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D E C I S I O N
of 9 May 2001

Case Number: T 0384/97 - 3.3.6

Application Number: 92900672.4

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Language of the proceedings: EN

Title of invention:
Processing of pigmented nylon fibers

Patentee:
E.I. DU PONT DE NEMOURS AND COMPANY

Opponent:
NOVALIS FRANCE

Headword:
Nylon 6/DU PONT

Relevant legal provisions:
EPC Art. 52(1), 56

Keyword:
"Inventive step (no) - alternative process (obvious)"

Decisions cited:
-

Catchword:
-



Case Number: T 0384/97 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 9 May 2001

Appellant: NOVALIS FRANCE
(Opponent) 6, rue Georges Marannes
F-69200 Venissieux (FR)

Representative: Esson, Jean-Pierre
RHODIA SERVICES
Direction de la Propriété Industrielle
25, quai Paul Doumer
F-92408 Courbevoie Cédex (FR)

Respondent: E.I. DU PONT DE NEMOURS AND COMPANY
(Proprietor of the patent) 1007 Market Street
Wilmington
Delaware 19898 (US)

Representative: Abitz, Walter, Dr.-Ing.
Patentanwälte Abitz & Partner
Postfach 86 01 09
D-81628 München (DE)

Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 14 February
1997 concerning maintenance of European patent
No. 0 558 611 in amended form.

Composition of the Board:

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

Summary of Facts and Submissions

I. This appeal is from the Opposition Division's decision maintaining European patent No. 0 558 611 in amended form. In a notice of opposition, based on lack of inventive step, the following documents were submitted, inter alia:

(1) EP-A-0 373 655

(2) A. Verma et al., "A Study on Blends of Nylon 6 and Nylon 66", Journal of Applied Polymer Science 31, 747-62 (1986)

II. Claim 1 of the patent as maintained by the Opposition division read:

"An improved process for preparing pigmented drawn filaments of copolymers of hexamethylene adipamide with up to 4 % by weight of hexamethylene-5-sulfoisophthalamide units wherein the polyamide is melted, pigment is added as a concentrate in a polymer matrix, polycaproamide is added with or by way of the pigment concentrate, and the polyamide is spun into filaments and drawn, characterized by reducing the number of draw breaks by adding the polycaproamide in an amount equal to at least 5% by weight of the polyamide content of the filament."

III. In its decision the Opposition Division found that the subject-matter of the claim as maintained was novel and inventive over documents (1) and (2).

IV. The Appellant (Opponent) filed an appeal and submitted that the subject-matter of Claim 1 did not involve an inventive step in view of documents (1) and (2); in support of its arguments it filed two further documents, namely

- (3) "Entwicklung und Tendenzen in der BCF-
Texturierung", Chemiefasern, Textilindustrie
(Dezember 1994) and English translation thereof;
- (4) "Developments and tendencies in BCF texturing,
Man-made Fiber Year book (1993).

It argued, in summary, that:

- contrary to the allegations of the Respondent (Proprietor), cooling was applied between spinning and drawing of the filaments according to the patent in suit;
- document (2) had to be taken into account for evaluating inventive step;
- starting from document (1), it was obvious for the skilled person, given the teaching of document (2), to incorporate at least 5% of nylon-6 (PA6) into nylon-66 (PA66) for improving the drawing property of the latter.

V. The Respondent (Proprietor) argued, in summary, that:

- according to the claimed process, the filaments were heated prior to drawing and not cold drawn;
- the fibres according to the process of document

(2) were cold drawn, i.e. at laboratory temperature which means room temperature, and that the results reported in document (2) were not applicable to the processes of the patent in suit and of document (1) and that therefore document (2) should be disregarded;

- quenching of filaments did not imply that the filaments were cold drawn.

VI. Oral proceedings took place on 9 May 2001. Shortly before the end of the debate, the Respondent's representative proposed that, if the Board should be of the opinion that the patent should be revoked, the oral proceedings be adjourned in order to allow him to file evidence of comparative data. He agreed that this suggestion would have meant continuing the proceedings in writing. Since the decision of the Opposition Division mentioned already the lack of comparative data in the patent (see page 5, last paragraph), the Board did not find any justification for making this submission at such a very late stage of the proceedings (see Article 114(2) EPC; Article 11(3), Rules of Procedure of the Boards of Appeal; paragraphs 3.3, 3.4 and 3.5.1, and also "Guidance for parties to appeal proceedings and their representatives", OJ 1996, 342). Therefore, the Board did not take up this suggestion.

