Europäisches Patentamt
Beschwerdekammern

European Patent Office
Boards of Appeal

Office européen des brevets
Chambres de recours

Veröffentlichung im Amtsblatt ja/Nein
Publication in the Official Journal Yes/No
Publication au Journal Officiel oui/Non

12

Aktenzeichen / Case Number / N° du recours : T 82/87 - 3.3.1

Anmeldenummer / Filing No / N° de la demande : 82 902 465.2

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 085 722

Bezeichnung der Erfindung: Electron beam-curable resin
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : C 08 G 18/67

ENTSCHEIDUNG / DECISION
vom / of / du 06 July 1988

Anmelder / Applicant / Demandeur : Sony Corporation

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence : Beam-curable resin/Sony

EPÜ / EPC / CBE Article 56

Schlagwort / Keyword / Mot clé : "Inventive step - obvious combination"

Leitsatz / Headnote / Sommaire

Europäisches Patentamt
Beschwerdekammern

European Patent Office
Boards of Appeal

Office européen des brevets
Chambres de recours

Case Number : T 82/87 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 06 July 1988

Appellant : Sony Corporation
7-35 Kitashinagawa
6 - Chome Shinagawa-Ku
Tokyo 141 (JP)

Representative : Thomas, Christopher Hugo et al
D Young & Co.
10 Staple Inn
London WCIV 7RD(GB)

Decision under appeal : Decision of Examining Division 012 of the European Patent Office dated 8 October 1986 refusing European patent application No. 82 902 465.2 pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : K.J.A. Jahn
Members : R.W. Andrews
C.V. Payraudeau

Summary of Facts and Submissions

I. European patent application No. 82 902 465.2, claiming priority of 19 August 1981 from two prior applications in Japan, was filed under the Patent Cooperation Treaty on 19 August 1982 under international application number PCT/JP/82/00324. The English translation of the Japanese language application, which was published under the Serial No. WO 83/00696 on 3 March 1983, was published in accordance with Article 158(3) EPC on 17 August 1983. The decision by the Examining Division 012 of the European Patent Office dated 8 October 1986 to refuse the application was based on Claims 1 to 8 filed on 15 July 1985. The independent Claims 1 and 7 read as follows:

"1. An electron radiation curable resin comprising an oligopolyester-urethane resin having urethane bonds at both terminals of its polyester moiety, or a polyester-polyurethane resin wherein its polyester moieities are chain-extended through urethane bonds, said resin having a molecular weight of 1,000 to 50,000, having a double bond at each terminal of the molecule, and containing in the molecule 0.2 to 30 mol % of carboxylic acid component having a metal sulphonate group based on the total carboxylic acid component.

7. A magnetic recording medium comprising a non-magnetic substrate and a magnetic layer formed thereon and comprising magnetic particles and an electron cured resin according to any one of the preceding claims."

II. The stated ground for the refusal was that the subject-matter of Claim 1 did not involve an inventive step in the light of the disclosure of JP-A-55/38 693 (1) and JP-A-50/77 433 (2) as disclosed in their Derwent Abstracts. The

Examining Division considered that the problem underlying the application in suit was to provide a resin capable of dispersing magnetic particles to yield coating films which possess good abrasion resistance, high solvent resistance and high mechanical strength. The Examining Division decided that it would be obvious to the skilled person seeking to improve both the solvent resistance and mechanical strength of the polymers disclosed in document (1) to cross-link them using the process disclosed in document (2). In the light of the finding that the subject-matter of Claim 1 did not involve an inventive step the patentability of Claims 2 to 8 was not considered.

III. An appeal was lodged against this decision by a duly confirmed telex on 21 November 1986 and the prescribed fee paid on 25 November 1986. In the statement of grounds of appeal filed on 6 February 1987 the Appellant argued that the Examining Division, prompted by hindsight, combined the disparate teachings of documents (1) and (2) and common general knowledge to deny the existence of an inventive step for the claimed subject-matter. However, by bringing together a selection of disparate and hitherto uncombined ideas from the prior art the Appellant has produced a resin which provides advantages in the area of manufacture, mechanical characteristics and magnetic performance.

IV. In a reply to a communication from the Board the Appellant declined to file observations on this communication and requested that the appeal be decided on the basis of the written arguments submitted in the statement of grounds of appeal.

