BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Publication in the Official Journal ~~Yes~~ / No

File Number: T 645/89 - 3.3.3

Application No.: 84 201 299.9

Publication No.: 0 137 546

Title of invention: Polyphenylene ether composition containing an epoxy compound

Classification: C08L 71/04

D E C I S I O N
of 8 July 1992

Proprietor of the patent: GENERAL ELECTRIC COMPANY

Opponent: BASF Aktiengesellschaft

Headword:

EPC Article 56

Keyword: "Inventive step - yes"

Case Number : T 645/89 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 8 July 1992

Appellant : (Proprietor of the patent)
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Respondent : (Opponent)
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Decision under appeal :
Decision of Opposition Division of the European Patent Office dated 28 August 1989 revoking European patent No. 0 137 546 pursuant to Article 102(1) EPC.

Composition of the Board :

Chairman : F. Antony
Members : R.A. Lunzer
M.K.S. Aúz Castro

Summary of Facts and Submissions

I. European patent No. 137 546 was granted on 25 November 1987 on the basis of application No. 84 201 299.9, filed on 10 September 1984, having a priority date of 12 October 1983 derived from Dutch Application No. 8 303 494. Claim 1 reads as follows:

"A polymer mixture comprising:

a) a polyphenylene ether resin;
b) an epoxy compound; and
c) a block copolymer having blocks derived from a conjugated diene and a vinylaromatic compound, wherein said epoxy compound is present in an amount of 0.2 to 7.5% by weight of the total composition and wherein said block copolymer is present in an amount of 1 to 25% by weight of the total composition."

II. On 23 August 1989 an opposition was lodged by the Respondent on the grounds of Articles 100(a) and (b) EPC, alleging lack of novelty (Article 54 EPC), lack of inventive step (Article 56 EPC), and lack of sufficiency of disclosure (Article 83 EPC). The Opponent relied in particular on the following documents:

(2) EP-B-55 473
(4) DE-A-2 434 848
(5) JP-A-49/28643 (in the form of a Derwent abstract).

III. By its decision of 28 August 1989, the Opposition Division revoked the patent. It rejected the objection lack of sufficiency of description, which objection was based solely on the fact that there were two errors in the description. In the view of the Opposition Division, these were obvious errors which did not make the description

insufficient. The Opposition Division also rejected the Respondent's argument as to lack of novelty having regard to document (2). However, in relation to inventive step, it held that it was, "well known from document (5) that the addition of an epoxy compound in a PPE composition results in an improvement of the peel strength being well in accordance with common general knowledge" (page 5 last paragraph), and that the, "patentee appeared to be doing no more than following the conventional teaching in the art" (page 6 lines 2 to 3). Accordingly, the patent was revoked.

IV. An appeal against that decision was lodged on 27 September 1989, together with the payment of the appeal fee, and the filing of the grounds of appeal. In the Statement of Grounds of Appeal, and during oral proceedings held on 8 July 1992, the Appellant argued that, taking document (4) as the closest prior art because it disclosed a polymer of a similar composition apart from the epoxy compound, the problem would then be to find a way of improving the adhesion of a sprayed coating, as to which the solution proposed by the patent in suit was the inclusion of the claimed proportion of an epoxy compound. A skilled worker, starting from document (4), and seeking a solution to the problem of the adhesion of coatings deposited such as by spraying, would probably not have found document (5) at all if, as might have been expected, his search had been directed to documents dealing with the problem of improving the adhesion of coatings on plastic mouldings. Even assuming that document (5) had been found, the skilled worker would then observe that it was concerned with bonding a plastic composition to a metal foil by employing high temperature and pressure. That would afford no suggestion as to what should be done at ambient temperature and pressure. Furthermore, the skilled worker might expect that the elevated temperatures

normally encountered in injection moulding could have a deleterious effect on any adhesive properties which a composition containing a proportion of epoxy resin might otherwise have.

V. The Respondent argued in its counterstatement, filed on 19 January 1990, and during the oral proceedings, that document (5) led directly to the alleged invention. It disclosed keeping the product at 300°C for ten minutes, which conditions were more severe than any normally encountered in injection moulding. At the very least, document (5) having revealed that the adhesion of PPE polymers to a foil could be improved by the inclusion of a minor proportion of an epoxy compound would have suggested to the skilled worker that he should try using a similar addition for the purpose of improving the adhesion of coatings sprayed onto solid PPE objects.

VI. The Appellant (patentee) requested that the decision under appeal be set aside and that the patent be maintained. The Respondent (opponent) requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. Novelty

Novelty was not in issue on appeal. Having reviewed the cited prior art, the Board is satisfied that the alleged invention is novel.

3. Closest prior art

In common with the view of the Opposition Division, the parties and the Board were in agreement in regarding document (4) as the closest prior art. It discloses a PPE polymer composition, which includes a block copolymer. In accordance with Example 3, an SBS block copolymer falling within Claim 1 of the patent in suit can be used. Document (4) is not concerned with spray coating moulded products.

4. Problem and solution

When compared with the polymers disclosed in document (4), the objective problem with which the alleged invention is concerned is to achieve an improvement in the adhesion of a coating of a lacquer, or an adhesive, on a solid PPE polymer article. That is also the problem identified in the patent in suit at page 2 lines 13 to 18. The solution to that problem resides in the inclusion of 0.2 to 7.5% of an epoxy compound in the polymer composition. In the light of the experimental detail given in the patent in suit, the Board is satisfied that an improvement is thereby attainable, albeit that the level of improvement is modest. In fact, the patent in suit describes the results of a number of comparative experiments as showing results which were better or equal to the results achieved by the reference examples.

