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File Number: T 427/89 - 3.3.3

Application No.: 82 101 026.1

Publication No.: 0 058 403

Title of invention: Flame retardant polyarylate compositions

Classification: C08L 67/02

DECISION
of
22 November 1991

Proprietor of the patent: AMOCO CORPORATION

Opponent: Bayer AG, Leverkusen Konzernverwaltung RP
Patente Konzern

Headword:

EPC Article 56

Keyword: Inventive step (no)

Headnote



Case Number : T 427/89 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 22 November 1991

Appellant :
(Proprietor of the patent)

AMOCO CORPORATION
200 East Randolph Drive
PO BOX 5910-A
Chicago
Illinois 60680 (US)

Representative :

Weinhold, Peter, Dr.,
Patentanwälte Dr. V. Schmied-Kowarzik
Dipl.-Ing. G. Dannenberg
Dr. P. Weinhold
Dr. D. Gudel
Dipl.-Ing. S. Schubert
Dr. P. Barz
Siegfriedstrasse 8
W - 8000 München 40 (DE)

Respondent :
(Opponent)

Bayer AG, Leverkusen
Konzernverwaltung RP
Patente Konzern
Bayerwerk
W - 5090 Leverkusen (DE)

Decision under appeal :

Decision of Opposition Division of the European
Patent Office of 17 February 1989, issued on
2 May 1989 revoking European patent No. 0 058 403
pursuant to Article 102(1) EPC.

Composition of the Board :

Chairman : F. Antony
Members : H.H.R. Fessel
M.K.S. Aúz Castro

Summary of Facts and Submissions

I. On 11 February 1982 the predecessor-in-title of the Appellant (Proprietor, now AMOCO) filed European patent application No. 82 101 026.1 claiming a US priority of 12 February 1981 and leading to patent No. 0 058 403 (mention of the grant 8 January 1986 cf. Bulletin 86/02).

II. On 29 March 1986 the Respondent (Opponent) filed a notice of opposition based on Article 100(a) EPC, contesting novelty and inventive step.

This objection was based on:

(1) DE-A-2 535 262

(2) EP-A-0 042 561

and two further documents filed after expiry of the opposition period, viz.

(3) GB-A-1 538 632

(4) DE-A-2 847 782.

III. In a decision issued 2 May 1989 the Opposition Division revoked the patent. That decision was based essentially on the following reasons:

It was stated that the subject-matter of the claims as amended during opposition proceedings (main and subsidiary requests) did neither contravene Article 123(2) and 123(3) EPC nor Article 54 EPC.

The late-filed documents (3) and (4) were considered to be less relevant and thus not admitted (Article 114(2) EPC).

As to inventive step, the Opposition Division held that, on the basis of a state of the art acknowledged in the patent specification as confirmed during oral proceedings before the Opposition Division, blends of polyarylates (a) with the specific thermoplastic polymers listed as component (c) in both versions of Claim 1 were known. The skilled man confronted with the problem to improve the flame resistance of a polymer blend of (a) and (c) would, in view of the teaching of (1), try to solve this problem by using alkali metal salts of aromatic sulfonic acids known therefrom as effective flame retardants for polymer blends containing polycarbonates. No inventive ingenuity was therefore required to arrive at the compositions of Claim 1 (both versions). An inventive step could, however, be recognised for a more limited claim wherein component (c) would be a combination of a polycarbonate plus a polyethylene terephthalate, based on the evidence produced in the patent specification and showing an unexpected effect for such a specific combination.

IV. On 4 July 1989 the Appellant filed a notice of appeal together with a new main claim. The prescribed fee was paid at the same time. With the Statement of Grounds of Appeal filed on 8 September 1989 another Claim 1 was submitted, reading now as follows:

"A flame retardant molding composition comprising a blend of:

- (a) at least 20 weight percent of a polyarylate derived from a dihydric phenol and an aromatic dicarboxylic acid;
- (b) 0.05 to 10 weight percent of an alkali or alkaline earth metal salt of an aromatic sulfonic acid; and
- (c) 5 to 79.95 weight percent of a thermoplastic polymer selected from (i) a polyester derived from an aliphatic or cycloaliphatic diol, or mixtures thereof and at least one aromatic dicarboxylic acid, (ii) an aromatic

polycarbonate, (iii) a poly(aryl ether) and combinations thereof.