V. The Appellant requests that the decision under appeal be set aside and a patent granted on the basis of Claims 1 to

8 filed on 15 July 1985. Alternatively, as an auxiliary request, the Appellant requests that a patent be granted on the basis of a new main claim as follows:

"A magnetic recording medium comprising a non-magnetic substrate and a magnetic layer formed thereon and comprising magnetic particles and a resin comprising an oligopolyester-urethane resin having urethane bonds at both terminals of its polyester moiety, or a polyester-polyurethane resin wherein its polyester moieties are chain-extended through urethane bonds, said resin having a molecular weight of 1,000 to 50,000, having a double bond at each terminal of the molecule, and containing in the molecule 0.2 to 30 mol % of carboxylic acid component having a sodium sulphonate group based on the total carboxylic acid component, said resin having been cured by electron radiation at a dose in the range 1 to 10Mrad."

and suitably re-worded dependent claims respectively based on present Claims 8, 2 to 4 and 6.

Reasons for the Decision

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

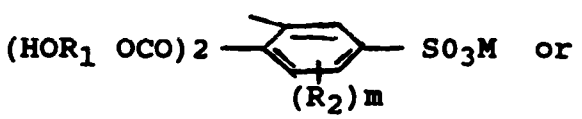
2. There are no formal objections to the present Claims 1 to 8 or Claim 1 in accordance with the auxiliary request since they are adequately supported by the original disclosure.

Claims 1 to 5 are identical with the corresponding Claims as originally filed apart from the deletion of the word

"about" in Claims 1 to 3. The amended definition of the symbol R_2 in Claim 6 finds support on page 4, lines 25 to 27 of the published patent application. Claims 7 and 8 are based on the disclosure on page 6, lines 4 to 11 and page 16, lines 19 to 30 of the printed patent application.

The main Claim in accordance with the auxiliary request is supported by the combined disclose of page 3, lines 12 and 13, page 6, lines 4 to 11, page 8, lines 26 to 27, page 16, lines 21 to 30 and Examples 1 and 2 of the published patent application.

3. The application relates to electron radiation curable oligopolyester-urethane or polyester-polyurethane resins containing metal sulphonate groups. These resins are suitable as binders in magnetic recording media. Document (1) discloses polyurethane binders prepared by reacting (a) a polyfunctional hydroxy compounds having molecular weights of 500 to 3000, (b) short chain diols having molecular weights of 500 or below, (c) di-or tri-functional isocyanate compounds and (d) compounds of the formulae



or

$$(HOR_1)_2N - R_3 - SO_3M$$

wherein R_1 is alkylene with 2 to 6 carbon atoms, R_2 is a hydrogen atom or an alkyl radical with 1 to 5 carbon atoms, R_3 is an organic radical, M is an alkali metal and m is 1 to 3. These resins are useful for the preparation of magnetic recording media by dispersing ferromagnetic powder in them.

However, although it was found that the presence of the alkali metal sulphonate groups in the binder improved the dispersability of the magnetic powder, due to the fact that the alkali metal sulphonate group is hydrophilic and the curing agent used to cure the resin reacts with water, it was necessary to use an excess of curing agent.

In the light of this closest prior art the technical problem underlying the application in suit may be seen in providing a resin capable of dispersing magnetic powders which does not require the use of excess curing agent. The films obtained from the resin should possess good abrasion and solvent resistance and high mechanical strength.

According to the patent application this technical problem is essentially solved by introducing double bonds into the structure of the resin containing the alkali metal sulphonate groups so that the resulting resin may be cured by electron beam radiation. From the results in Tables 1, 2, 3 and 4 of the patent application the Board is satisfied that this technical problem is credibly solved.

4. After examination of the cited documents the Board has reached the conclusion that this technical teaching is not disclosed in any of them and is, therefore, novel. Since novelty is not disputed it is not necessary to substantiate this conclusion.

5. It still remains to be examined whether the requirement of inventive step is met by the claimed subject-matter.

5.1 The skilled person in the field of polymers confronted with the technical problem as defined above is aware from his common general knowledge that it is possible to cure suitable resins by electron radiation. Thus, he would

immediately realise that this known method obviates the need for the presence of curing agents.

Furthermore the specialist in the field of magnetic recording media knows from document (2) that electron beam radiation has been used to cure polyurethane resins in which a small proportion of 2-hydroxyethyl acrylate has been incorporated.