VII. The Appellant requested that the decision under appeal be set aside and that the patent be revoked.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. *Novelty*

The Board is satisfied that none of the cited documents anticipates the subject-matter of Claim 1. Since novelty is not in issue, no detailed reasons need be given.

2. *Inventive step*

2.1 The patent in suit concerns a method for reducing the draw tension necessary for orienting melt-spun pigmented nylon fibres. Organic pigments, added into nylon to improve the resistance to degrading and fading in ultraviolet light, crosslink nylon, change its viscosity, form spherulites which weaken the fibres, and require increased draw tension resulting in increased fibre breaks.

The problem as stated in the patent in suit was to find ways of reducing the impact of such pigments on nylon spinning and drawing performance,

- which would permit the use of a wider selection of coloured pigments, both organic and inorganic, and
- which would allow the production of a complete range of coloured fibres without encountering serious product deficiencies or operating difficulties with any of them, and
- which would allow the production of high tenacity pigmented nylon fibres (page 2, lines 26 to 30).

2.2 A process for making stain-resistant, pigmented nylon fibres was known from document (1) which the Board takes as the starting point for evaluating inventive step.

The objective of document (1) was to use a wide selection of coloured pigments, both organic and inorganic, without encountering serious product deficiencies or operating difficulties.

For evaluating the pigmented drawn filaments, the spinning break level was determined. In document (1), the number of breaks was measured in breaks per 8 hours whereas in the patent in suit the measurement is expressed in breaks per ton. So a comparison of the respective break figures is not possible.

Therefore, the technical problem underlying the patent in suit has to be reformulated against document (1) as the provision of a further process for preparing pigmented drawn filaments of a copolymer of PA66.

2.3 The problem underlying the patent in suit was said to be solved by a process for preparing pigmented drawn filaments of copolymers of hexamethylene adipamide with up to 4% by weight of hexamethylene-5-sulfoisophthalamide units wherein the PA66 was melted and polycaproamide was added in an amount equal to at least 5% by weight of the polyamide content of the filament.

2.4 The copolymers of Examples 1, 2 and 3 of the patent in suit comprise 5.8%, 5.8% and 5.2% PA6 respectively. Thus the problem as defined above was solved. The question remains whether the solution involves an

inventive step.

- 2.5 The PA6 (polycapramide) content in the fibre made according to document (1) was lower than 5% by weight, a fact which was not contested by the parties. The subject-matter of Claim 1 of the patent in suit differed in that the added PA6 was added in an amount equal to at least 5 weight % of the polyamide content of the filament.

Document (2) did not disclose PA66 copolymers containing pigments. The Board has disregarded this document since no evidence has been adduced to suggest that the person skilled in the art would have, from his general knowledge, combined the teaching of documents (1) and (2). The Appellant did not contest that this evidence was missing.

- 2.6 All the arguments concerning the cooling step were not relevant since the process as claimed did not mention any temperature-related features.

- 2.7 Document (1) teaches that organic pigments crosslink nylon, raise its viscosity, form spherulites which weaken the fibres and cause increased draw tension and filament breaks. Many inorganic pigments depolymerize the nylon, lower its viscosity and form spherulites. Either type of pigment in large particles weakens the fibres, clogs the spinning pack filters and causes breaks. Very finely divided pigment agglomerates to form larger masses of varying size causing the same problems as large particles. The depolymerization caused by inorganic pigments is usually worse in the processing of PA66 than in PA6 because of the higher melting temperature of PA66 and the more reactive

nature of PA66 (see page 2, lines 21 to 30).

The Board concludes that it was obvious for the skilled person to increase the amount of PA6 and reduce thereby the amount of PA66 since PA66 was known to be more liable to manufacturing problems than PA6.

As to the amount of PA6 to be added, there was no evidence on file showing that the limit of at least 5% by weight of the polyamide content of the filament was in any way at all critical.

With respect to the comonomer hexamethylene-5-sulfoisophthalamide which may be present in an amount of up to 4% by weight in the copolymers of PA66, no evidence was made available by the Respondent as to the effects resulting from its presence alone or the simultaneous presence of PA6 (as a blending component) and hexamethylene-5-sulfoisophthalamide (as a comonomer).

- 2.8 Therefore the Board concludes that provision of a further process comprising the addition of PA6 for preparing drawn filaments of copolymers of hexamethylene-5-sulfoisophthalamide units was obvious to a person skilled in the art.

It follows that the subject-matter of claim 1 does not meet the requirements of Articles 52(1) and 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

G. Rauh

P. Krasa