at least partially cross-linked polyethylene of document (D1) to polypropylene copolymers, would not necessitate a higher than 10% gel content.

VI. The Respondent (former Opponent 01) argued as follows:

- (a) Document (D1), Example 7, employed polyethylene with a gel content of merely 0.7%, which was indicative of non-crosslinked material to the extent of 99.7%. The same document expressly referred to a possible gel content, i.e. crosslinkage as low as 0.01%. Document (D6) classifies polymers up to 10% gel content, as substantially non-crosslinked.
- (b) Document (D1) expressly referred to copolymers of ethylene with propylene. The polyethylene in Example 7 had a melt index of 0.3 which suggested a material within the range specified in the claim in the present case.

VII. The Appellant requests that the decision under appeal be set aside and the patent be maintained as granted. According to the auxiliary request, the subject-matter of Claim 3 would be incorporated in Claim 1 with consequent amendment of the description.

The Respondent requests that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.
2. The closest state of the art

There was a general agreement that document (D1) represents the closest and therefore the most relevant state of the art. The disclosure therein covers a wide range of polyolefin materials and describes the process steps necessary for the preparation of foamed and molded articles. Although the examples use polyethylene pellets, the general introduction also mentions specifically "copolymers of ethylene and other olefins such as polypropylene ...". Whilst some preference is given to at least partially crosslinked material, the degree of gelation in this respect could be as low as 0.01% (page 3, line 21).

The physics and chemistry of the process involves the pressurisation with gas (ageing), moulding and heating, which are expected to be analogously applicable to all olefins, whether crosslinked or not (cf. claims in the document).

3. The technical problem and the solution

Notwithstanding the fact that the examples in (D1) use polyethylene to illustrate the processes claimed, some other specifically mentioned materials, in particular ethylene/propylene copolymers can also be the source of technical problems to the skilled person in the absence of anything to the contrary. This is particularly so in the present case, where the skilled person was also aware from

his common general knowledge that polypropylene is associated with excellent chemical, physical and mechanical properties, and that other approaches to provide foamy materials to utilise such advantages did not give satisfactory results (cf. explanations in the patent-in-suit, column 1, lines 4 to 28).

In view of this, it was an objectively recognisable technical problem in respect of document (D1) to apply the general method presented therein to polypropylene resins, in particular to ethylene/polypropylene resins because of the express reference to the latter in the document. Thus the task was to find the kind of material in this respect which would provide foam with the expected advantageous properties.

The solution of the problem involved the use of a material characterised by ranges of certain physical properties, i.e. melt index value (0.1 to 25), latent heat of crystallisation (max. 28 cal/g) and ethylene content from 1 to 30%. The processing conditions themselves in the claim have undoubtedly already been known from document (D1), but the suggested quality characteristics were not disclosed therein and the subject-matter is therefore novel.

4. Inventive step

4.1 The selection of quality characteristics, however, appear to correspond to what was commonly available on the market, which can also be interpreted as being part of common general knowledge in view of corresponding references in the literature. In particular Ullmann's Encyclopedia (D8) suggests that commercially available ethylene/propylene copolymers have "up to 30% by weight of ethylene" mainly as block polymers, i.e. to some extent

crosslinked. As already explained in the decision of the first instance, the same general reference book also discloses that the latent heat of crystallisation for polypropylene would be up to 30 cal/g and that any ethylene content should necessarily reduce that value bringing the same into the range specified in the claim. The same applies to the broad range of melt index value from 0.1 to 25, which is for instance suggested by other sources such as again by document (D8).

- 4.2 The Board also confirms the view taken by the first instance according to which evidence published after the priority date could be relevant and meaningful to show what was the prevailing situation before the date. In the present situation the evidence supports the view that the kind of ethylene/propylene copolymer, which the patent relies upon, was freely obtainable without difficulty on the market. The situation is analogous to proving common general knowledge at an early date with a textbook of recent date.
- 4.3 In addition to the knowledge available about the specific physical values characterising the main claim in the present case, it can be noted that the ranges are very wide and have hardly any selective information content in the circumstances. Thus a great variety of material would fall within the scope of the claim, all providing foam with the expected advantageous properties on account of the high polypropylene moiety. Thus the inventive step, if any, must rely on the originality of the process and not on the surprising properties of the product. This must be assumed in view of the fact that the products are not claimed per se.
- 4.4 Any lack of novelty is in consequence of a direct and unequivocal, i.e. inevitable disclosure of the claimed

subject-matter in the state of the art. This includes the follow up of instructions to carry out a process irrespective whether or not the skilled person would have known all the characteristics of the process or the result (cf. also "Diastereomers/BAYER" T 12/81, OJ EPO 1982, 298).

Obviousness, on the other hand, can be explained as an indirect potential availability of the totality of features of a subject-matter through a mental recognition of the consequences of disclosures in the art or, and this should also be relevant, through normal practice in the art including the use of what is available for the purpose.

Thus it is the view of the Board that if, for a particular application of a known process, the skilled person could obviously use a material generally available on the market and suitable for the purpose, and were also highly likely to use it for reasons irrespective of its characteristics, the usage should not be considered as inventive on account of those characteristics alone. It stands to reason that if carrying out such a step was itself already obvious for other reasons, the natural choice of the particular means on the marketplace is devoid of mental or practical effort, or of "purposive selection", in the absence of anything to the contrary. Again, not unlike the inevitable loss of novelty in consequence of following certain instructions to carry out some steps in practice, the skilled person would have, in an obvious manner, practiced the process without knowing all its characteristics in such situations.

Even if the availability of such material is not exclusive but common enough to be reasonably likely to be tried for the purpose simply by chance, such choice should remain in

the public domain. This should not, of course, diminish the right to obtain coverage for a novel product of such process, if that turns out to be inventive per se

4.5 The reduction to practice of the process according to document (D1) with ethylene/propylene was likely to involve available pellets falling within the broad range of physical characteristics in any case. There was no prejudice in the art to inhibit the skilled person to try the process, since earlier difficulties to produce foams were associated with different methods. In view of the expectation to obtain foam with advantageous characteristics, it was not only a question of whether or not the skilled person could use such specific resins, but it was highly probable that he would in practice choose them for the purpose. This is not the kind of situation wherein the subject-matter can be mentally derived from the state of the art, but an obvious consequence of that art under the envisaged practical conditions which prevailed at the date of the application. Nevertheless, the latter can also deprive the subject-matter of inventive merit and this now applies to Claim 1 in the main request which thereby fails to comply with Articles 52 and 56 EPC.

4.6 As regards the auxiliary request, this relates to Claim 1 of the main request, further limited to the use of non-crosslinked materials. It was alleged that trouble free processing was less expected with such materials and therefore perhaps the quality of the product might be less readily predictable. Again, the claimed subject-matter does not rely on any inventive product with peculiar or advantageous properties, and the only question to decide is whether or not it was unexpected to apply the process to such materials at all. Neither the relevant prior art described in document (D1), nor the patent application or

the granted patent in the present case suggest that non-crosslinked materials cannot be processed, or that special conditions would have to be applied to overcome difficulties.

As explained above, the primary citation used in one example material with a mere 0.7% crosslinkage and suggests 0.01% as the minimum for such "gel" content characteristic. In such circumstances, the skilled person would exactly know what to expect with a slightly different completely non-crosslinked material, and allow for any differences. The possibility of being able to practice the generally known process with or without crosslinking was established in that cited art, and it is not convincing to suggest prejudice against the latter. In view of this, the amended Claim 1 according to the auxiliary request also lacks inventive step.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:



S. Fabiani

The Chairman:



G. Szabo