On treatment with radiation, cross-linking occurs due to the cleavage of the double bonds. Therefore, the skilled person would immediately conclude that the solution to the technical problem underlying the application in suit of avoiding the use of an excess of curing agent for curing the resins known from document (1) would be to avoid the use of curing agent entirely by modifying these prior art resins to introduce double bonds into their structure by the method disclosed in document (2). This modification would enable them to be cured by electron beam radiation.

5.2 From his common general knowledge the skilled person is also aware that the cross-linking of any polymer results in an improvement in the solvent resistance and mechanical strength of the polymer(cf. page 239 under the caption "cross-linking" in The Condensed Chemical Dictionary, 9th Ed., Revised by Gessner G. Hawley, published by Von Nostrand Reinhold Company). In the light of this common general knowledge the skilled person would expect an improvement in the solvent resistance and mechanical strength of the coating produced from such electron beam cured polymers as compared with the coatings prepared from the corresponding polymers having no double bonds in their structure. Moreover, due to the presence of the alkali metal sulphonate groups in the polymers the skilled person would realise that the ability to disperse magnetic particles when used as binders would be maintained. The

Comparative Examples in the disputed application confirm that these expectations are in fact realised.

5.3 In the Board's opinion it would be obvious to combine the teachings of documents (1) and (2) since both documents lie in the same technical field as the disputed application and there is no inherent incompatibility in the disclosure of the two documents which would deter the skilled person, confronted with the technical problem as defined above, from making the combination.

5.4 The Board cannot accept the Appellant's argument that, despite the pressure for further improvements in magnetic recording tapes and the large number of groups of skilled persons working in this field, none of these skilled persons had combined the teachings of documents (1) and (2). In a decision of this Technical Board of Appeal (cf. T 24/81, OJ EPO, 1983, 133) it was held that a process developed in the light of the need which arose relatively shortly before the application is not deemed to involve an inventive step if this need could be readily met by an obvious combination of teachings from the state of the art. Thus, the period between the publication of document (1) on 18 march 1980 and the priority date of 19 August 1981 of the application in suit must qualify as a relatively short period within the context of the above-mentioned decision. Therefore, in the Board's view the reason why these skilled persons did not combine the teachings of documents (1) and (2) did not lie in their disparity but in the short time which elapsed between the publication of document (1) and the priority date of the application in suit.

5.5 In the Board's judgement the proposed solution to the technical problem underlying the disputed application as defined above does not involve an inventive step in the

light of the disclosure in documents (1) and (2). The subject-matter of Claim 1 in accordance with the main request is, therefore, unpatentable.

Since all the claims of the application must meet the requirements of the Convention an examination of Claims 2 to 8 in accordance with the main request is unnecessary.

6. The main Claim in accordance with the auxiliary request relates to a magnetic recording medium comprising a non-magnetic substrate and a magnetic layer formed thereon and comprising magnetic particles and a resin in accordance with Claim 1 of the main request containing an alkali metal sulphonate group which has been cured by electron radiation at a dose in the range of 1 to 10Mrad.

In the light of the disclosure in document (1) the technical problem underlying the disputed patent application in accordance with the auxiliary request may be seen in providing a magnetic recording medium with good abrasion and solvent resistance and high mechanical strength.

In accordance with the application in suit this technical problem is solved by employing the resin according to Claim 1 in accordance with the main request containing an alkali metal sulphonate group as the binder and curing it with electron radiation at the specified dose. From the results in Table 4 of the disputed application the Board is satisfied that this technical problem is plausibly solved.

6.1 However, for the reasons given above the combination of the teachings of documents (1) and (2) would lead the skilled person to the resin in accordance with Claim 1 of the main request. The selection of sodium sulphonate is

not considered to be inventive in the absence of any evidence of any unexpected advantage connected with this selection and in view of the disclosure of this group in the detailed teaching of document (1).

From his common general knowledge the skilled person would be aware that the cross-linking of the binder resin would result in a magnetic medium with good solvent resistance and high mechanical strength. From the teaching of document (1) the skilled person would also conclude that the resistance to wear of the magnetic medium would be satisfactory.

6.2 From document (2) it is known to cure an unsaturated binder resin in a magnetic recording medium with electron radiation at a total dose of 3Mrad. In view of this teaching it must be considered to be within the competence of skilled person to determine that a dose in the range of 1 to 10Mrad could be used to effectively cure an unsaturated binder resin.

6.3 Therefore, in the Board's judgement the subject-matter of Claim 1 in accordance with the auxiliary request does not involve and inventive step and this claim is also unallowable.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar The Chairman

02119