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D E C I S I O N
of 4 February 1994

Case Number: T 0845/91 - 3.3.3

Application Number: 85903479.5

Publication Number: 0226578

IPC: C08G 75/14

Language of the proceedings: EN

Title of invention:
Method of producing mercaptan terminated polymers with increased reactivity and reduced odor

Applicant:
Courtaulds Aerospace, Inc.

Opponent:
-

Headword:
-

Relevant legal norms:
EPC Art. 111(1)

Keyword:
"Decision re appeals - remittal (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0845/91 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 4 February 1994

Appellant: Coutaulds Aerospace, Inc.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 14 May 1991 refusing European patent application No. 85 903 479.5 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. Gérardin
Members: H. Fessel
G. Davies

Summary of Facts and Submissions

I. The European patent application No. 85 903 479.5, filed on 11 June 1985 and published under the International Publication No. WO 86/07369, was refused by a decision of the Examining Division of the European Patent Office dated 14 May 1991.

That decision was based on a set of 14 claims filed on 13 July 1989 as amended on 13 December 1989, the only independent Claim 1 - after a minor correction (incorporation of the word "of" before "less" in the first paragraph) - reading as follows:

"A method for increasing cure rate of a liquid mercaptan terminated polymer to a solid elastomer, said liquid mercaptan terminated polymer containing from about 0.5 weight percent to about 3 weight percent of low molecular weight mercaptan compounds having a molecular weight of less than about 300 and having an obnoxious smell, said method comprising the steps of:

forming a film of said liquid mercaptan terminated polymer having a thickness of less than about 6 mm;

heating said film to a temperature of between 135 and 175°C for less than two minutes to vaporize at least about 50 weight percent of said low molecular weight obnoxious smelling mercaptan compounds, but not decomposing said liquid mercaptan terminated polymer, thereby obtaining a stripped liquid mercaptan terminated polymer having an increased cure rate and a reduced obnoxious mercaptan odor; and

separating the vapor containing low molecular weight mercaptan compounds from said stripped liquid mercaptan terminated polymer."

Claims 2 to 14 are dependent claims directed to preferred embodiments of the method according to Claim 1.

II. The reason for the decision was that the claimed subject-matter did not involve any inventive step *vis-à-vis* the teaching of the following prior art documents:

(1) US-A-2 831 896,
(2) Encyclopaedia of Chemical Technology, 3rd Edition, Vol. 9, (1980), page 481,
(3) B. Vollmert, "Grundriss der Makromolekularen Chemie", Karlsruhe (1985), Vol. I, pages 80 to 81.

More specifically, it was stated that it was known from document (1) to eliminate low molecular weight compounds, such as low boiling solvents or mercaptan starting materials, from polysulphide polymers by conventional heating treatment. In order to avoid oxidation and depolymerisation reactions, it would have been obvious, in view of document (2), to use gentler techniques, such as a wiped film evaporator requiring very low residence times in contact with the heating surface. The advantage in terms of faster cure rate put forward by the Applicant was not surprising, and thereby was not evidence of an inventive step, since the deleterious effect of mercaptans on cure was taught in document (3).

III. On 5 July 1991 a notice of appeal was lodged against that decision together with payment of the prescribed fee. A Statement of Grounds of Appeal was submitted by

16 September 1991. Simultaneously, the Appellant (Applicant), now by change of name dated 27 July 1992, Courtaulds Aerospace INC., filed a new Claim 1 and amended pages 2 and 4 of the description, the sole amendment in Claim 1 being that the low molecular weight mercaptan compounds were now explicitly bifunctional.

In favour of the patentability of the claimed subject-matter as amended the Appellant argued that the mercaptans being now bifunctional could no longer be equated with the low molecular weight monothiol compounds identified as chain stoppers in document (3). If anything, these compounds would be expected to enhance the curing in acting as cross-linking agents. Removal of said components would thus be expected to give reduced, but not increased, cure rates.

IV. The Appellant requested that the decision under appeal be set aside and a patent be granted on the basis of Claim 1 filed on 16 September 1991 and Claims 2 to 14 filed on 13 July 1989 as amended on 13 December 1989, and following description:

- original pages 1, 12 to 14 and 16 to 18;
- pages 2 and 4 filed on 16 September 1991;
- pages 3 and 5 filed on 13 July 1989;
- pages 6 to 11, 15, 19 and 20 filed on 13 December 1989.

Reasons for the Decision

1. The appeal is admissible.

2. The Board is satisfied that the amendment made in Claim 1 during appeal proceedings, viz. addition of

"bifunctional" before "mercaptan compounds", meets the requirements of Article 123(2) EPC in view of the disclosure on page 4, lines 6 to 11 of the original files. In particular, in view of the compounds exemplified in that passage, the Board regards the concept of bifunctional mercaptan compounds as adequately supported by the original disclosure, even if the latter makes no explicit reference to functionality.

Further amendments made during examination proceedings are also not objectionable under Article 123(2) EPC.

3. The application as originally filed mentions a certain number of mercaptan compounds, which can be identified as dimercaptans and mercaptoalkanols, i.e. as bifunctional compounds, whether they contain two mercaptan groups or one mercaptan group and one alcohol group. This relatively specific definition, which is now in the version of Claim 1 before the Board, contrasts with the broader wording, i.e. "low molecular weight mercaptan compounds", which makes no reference to functionality, which was the basis for the decision under appeal. From the arguments in that decision, which rely in particular on the teaching of document (3) dealing with the effect of monothiol compounds on polymerisation, it appears that the expression "low molecular weight mercaptan compounds" has been correctly interpreted as possibly referring to monofunctional compounds only and that the case of the bifunctional compounds has not been considered at all.

For the purpose of deciding whether the latter alternative involves an inventive step, in particular in view of the new arguments provided by the Appellant in the Statement of Grounds of Appeal, the Board makes use of its power given by virtue of Article 111(1) EPC and

remits the case for further prosecution to the Examining Division.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division for further prosecution on the basis of the claims and description as mentioned above in paragraph IV.

The Registrar: The Chairman:

E. Görgmaier C. Gérardin