- V. Oral proceedings were held on 22 November 1991. At the beginning of these oral proceedings the Chairman of the Board informed the Appellant that the late-filed document (4) is considered to be relevant prior art and would, therefore, be introduced into the proceedings.

The Appellant contested the reasoning given in the decision of the Opposition Division since, as a result of a misunderstanding, it was based on the assumption that blends of polyarylates (a) with a specific thermoplastic polymer listed as component (c) of Claim 1 were known. The composition of Claim 1 could, however, not in fact be regarded as a combination of a known flame retardant (b) with a known polymer blend ((a) + (c)) such as e.g. the combination of a polycarbonate plus polyarylate. He stressed that only (1) could be considered as closest prior art to define the problem since (2) was an Article 54(3) EPC document.

During oral proceedings the Appellant filed two subsidiary requests: Claim 1 of the first such request differs from that of the main request in that component (c) would be defined as an aromatic polycarbonate or as a mixture thereof with a polyethylene terephthalate. The second auxiliary request differs therefrom in that component (c) would be defined as only a mixture of an aromatic polycarbonate and a polyethylene terephthalate.

The Appellant argued that, with regard to the cited prior art, the good flame resistant properties of the claimed composition, especially as far as the first ignition was concerned, were surprising. No hint was given in the prior art to confer flame resistant properties to tailor-made

compositions as e.g. those specified in control M. In particular, as demonstrated in Example 13 a dramatic reduction of burning time (45 versus 4.2) would be achieved when a specific combination of components as claimed in Claim 1 of the second auxiliary request was used. This could only be the result of an inventive selection of the specified components.

- VI. The Appellant requested to set the decision under appeal aside and to maintain the patent in amended form based on Claim 1 as filed on 8 September 1989 as main request, or in accordance with the first or second auxiliary request made during oral proceedings.

The Respondent did not produce any comment, he had informed the Board that he would not attend oral proceedings and requested to decide the case as at it stands.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC (cf. items III., IV. and V. above) and is, therefore, admissible.
2. The current wording of the claims does not give rise to any objections under Article 123 EPC.

In substance, the wording of Claim 1 of the main request differs from that as originally filed by the fact that:

- (a) a third component (c) is specified therein and
- (b) the amounts of the components (a), (b) and (c) are indicated.

These amendments are sufficiently supported by page 3, lines 14 to 34 in conjunction with page 9, lines 10 to 14 of the specification as originally filed (corresponding to page 2, lines 27 to 35 and page 4, lines 43 and 44 of the patent specification).

The wording of Claim 1 of the first and second auxiliary requests differs from that of the main request in that beyond a deletion of alternatives the polyester as specified in component (c) is now defined as being a polyethylene terephthalate. This amendment is clearly supported by original Claim 15 corresponding to Claim 14 of the Patent Specification.

Since the subject-matter of all the versions of Claim 1 now on file is narrower in scope than that of Claim 1 as granted, the protection conferred thereby is not extended with regard to the opposed version (Article 123(3) EPC).

3. The Board is satisfied that the subject-matter of the claims of the main and auxiliary requests 1 and 2 is novel. There is no need to give a detailed reasoning since novelty was not disputed in appeal proceedings.
4. When oral proceedings started there was only one request before the Board, corresponding to the main request now on file. At that time the Board considered document (4) to represent the closest prior art with regard to the subject-matter of Claim 1 wherein (c) is a polyester as defined under item (i) therein. The problem to be solved was considered to consist in providing compositions of (a) + (c) having enhanced flame retardant characteristics.

As a result of the submissions put forward during oral proceedings this approach is no longer maintained.

5. Claims 1 of the main and first auxiliary requests are considered together, on the basis of the alternative feature common to both, viz. (c) being an aromatic polycarbonate.

A composition comprising 0.01 to 10 weight percent of an alkali metal salt of an aromatic sulfonic acid and an aromatic polycarbonate is known from document (1) (cf. page 2, lines 1 to 4 in conjunction with page 6, lines 13 to 28 and Example II). The Board now considers this document to represent the closest prior art.

Starting from this prior art the problem to be solved may be seen in the provision of a moulding composition comprising (b) and (c) and having enhanced flame retardant properties.

