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Veröffentlichung im Amtsblatt	Ja/Nein
Publication in the Official Journal	Yes/No
Publication au Journal Officiel	Oui/Non

000995

Aktenzeichen / Case Number / N° du recours : T 179/86 - 3.3.2

Anmeldenummer / Filing No / N° de la demande : 79 901 613.4

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 020 782

Bezeichnung der Erfindung: Light-sensitive polyamide resin composition
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : G03C 1/68

ENTSCHEIDUNG / DECISION

vom / of / du 18 November 1988

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent / Titulaire du brevet : Toray Industries, Inc.

Einsprechender / Opponent / Opposant : BASF AG

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Art. 54, 56

Schlagwort / Keyword / Mot clé : "Novelty (affirmed)" - "Inventive step (affirmed) - reference to remote technical fields irrelevant - mere critical statements not sufficient to throw doubt on results"

Leitsatz / Headnote / Sommaire

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Case Number : T 179 /86 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal 3.3.2
of 18 November 1988

Appellant : (Opponent)
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Representative :

Respondent : (Proprietor of the patent)
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Decision under appeal : Decision of Opposition Division of the European Patent Office dated 31 January 1986, posted on 8 April 1986, rejecting the opposition filed against European patent No. 0 020 782 pursuant to Article 102(2) EPC.

Composition of the Board :

Chairman : P. Lançon
Members : S. Schödel
J. Stephens-Ofner

Summary of Facts and Submissions

I. European patent No. 20 782 was granted with five claims on 30 May 1984 in response to European patent application No. 79 901 613.4 arising from International application No. PCT/JP 79/00307 (International publication No. WO 80/01212) filed on 30 November 1979. Claim 1, the only independent claim, reads as follows:

"A photosensitive polyamide resin composition comprising a polyamide and a photopolymerizable unsaturated compound, characterized in that said polyamide contains 10% to 70% by weight of a polyoxyethylene segment or poly(oxy-ethylene/oxypropylene) copolymer segment having a number average molecular weight of from 150 to 1500 in its main molecular chain".

II. A Notice of Opposition was filed in due time by the Opponent requesting revocation of the patent on the grounds of lack of novelty and inventive step. The opposition was supported, inter alia, by the following documents:

(1) US-A-3 882 090 and
(2) DE-A-1 447 929.

III. In a decision dated 31 January 1986 and notified on 8 April 1986 the Opposition Division rejected the Opposition.

In relation to novelty, the Opponent had failed to demonstrate that - following the teaching of (2) - a polyamide would be obtained having all the features specified in Claim 1 of the patent in suit. In relation to inventive step it might have been true that some of the linear polyamides falling under the general formula in (1)

could be of the same structure as the polyamides of present Claim 1. Document (1), however, was directed to textile sizing agents and paper adhesives. The skilled person would not therefore have been stimulated to replace the polyamides in the photosensitive compositions of (2) which contained polyoxyalkylene units in said chains instead of in the main chain, by those polyamides, which were exemplified in (1), and use them in compositions provided for printing plates. Even if he had done so he would not have arrived at the features of Claim 1 of the patent under dispute.

The claimed subject-matter was thus considered patentable.

IV. A Notice of Appeal was lodged by the Appellant, who was the Opponent, on 30 May 1986, the fee being paid on the same day.

The arguments put forward by the Appellant in his Statement of Grounds received on 2 August 1986, and at the oral hearing held on 18 November 1988 can be summarised as follows:

(i) concerning novelty, the disclosure in (2) of "repeated addition" in particular of ethylene oxide (EO) to amide polymers or oligomers, e.g. to give the exemplified product (R) LUROTEX A 25, included also repeated addition at the chain ends, which would give rise ultimately - according to the mechanism described in (3) Journal of Polymer Science, XV (1955), 427 - to terminal EO segments of molecular weight greater than 150, such segments forming part of the main chain as claimed;

(ii) with regard to inventive step, it was in any case obvious to replace the polyamides of (2) by modified

polyamides such as those known from (1), which would have been retrieved in a search for EO-modified polyamides, independent of use; investigation of the properties of these (solubility, flexibility, compatibility with additives) would have shown these to be of equal suitability with those disclosed in (2) and therefore as appropriate to replace (R) LUROTEX A 25;

(iii) the fact that polyamides of the precise structure claimed were not exemplified in (1) was irrelevant, since it was rather the general teaching in the document which was considered important;

(iv) the alleged advantages according to the patent in suit had not been convincingly demonstrated since the results given for printing plates were merely qualitative in character; the fact of being able to use a single polymer instead of a mixture as in (2) was not reflected by any corresponding limitation in the claims and even if it had been, the substitution of the straightforward equivalent single polymer of (1) would still have been an obvious option.

