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D E C I S I O N
of 10 May 1995

Case Number: T 0695/92 - 3.3.3

Application Number: 87201207.5

Publication Number: 0253424

IPC: C08G 8/28

Language of the proceedings: EN

Title of invention:
Synthetic resin composition, substrate material for printed circuit boards and method of manufacturing a synthetic resin composition

Applicant:
Philips Electronics N.V.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 123(2), 54, 56

Keyword:
"Amendments - added subject-matter (no)"
"Novelty - implicit disclosure (no)"
"Inventive step - non obvious combination of features"

Decisions cited:
G 0010/93

Catchword:
-

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Case Number: T 0695/92 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 10 May 1995

Appellant: Philips Electronics N.V.
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Representative: Weening, Cornelis
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 12 May 1992 refusing European patent application No. 87 201 207.5 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. Gérardin
Members: B. ter Laan
J. Stephens-Ofner

Summary of Facts and Submissions

I. European patent application No. 87 201 207.5, filed on 24 June 1987, claiming priority of 14 July 1986 from an earlier application in the Netherlands (8601829), and published on 20 January 1988 under No. 0 253 424, was refused by a decision of the Examining Division of the European Patent Office dated 12 May 1992.

The decision was based on a set of 3 claims filed on 19 February 1992, Claim 1 reading as follows:

"A method of manufacturing a synthetic resin composition which comprises a phenol-formaldehyde resin and a polyurethane component by reacting a polyurethane component blocked with alkylated phenol with the phenol-formaldehyde resin in the presence of a basic catalyst, characterized in that the phenol-formaldehyde resin is prepared in the presence of the blocked polyurethane component at the boiling point of a mixture comprising phenol, formaldehyde or a formaldehyde-producing compound, the blocked polyurethane component and the basic catalyst, and in which per mol of phenol from 0.005 to 0.02 mol of the blocked polyurethane component is used."

Claim 2 refers to a substrate material for printed circuit boards, comprising a fibrous carrier material impregnated with a synthetic resin obtainable according to Claim 1. Claim 3 is directed to the use of a synthetic resin obtainable according to Claim 1, for manufacturing a substrate material for printed circuit boards.

II. The reason given for refusal was lack of novelty of the subject-matter as defined in Claims 2 and 3. More

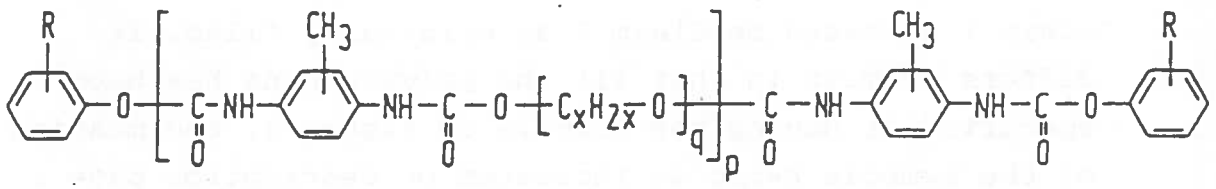
specifically, it was held that US-A-4 440 833 (D3) described the preparation of a copper laminate comprising a cellulose containing material impregnated with a varnish composition based on a phenol-resol resin and a p-nonylphenol blocked polyurethane derived from toluene-2,4-diisocyanate and a mixture of polyethylene and polypropylene glycols. It was also held that these copper laminates were useful as substrates for printed circuits. Products obtained according to the process of Claim 1 of the application in suit differed from those of D3 only in the presence of the blocked polyurethane during the preparation of the phenol-formaldehyde resin. This operative feature could not lead to a compositional difference between D3 and the subject-matter of Claims 2 and 3. In addition, the decision stated that the comparative tests filed during the examination procedure could provide evidence for the inventiveness of the process as defined in Claim 1.

III. On 10 July 1992 a Notice of Appeal was lodged against that decision, together with payment of the prescribed fee. In the Statement of Grounds of Appeal filed simultaneously the Appellant (Applicant) concentrated on the issue of novelty as set out in the decision under appeal. He argued, in particular, that the method as defined in Claim 1 of the application in suit required that the phenolic resin be prepared in the presence of a small amount of a blocked polyurethane, whereby an undefined interpolymer was formed by the deblocking reaction of the polyurethane, which was then incorporated in the phenolic resin. In accordance with these arguments, the method claim of the three requests to be considered - main request: Claims 1 to 3 filed on 19 February 1992; first auxiliary request: single amended method claim filed on 10 July 1992; second auxiliary request: Claim 1 filed on 19 February 1992 - was based on the use of such a blocked polyurethane.