5. Inventiveness

5.1 The issue of inventiveness turns on whether a skilled person, having as his starting point polymers such as are disclosed in document (4), and confronted with the problem of improving the adhesion of a layer of lacquer or adhesive, would have found in document (5) any pointer towards the inclusion of an epoxy resin as a way of overcoming that problem.

5.2 The first issue with which the Board was concerned was whether a skilled worker, confronted with that problem at the priority date of 1983, would have found document (5) at all, it being an abstract published 1974. It was argued by the Appellant that this document would not have been found by one searching for documents dealing with methods of improving the bonding between plastic mouldings and surface lacquers or adhesives. However, in the view of the Board, a skilled worker seeking to improve the surface properties of PPE polymer mouldings would look for disclosures in the PPE field, and although that is a wide field, the document in question would in all probability have been found. Accordingly, the Board regards document (5) as being a relevant disclosure for the purposes of considering inventiveness.

5.3 As there is a number of points of distinction between the disclosure of document (5) and the alleged invention, the Board sets out the whole of that brief abstract as follows:

"Modified epoxy adhesives - based on polyphenyleneoxide and epoxy resins

The resin compn. contains a poly(phenylene oxide) with or without halogen, alkyl, CN, alkoxy, PhO or NO_2 substitutions on the ring and an epoxy resin. The compn. is useful as an adhesive, and the compn. reinforced with glass fibres has good mech. strength. In an example, 100 parts of a 95:5 blend of poly(2,6 dimethyl-1,4-phenylene oxide) and EPDM rubber and 10 parts of Epikote 1009 were extruded and pressed with a 0.1 mm Cu foil at 300°C for 5 min., at 300°C and 50 kg/cm^2 for 3 min., and at 300°C and 100 kg/cm^2 for 2 min. to form a 1-mm resin layer on one side of the foil. The peel strength of the foil from the resin was 5.8 kg/cm^2, compared with 2.2 kg/cm^2 for a similar combination without Epikote 1009."

5.4 The Board observes the following differences between that disclosure and the alleged invention.

(i) The polymer composition in accordance with the abstract includes 10% of epoxy compound, whereas the claimed range is 0.2 to 7.5%.

(ii) The said composition lacks any block copolymer.

(iii) The abstract is concerned with the formation of a bond between a metal foil and the polymer, whereas the patent in suit is concerned with a bond between the polymer and another (normally organic) coating.

(iv) The abstract involves the use of a temperature of 300°C for a total time of 10 minutes, while for 3 minutes and 2 minutes respectively, the considerable pressures of first 50, and then 100 kg/cm^2, are applied.

5.5 Dealing with the above points of distinction, in common with the Opposition Division, the Board considers that if (i), the idea of including a proportion of epoxy compound were to be adopted, arriving at the optimum amount to be used would be no more than a matter of trial and error. Regarding (ii), as the matter at issue here is inventiveness, and not novelty, the Board does not consider the difference in composition to be important, since in both cases PPE is the main constituent of the polymer.

5.6 The Board regards features (iii) and (iv) above as being related, in the sense that as a foil normally has a smooth

metallic surface, temperature and pressure may well be needed to secure a bond between the metal surface, and a polymer composition. Those conditions might not be required when considering the bond between an organic composition capable of being sprayed at room temperature and pressure, and a moulded finished article.

5.7 The Board regards document (5) as teaching the skilled reader that epoxy resins are compatible with PPE polymers, and that in the circumstances there described, the well known adhesive properties of the epoxy resin were not lost by its being diluted by a much greater quantity of another polymer.

5.8 However, the essential question in relation to the present appeal is whether this document contains sufficient pointer to the fact, which is now known to be true as a result of the alleged invention, but was not - on the basis of the information currently available to the Board - otherwise known at the priority date, that at room temperature, a PPE moulding containing a proportion of epoxy resin would be likely to have a more adhesive surface than a PPE resin without that inclusion.

5.9 Although it was argued that the disclosure of document (5) made it obvious to try the inclusion of a proportion of epoxy resin, in the view of the Board, the emphasis in document (5) on high temperatures, and very significant pressures, as a means for achieving a bond, tells the skilled reader nothing about whether there would be any useful surface tackiness to be found in cold PPE mouldings containing a small proportion of an epoxy compound. The skilled worker would therefore have seen no adequate reason to try the expedient, disclosed in document (5) in connection with bonding hot polymer to metal foils under high temperature and pressure, to the quite different

circumstances of improving the bond between a PPE moulding at room temperature, and a coating sprayed onto it. In addition there was no material before the Board suggesting that there was any common knowledge, or common experience, that the adhesive properties of the surface of a solid object, such as might be produced by injection moulding a polymer, could be improved by including in the polymer a minor proportion of a resin known to have good adhesive properties. Consequently, although the Board regards the disclosure of document (5) as coming very close to the invention, it nonetheless reached the conclusion that the patent should be maintained.

6. Conclusion

The subject matter of Claim 1 of the patent in issue thus involves an inventive step as required by Article 56 EPC, and the Claim is therefore patentable. The dependent Claims 2 to 6 relate to modifications of the polymer falling wholly within the scope of Claim 1, and on that ground alone they are entitled to be upheld.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The patent is maintained as granted.

The Registrar: The Chairman:

E. Görgmaier F. Antony

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