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D E C I S I O N
of 28 August 1995

Case Number: T 0453/93 - 3.3.3

Application Number: 88102691.8

Publication Number: 0281003

IPC: C08K 5/34

Language of the proceedings: EN

Title of invention:
Flame retardant polyetherimide ester elastomers

Applicant:
GENERAL ELECTRIC COMPANY

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0453/93 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 28 August 1995

Appellant: GENERAL ELECTRIC COMPANY
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 3 March 1993 refusing European patent application No. 88 102 691.8 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. R. J. Gérardin
Members: H. H. R. Fessel
J. A. Stephens-Ofner

Summary of Facts and Submissions

I. The appeal lies against the decision of the Examining Division 2.1.02.013 dated 3 March 1993 to refuse European patent application 88 102 691.8 filed on 24 February 1988 in the name of General Electric Company, Schenectady New York 12305(US). The decision was based on a set of 41 claims filed on 25 November 1991 of which the independent Claim 1 reads as follows:

"1. A flame retardant composition comprising:

(i) at least one polyetherimide ester resin; and
(ii) 10 to 60 weight %, based upon the combined weight of resin (i) and compound (ii), of at least one melamine compound."

Claim 2 to 41 are dependent claims which concern preferred embodiments falling within the scope of Claim 1.

II. The reasons for the decision was that the subject-matter as defined in Claim 1 was deemed to be novel, but did not involve any inventive step vis-à-vis the teachings of documents

(1) EP-A-0 179 470,
(2) GB-A-1 204 835, and
(3) Encyclopedia of Polymer Science and Engineering, Vol. 7, 1987, Wiley-Interscience, page 89.

Starting from document (1), which describes the preparation of polyethermide ester resins within the terms of the application in suit, it was regarded as obvious to add a melamine resin as a fire retardant

additive, since (i) document (2) describes the addition of melamine resin to polyamides for that purpose, and (ii) document (3) teaches that polyamides belong to the general class of polyamides.

III. A Notice of Appeal was lodged on 19 April 1993 against that decision together with payment of the prescribed fee. A Statement of Grounds of Appeal was received on 26 April 1993. The Appellants argued that the use of melamine compounds not only rendered polyethermide ester polymers flame retardant, but also increased the flexural modulus of the composition. It was thus not permissible as was done in the decision under appeal, to restrict the definition of the technical problem underlying the application in suit to the provision of a flame retardant polyethermide ester composition. In the absence of any reference in document (2) to an improvement of the flexural modulus of the polyamide by addition of melamine resins and in view of the substantial differences between polyamides and polyethermide esters, there was no reason to expect such an effect with polyethermide esters.

IV. The Appellants requested

that the decision under appeal be set aside and a patent be granted on the basis of Claims 1 to 41 filed on 25 November 1991.

Reasons for the Decision

1. The appeal is admissible.

2. The Board is satisfied that the amendments to the claims made for the sake of clarity in response to an objection of the Examining Division based on Article 84 EPC do not give raise to any objection under Article 123(2) EPC.

3. The subject-matter of Claim 1 of the present application is a composition comprising two components, i.e. a polyetherimide ester resin and at least one melamine compound. None of the cited documents discloses such a composition. The claimed subject-matter is therefore new, as has already been held by the Examining Division.

4. The present Patent Application is directed to a flame retardant composition comprising a specific polyetherimide ester resin and a flame retardant, i.e. a melamine compound in an amount of 10 to 60 weight%, based on the combined weight of resin. This specific polymer is described in document (1), which the Board, like the Examining Division, regards as the closest state of the art. Although emphasis is laid in that citation (page 1, lines 1 to 6; page 15, lines 5 to 8; page 18, Table 2) on a desirable combination of excellent mechanical properties which makes these polymers especially suited for moulding and extrusion applications, their flexural modulus cannot be regarded in practice as entirely satisfactory. Moreover, as underlined in the introduction of the application in suit (page 2, lines 11 to 13), these polymers are somewhat flammable.

In view of these shortcomings the technical problem to be solved may thus be seen in the provision of a polyetherimide ester resin composition having simultaneously flame retardant characteristics and improved flexural moduli.

The problem is said to be solved by the addition of at least one melamine compound.

In view of the results of experiments given in Table I of the present application the Board is satisfied that the two aspects of the above defined problem are effectively solved with the indicated means.

5. It has now to be decided whether the above solution involves an inventive step.

5.1 Document (1) does not contain any hint as to how to make the polyetherimide ester resin flame resistant, or how to improve its flexural moduli. The only modification of properties which it mentions concerns the increase of the modulus of the material at various elongations by incorporation of conventional inorganic fillers (page 13, lines 19 to 26).

5.2 Document (2) teaches that fibre reinforced, and in particular glass-fibre reinforced polyamides are flammable (Claim 1). It is further stated that the addition of fire-retarding substances was generally known in the art. It was, however, also known that substances of this kind cannot be universally used with equal effect in every type of plastic; but instead, each type of plastic has to have its system (see loc.cit., page 1, lines 32 to 38). The document further states that hitherto there has never been any evidence of an additive which in every type of polyamide, and in particular (glass)fibre-reinforced polyamides, produced an adequate level of self-extinguishing properties, and which caused little or no damage to the mechanical properties of the polyamide material (see page 1, lines 61 to 71). All these objects are accomplished by the teaching given in document (2), i.e. by a self-extinguishing polyamide moulding composition comprising

a polyamide having recurring carbonamide linkages in the polymer chain and 0.5 to 25% by weight, based on the moulding composition, of a melamine compound. Suitable polyamides include any polyamides of the kind that could be obtained by polymerising lactams, polycondensing aminocarboxylic acids or polycondensing diamines with dicarboxylic acids or derivatives thereof. A person skilled in the art would have learnt from the above teaching that one could neither predict the efficiency of a fire retardant additive, nor forecast the effect on its mechanical properties in its combination with different plastic materials.

In the light of this teaching, the Board concludes that, whilst a person skilled in the art could well have replaced the polyamide specified in document (2) by the polyetherimide ester resin known from document (1), he would not in fact have done so in the expectation of the solution of the above problem.

5.3 The Board cannot accept that document (3) teaches the skilled person to understand the word polyamide as clearly comprising not only polyimides, but also polyetherimide ester resins as used in the present patent application. This citation concerns thermal properties of films of different classes, one of them being the class of polyamides, also mentioning polyimide. The Board considers this classification as being clearly linked with the properties of films, and not as an indication that a person familiar with flame retardant compositions would understand the polyetherimide ester resin of the application in suit to include a polyamide as specified in document (2). In fact, in view of the structure and the composition of its polymer chain, a polyetherimide ester polymer can hardly be regarded as a simple polyamide. On the one hand, the ester linkages and imide linkages play an

equally important role in the formation of that chain; on the other hand, the definition of the diamine used in the preparation of the polymer (page 4, lines 3 to 30), which is a long chain ether diamine with a molecular weight between 600 and 12000, shows that there are much more ether linkages than imide linkages in the chain.

5.4 From the reasoning given above it follows that neither one of the documents cited above nor any combination thereof can raise any doubts upon inventiveness of the subject-matter as claimed in Claim 1.

6. In view of the above findings the Board sees no need to deal separately with Claims 2 to 41.

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.

The Registrar: The Chairman:

E. Görgmaier C. Gérardin