IV. In a telephone conversation on 18 April 1995 the Appellant was informed that there was no support in the application as originally filed for the general term "polyurethane component blocked with alkylated phenol" and that, consequently, the three requests contravened Article 123(2) EPC.

On 20 April 1995 the Appellant filed a new set of three claims to be considered as his sole request, in which the above dependent Claims 2 and 3 were maintained unamended and Claim 1 was drafted as follows:

"A method of manufacturing a synthetic resin composition which comprises a phenol-formaldehyde resin and a polyurethane component by reacting a polyurethane component blocked with alkylated phenol with the phenol-formaldehyde resin in the presence of a basic catalyst, characterized in that the phenol-formaldehyde resin is prepared in the presence of the polyurethane component at the boiling point of a mixture comprising phenol or substituted phenol, formaldehyde or a formaldehyde-producing compound, the polyurethane component and the basic catalyst, wherein the polyurethane component has the formula:



in which R is an alkylgroup having 4 to 12 carbon atoms, p is an integer from 0 to 2, q is an integer from 10 to 30 and x is an integer from 2 to 6."

Simultaneously, three pages numbered 1, 1a and 2, were submitted in replacement of pages 1 and 2 of the description and the deletion of the expression "for example" on page 3, line 25, was requested.

V. The Appellant requested that the decision under appeal be set aside and a patent be granted on the basis of Claims 1 to 3 filed on 20 April 1995 and the following description:

- pages 1, 1a and 2 filed on 20 April 1995,
- page 3 amended according to the above request,
- pages 4 and 5 as originally filed,

and drawing 1/1 (Figures 1 and 2) as originally filed.

Reasons for the Decision

1. The appeal is admissible.

Article 123(2) EPC

2. The wording of the Claims does not give rise to any objections under Article 123(2) EPC for the following reasons.

Claim 1 is based on Claim 3 as originally filed. It differs from it in that (i) the polyurethane has been specified as having the formula of Figure 1, the meaning of the symbols being as indicated on description page 3, lines 25 to 29 of the application as originally filed, and (ii) the reactants are kept on the boil, which is originally disclosed on page 3, lines 32 to 33 of the application as originally filed.

Claim 2 is based on Claim 2 as originally filed, but the impregnating synthetic resin composition now refers to the product obtainable by the method of Claim 1.

The basis for Claim 3 can be found in original Claim 2 and on original description page 4, lines 11 to 21.

Novelty

3. For the reasons set out below, the Board agrees with the interpretation of D3 of the Examining Division (cf. Summary of Facts and Submissions, point II). Apart from the use of a blocked polyurethane derived from a specific combination of two polyetherglycols and toluene-2,4-diisocyanate, the main feature of the method described in D3 is that the blocked polyetherurethane reacts with a phenol-resol resin already formed (Claim 1 in conjunction with column 2, lines 40 to 42; column 4, Table I, polyurethane (E)). The resulting polymer thus differs in two respects from the product obtained by the method as claimed in the application in suit. On the one hand, the components of the polyurethane, i.e. the mixture of polyetherglycols and toluene-2,4-diisocyanate, give rise to a polyetherurethane unit which cannot correspond to the formula now required by the application in suit; on the other hand, the structure resulting from the reaction between the phenol-resol resin and the polyurethane component is different from that of the interpolymer prepared in the application in suit from the unreacted compounds, i.e. (i) a phenol, (ii) formaldehyde or a formaldehyde-producing compound and (iii) the polyurethane. The latter is confirmed by the comparative tests filed during the examination procedure, in which it was shown that the polymers according to D3 had different properties from those of the application in suit.

The synthetic resin manufactured by the method according to Claim 1 being different from the products of D3 by both its composition and its structure, it follows that any application of this resin, whether formulated as a substrate material for printed circuit boards comprising a fibrous carrier material impregnated with such a resin as in Claim 2, or as the use of the resin for the manufacturing of a substrate material for printed circuit boards as in Claim 3, is also novel. This means that the present wording of the claims overcomes the objection of lack of novelty raised against Claims 2 and 3.