V. The Respondent, who is the Patentee, argued substantially as follows:

(i) in the polyamides used according to the patent in suit it was essential that the polyether segments were portions of the main molecular chain;

(ii) document (2) disclosed a modified polyamide which was produced by reacting an alkylene oxide with a polyamide, in which a number of polyalkylene oxide side chains were attached to the main molecular chain of the polyamide molecules, and furthermore did not

suggest a restriction of the molecular weight of the resulting polyether segments to 150 to 1 500; these definite distinctions provided novelty;

(iii) in relation to inventive step, document (1) which disclosed polyetheramides useful as sizing agents or adhesives, belonged to a remote field of technology; it could not be assumed that the properties of resins suitable in this area implied any particular capability for solving the very different problems arising in connection with light sensitive materials.

(iv) the Appellant had not provided any experiments of his own to disprove the advantages alleged for the claimed compositions.

VI. The Appellant requests that the decision rejecting the Opposition be set side and that the patent be revoked.

The Patentee requests that the appeal be dismissed.

Reasons for the Decision

1. The appeal complies with Articles 106 and 108 and Rule 64 EPC and is, therefore, admissible.

2. There is no formal objection to Claim 1 under Art. 123 EPC. The limitation, introduced during the examination proceedings, to the polyoxyethylene or poly(oxyethylene/oxypropylene) segment (hereafter "poly EO or EO/PO segment") of the polyamide (hereafter "PA") being "in its main molecular chain" finds a basis in the original description on page 4 lines 8-15.

The PA is defined as having such segment "in its molecular chain" which must be understood as referring to the main or backbone chain. The structural units of the said PA are derived from polyalkylene oxide (hereafter "poly AO") having an amino or carboxyl group in the terminal end thereof and conventional dicarboxylic acids or diamines. From these reactants it is clear that the poly AO segments are incorporated into the backbone chain of the resulting essentially linear polymer.
Claims 2-5 remained unchanged.

3. The patent in suit relates to a photosensitive polyamide resin composition. Such compositions are capable of being insolubilised under the action of light. Thus a printing relief may be produced by exposing a photosensitive layer of a plate comprising a support with such a composition thereon to rays through a negative or positive film having a transparent image area, whereby the resin is insolubilised and hardened in exposed areas, after which the unexposed areas are dissolved out with a suitable solvent.

3.1 Compositions of this general type are known from document (2) which is considered to be the closest state of the art. According to (2) a printing plate is produced from a film of a material comprising

(a) 69.5 - 25% of a soluble linear copolyamide "carrier";

(b) 30 - 60% of compounds with at least two photopolymerisable double bonds, and

(c) 0.5 - 15% of a compound obtained, inter alia, by the reaction of PA with an epoxide of the formula $R_1-CH-CH-R_2$ (R_1, R_2 = H; C_1-C_3 alkyl).

In the only worked example the compound (c) is formed by the reaction of polycaprolactam with three parts of EO ((R) LUROTEX A 25). The resulting printing plate, which was developed using a benzene-methanol-water mixture, produced an image having excellent accuracy of contour and reproduction of detail. Such plates may be rigid or flexible.

3.2 According to the introductory part of the present description, photosensitive resin compositions have found a wider field of application in recent years. For this purpose the basic PA should meet a number of requirements, such as compatibility with the photopolymerizable unsaturated compound and various other additives of the composition to give a uniform mixture, developability (solubility before exposure to light and insolubility after) in a solvent such as water or alcohol to give an accurate image, transparency, high mechanical durability, smoothness and flexibility. The Respondent found that the prior art printing plates were unsatisfactory for practical purposes in several respects.

4. The technical problem underlying the patent in suit was therefore to provide photosensitive polyamide resin compositions which when processed give printing plates with improved overall performance characteristics.

The solution of this technical problem is outlined in more detail in Claim 1 of the patent in suit.

5. From a consideration of the numerous examples of the disputed patent it is evident that the technical problem has been solved. Printing plates prepared from photosensitive compositions containing preferred polyetheramides were tested and in particular the two sets of tabulated results show excellent performance in respect

of transparency, water-developability, flexibility, flatness, toughness and especially printing durability to be obtained according to the invention. None of the necessary properties had been obtained at the expense of any of the others.

The explanatory statements on page 3, paragraph 2 of the description as well as the comparative examples demonstrate that minor deviations from even one of the parameters claimed - for instance using molecular weight of the polyether falling outside the scope of Claim 1 - lead to unsuitable printing plates.