With regard to the results given in the Tables of the patent in suit, especially control G and Example 8, the Board is satisfied that this problem is effectively solved by a composition as claimed in the above alternative feature of Claim 1 according to both versions.

It remains to be considered whether, having the existing problem in mind, the partial replacement of the polycarbonate component (c) by a polyarylate component (a) (hereinafter PC and PA) was obvious with regard to the prior art.

It was known from the prior art that unmodified PA's per se exhibit comparatively favourable flammability ratings (cf. page 2, lines 8 to 15 especially lines 13 and 14 of the patent in suit). Moreover, it was known from the prior art that PC per se exhibits poor flame retardant properties (cf. Example I of document (1)). For a man

skilled in the art wishing to improve these properties of the said prior art products it was therefore obvious to replace part of PC by PA, e.g. in a composition known from Example II of document (1).

On the basis of these findings, the subject-matter according to both the main and first auxiliary requests does not meet the requirements of Article 56 EPC.

6. Claim 1 of the second auxiliary request requires component (c) of the composition to be a mixture of an aromatic polycarbonate (PC) with a polyethylene terephthalate, hereinafter (PET). (This corresponds to one of the alternatives covered by Claim 1 according to the first auxiliary request.) However, on the basis of especially Example 13 of the patent in suit on the one hand, and Example II of document (1) on the other hand, the Board is not satisfied that the resulting proposal would indeed solve the problem defined above in the third paragraph of point 5 insofar as enhancement of the flame retardant properties are concerned (e.g. UL-94 rating V-2 and burning time on first ignition of 3.4 seconds). As an effect not actually achieved has to be disregarded in formulating the problem, there remains the less ambitious problem of providing another flame retardant moulding composition.

The Board is satisfied that this less ambitious problem has indeed been solved (cf. Example 13 of the patent in suit).

7. It remains to be judged whether this solution was obvious considering also the teaching given in document (4). Example 4 of that document concerns a composition comprising 3 parts PA and 97 parts of PET and, read in conjunction with Claim 1, results also in a teaching of a

composition comprising 20 weight percent PA and, accordingly, 80 weight percent PET.

A man skilled in the art starting from Examples I and II of document (1) in search of alternative flame retardant compositions, being aware of the poor flame retardant properties of PC per se and having in mind that PA per se has more favourable flame properties, would not hesitate to replace part of the PC in a composition known from Example II of document (1) by a composition as known from document (4).

No inventive ingenuity was therefore required to arrive at the composition of Claim 1 of the second auxiliary request. The subject-matter of Claim 1 of the second auxiliary request is thus not patentable with regard to the provisions of Article 56 in conjunction with Article 52(1) EPC.

8. This conclusion cannot be overcome by the Appellant's argument that there was a need for tailor-made products in the art, and in the present case it was an object to improve flame retardant properties of such a tailor-made product, cf. Control M in Table IV of the patent in suit. A man skilled in the art seeking to improve the flame retardant characteristics of the 3-component composition of Control M would be surprised of the amount of such an effect (45 versus 4.2 for the burning time of the first ignition) as demonstrated by Example 13 (cf. Table IV).

With regard to these arguments the Board is not aware of prior art disclosing a composition as defined in Control M. But even if this were the case and the amount of the improvement of flame retardant characteristics were surprising, no inventive step could be based on such a "surprising" effect being far beyond an expected one, when

it was obvious to try to improve the characteristics of said composition by the addition of a well-known flame retardant agent as specified under item (b) of Claim 1.

The Appellant further argued that only the specific combination as claimed in Claim 1 would lead to a product showing the demonstrated characteristics. With, for example, other flame retardant agents than those specified in Claim 1 the characteristics of said compositions would be deteriorated.

This argument is disregarded by the Board, for lack of supporting experimental evidence, as a mere unproved assertion. As far as the purported synergistic effect is concerned, the presence of such an effect has not been demonstrated either, and is thus disregarded as well.

9. In view of the foregoing the Board considers the subject-matter of Claim 1 (of all versions) as lacking inventive step and thus not being patentable (Article 52(1) EPC). The subject-matter of the dependent claims falls with the subject-matter of the independent claim since a request can only be dealt with in toto.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:


E. Görgmaier

The Chairman:


F. Antony