Inventive step

4. Although the sole ground of refusal of the application was lack of novelty, the content of the examination file reveals that the issue of inventive step had been extensively discussed and even that, as stated in point II above, a positive conclusion regarding that question was envisaged by the Examining Division. Since the scope of present Claim 1 is now more narrowly defined, which means that the same considerations and arguments in favour of an inventive step should apply, and since the Board shares the view of the first instance in that respect, the Board regards it as appropriate to make use of its power under Article 111(1) EPC and decide itself on the case, following the principles enunciated in Decision G 10/93 (OJ EPO 1995, 172).

5. The application in suit concerns a method for manufacturing a synthetic resin composition, a substrate material for printed circuit boards and a method for manufacturing substrate material for printed circuit boards.

Such subject-matter is disclosed in D3 which the Board, in common with the Examining Division, regards as the closest state of the art. Although the laminates obtained by the method according to this citation (see points II and 3 above) are said to have improved mechanical properties, particularly in terms of cold-punching ability and elasticity (column 2, lines 1 to 5 and 26 to 46), their degree of sagging, flexural strength and heat distortion temperature were capable of improvement.

In view of these shortcomings the technical problem underlying the application in suit may thus be seen in the definition of a process of manufacturing a resin resulting in a lower degree of sagging as well as improved flexural strength and heat distortion temperature of printed circuit boards impregnated with that resin.

According to the application in suit this problem is to be solved by using a polyurethane component having the formula specified in Claim 1 and by preparing the phenol-formaldehyde resin in the presence of the polyurethane component at the boiling point of a mixture comprising substituted or unsubstituted phenol and formaldehyde or a formaldehyde-producing compound, and a basic catalyst.

The comparative example in the application (page 4, line 27 to page 5, line 5) and the test report filed on 19 February 1992 show that the various aspects of the above-defined problem are effectively solved.

6. The issue to be decided, therefore, is whether the claimed subject-matter is obvious having regard to all documents on file.

6.1 Apart from the fact that D3 does not consider any of the properties mentioned in the definition of the technical problem, its specific teaching would discourage the skilled person to operate according to another line. In particular, it clearly appears that both the definition of the blocked polyurethane component and the reaction thereof with a phenol-resol resin already prepared are essential for the properties of the laminate (column 2, lines 40 to 55).

For these reasons, D3 does not, indeed, provide a solution of the above-defined problem.

6.2 Chemical Abstracts, vol. 94, No. 12, June 1981, page 51, abstract No. 193386c (D1) describes the preparation of modified phenolic resins by reaction of phenol and formaldehyde in the presence of a polyesterurethane, whereby resins for electric insulators having good punching processability are obtained; in particular, reference is made to paper prepregs containing 50% by weight of such resins and to the resulting laminates.

Such teaching is unrelated to any of the three aspects of the technical problem as defined above and would not, therefore, be considered by a skilled person faced with that problem. In other words, the sole fact that an operative feature disclosed in this citation - i.e. the preparation of a phenolic resin in the presence of a polyurethane already formed - corresponds to the method as claimed cannot provide any incentive to use the same operative feature in order to improve totally different properties.

Furthermore, even a combination of D1 with D3 would not result in the claimed subject-matter, since neither the polyesterurethane according to D1, nor the specific

polyetherurethane used in D3 corresponds to the polyurethane required by the application in suit.

6.3 The other documents on file,

D2. US-A-4 173 594,
D4. GB-A-975 377,
D5. EP-A-0 047 654,
D6. EP-A-0 023 586,

are even more remote, since they describe compositions based on mixtures of phenolic resins and various polyurethanes without any reference to the properties falling under the above defined problem.

6.4 For these reasons, the subject-matter of Claim 1 is not obvious in view of the documents cited.

7. For the same reasons as stated under points 5 and 6 above, the synthetic resin manufactured by the method according to Claim 1 is also not obvious in view of the documents cited, and any application of this resin therefore likewise involves an inventive step.

Conclusion

8. With the new set of claims, the Appellant also submitted amended pages of the description which have been adapted to the specific scope of the new claims and in which the content of the relevant prior art documents has been correctly acknowledged. The requirements of Article 84 and Rule 27(1)(b) having thus been met, there are no obstacles to the grant of a patent.

Order

For these reasons it is decided that:

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division with the order to grant a patent on the basis of Claims 1 to 3 filed on 20 April 1995, and the following description:

   - pages 1, 1a and 2 filed on 20 April 1995,
   - page 3 amended according to the request filed on 20 April 1995,
   - pages 4 and 5 as originally filed,

   and drawing 1/1 (Figures 1 and 2) as originally filed.

The Registrar: The Chairman:

E. Görgmaier C. Gérardin