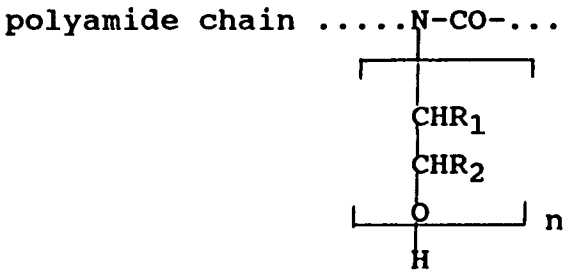
The Appellant made the criticism that the results given were only qualitative in nature and therefore unconvincing. He failed, however, to repeat the examples - which he had had ample opportunity to do - with a view to re-assessing their quantitative significance. Mere critical statements however cannot be regarded as sufficient to throw serious doubt on the validity of the above results.

6. The photosensitive polyamide resin composition of present Claim 1 requires two components, a photopolymerizable unsaturated compound and a modified PA, the latter containing in its main chain a given percentage by weight of a poly AO segment as specified and the number average molecular weight of this segment being 150-1500. In accordance with the Appellant's view, the said PA may be regarded as corresponding to the simplified formula

... A - A - EO - EO - EO - ... A - A - ...
(A= amide containing compound; Statement of Grounds dated 31 July 1986, page 3).

In contrast to this, the relevant resin composition disclosed in (2) consists of at least three essential

components, of which component (c) contains the AO-segment as a side chain of unspecified length, according to the formula:



wherein R_1 and R_2 mean H or C_1-C_3 alkyl and n is indeterminate.

It is by this feature in particular that the modified PA of present Claim 1, and the PA (c) of (2) fundamentally differ from each other.

Furthermore, there is no evidence that the "repeated" addition of AO, especially EO, to a ready formed PA (cf. (R) LUROTEX A 25), would - as alleged by the Appellant - inevitably lead to something falling within the scope of Claim 1 (cf. (2), Claim 4; page 3, para. 2; example). Document (3) in this connection merely gives a general review of the addition of EO to the NH groups of PA and does not add anything significant to the disclosure of (2).

Therefore the subject-matter of Claim 1 is novel under Art. 54 EPC.

7. Turning now to inventive step, it has to be investigated whether present Claim 1 satisfies the requirements of Article 56 EPC.

7.1 The skilled person, faced with the aforementioned technical problem, who started out from (2) would have had to perform

a series of steps, intellectually and practically, in order to arrive at a photosensitive resin composition according to Claim 1 of the patent under dispute. These steps were:

- turning away from the PA having a poly AO side chain (graft polymer) in favour of a PA having a poly AO segment in its backbone chain (block polymer);
- selection of the specific long chain EO and EO/PO-(co) polymer;
- use of carefully balanced amounts of these (co)polymers in terms of the molecular weight and % by weight of the segment.

The claimed composition in its simple embodiment requires only two components, the modified PA taking over the function of components (a) and (c) of the known resin composition according to (2).

None of these modifications is derivable from the cited prior art: in (2) itself there is no hint or indication as to how further or improved qualities in printing plates might be obtained; (3) as outlined before gives only general information, which is not helpful in approaching the claimed subject-matter and (1) cannot be taken into account at all, because it relates to a remote field of technology.

7.2 As regards (1), there is no correlation between the technical fields of hot melt sizing compositions for textile yarns and hot melt adhesives for paper on the one hand and photosensitive materials on the other, in that the characteristics of the (alkyleneoxy) bis (propylamine) of (1), do not automatically imply the same useful properties in the light sensitive compositions of the disputed patent: in other words the problems arising in these different technical areas cannot necessarily be satisfactorily solved

by the same or even similar means. From this it results that the teachings of (2) and (1) cannot be combined (see also the decisions T 176/84, OJ EPO 1986, 050 and T 195/84, OJ EPO 1986, 121).

A closer analysis of (1), moreover, reveals that at least some of the basic (alkyleneoxy) bis (propylamine) species mentioned in col. 3 - e.g. those with 2 or 3 EO groups - would not be suitable for use in the compositions claimed; for the remaining disclosed long chain diamines the Appellant has put forward no evidence (e.g. calculations) to show that when processed they are actually in accordance with the parameters of present Claim 1.

Apart from this, he himself has suggested that these polyetheramides are disadvantageous in any case (see Statement of Grounds dated 31 July 1986, page 4, last paragraph).

7.3 To sum up, it was the Respondent's own initiative to employ the specific polyetheramide resins of present Claim 1, which provide the further improvements and additional desirable qualities found in the overall performance characteristics of the resulting printing plates. This favourable result was not to be foreseen.

8. Thus the subject-matter of Claim 1 does not arise in an obvious manner from the state of the art and Claim 1 is therefore patentable (Art. 56 EPC).

Dependent Claims 2-5, which relate to preferred embodiments of the first claim, derive their patentability from this claim.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

F.Klein P.Lançon