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Aktenzeichen / Case Number / N° du recours : T 40/84 - 3.5.1

Anmeldenummer / Filing No / N° de la demande : 79 301 549.6

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Bezeichnung der Erfindung: Electric recording material and method of electric
Title of invention: recording
Titre de l'invention :

Klassifikation / Classification / Classement : B41M 5/20, B41C 1/14

ENTSCHEIDUNG / DECISION
vom / of / du 10 October 1988

Anmelder / Applicant / Demandeur : SEKISUI KAGAKU KOGYO KABUSHIKI KAISHA

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPU / EPC / CBE Article 56

Schlagwort / Keyword / Mot clé : "Inventive step (yes)"

Leitsatz / Headnote / Sommaire

Europäisches
Patentamt

Beschwerdekammern

European Patent
Office

Boards of Appeal

Office européen
des brevets

Chambres de recours

Case Number : T 40/84 - 3.5.1



D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 10 October 1988

Appellant : SEKISUI KAGAKU KOGYO KABUSHIKI KAISHA,
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Decision under appeal : Decision of Examining Division 086
of the European Patent Office
dated 16 September 1983 refusing
European patent application
No. 79 301 549.6 pursuant to
Article 97(1) EPC

Composition of the Board :

Chairman : P.K.J. van den Berg
Members : W.J.L. Wheeler
P. Ford

Summary of facts and submissions

- I. European patent application No. 79 301 549.6 (publication No. 8 198) was filed on 1 August 1979, claiming priority from three previous applications in Japan: JP 95547/78 of 4 August 1978, JP 164256/78 of 25 December 1978 and JP 3300/79 of 12 January 1979. It was refused by the decision of the Examining Division 086 of the European Patent Office dated 16 September 1983. That decision was based on Claims 1 and 2 filed with the letter dated 15 December 1982, and Claims 3 to 25 filed with the letter dated 23 January 1981, with the amendment to Claim 23 requested in the letter dated 18 May 1982.
- II. The reason given for the refusal was that the subject-matter of the claims did not involve an inventive step within the meaning of Article 56 EPC having regard to the following prior art documents:
- (1) FR-A-2 357 377
 - (2) FR-A-2 142 406
 - (3) US-A-3 810 193
 - (4) GB-A-871 226
 - (5) FR-A-1 394 453
 - (6) FR-A-2 121 253.
- III. On 15 November 1983 the Appellant filed by telex a notice of appeal against this decision. The fee for appeal was paid on the same day. A letter confirming the telex was received on 19 November 1983. The statement of grounds was filed on 25 January 1984.
- IV. After some correspondence between the Board and the Appellant, the Appellant filed with a letter dated 5 August 1988 (received on 10 August 1988) a new set of claims 1 to 22 and amended pages of the description. With a

further letter dated 23 September 1988 (received on 28 September 1988), the Appellant filed amended pages of description and pages showing amendments to Claims 1 and 5, and requested amendment of the title to "Electric recording material and method of electric recording."

- V. The Appellant requests that the decision under appeal be set aside and a patent granted on the basis of Claims 1 to 11 (part) filed on 28 September 1988 and Claims 11 (part) to 22 filed on 10 August 1988. The description consists of pages 3, 4, 13, 25, 26 and 31, filed on 28 September 1988; pages 1, 2, 4A, 5, 6, 9 to 12, 15 to 24, 27 to 30 and 32, filed on 10 August 1988; pages 5A, 7 and 7A, filed on 22 May 1982; page 8 as originally filed; and page 14 as originally filed, lines 22 to 25 being amended as requested in Appellant's letter dated 23 January 1981 so as to read: "resin matrix to a receptor sheet by discharge at the time of passing an electric current during electric recording. Molten lower-melting resin inhibits the occurrence of offensive odors and soot at the time of recording." There are no drawings.

- VI. The text of Claim 1 is:

"1. An electric discharge recording material for use in a transfer printing process by application of an electrical signal in the form of an electric voltage to a metal-containing resin layer (B) to break down an underlying semiconductive resin layer (A) and form an image by transfer of said broken layer to a receptor sheet without breaking down said layer (B), the electric recording material comprising

- (A) a semiconductive resin layer comprising a resin matrix and a conductivity-imparting agent dispersed therein,
(B) a metal-containing resin layer comprising a resin matrix and 5 to 60% by volume of a metal powder having an average

particle diameter of 0.2 to 20 μm and a specific resistance of not more than 2×10^{-4} ohms-cm dispersed therein, said metal-containing layer having a surface resistance of 10^5 to 10^{16} ohms and a volume resistance of not more than 10^4 ohms-cm and being laminated to one surface of said semiconductive resin layer (A), and

(C) an electrically conductive covering layer having a surface resistance not exceeding 10^4 ohms and a volume resistance of not more than 10^2 ohms-cm, said covering layer comprising a resin matrix and a conductivity-imparting agent dispersed therein, or a vacuum-deposited metal film, and being laminated to the other surface of said semiconductive resin layer (A),

characterised in that: - said semiconductive resin layer (A) has a surface resistance of more than 1 ohm to less than 10^5 ohms and a volume resistance of not more than 10^3 ohms-cm, the ratio of the surface resistance of the semiconductive resin layer (A) to that of the covering layer (C) being from 10:1 to 1.4×10^4 :1, and the electric recording material also comprises

(D) a protective covering resin layer comprising a resin matrix and a conductivity-imparting agent dispersed therein and having a higher surface resistance than that of said covering layer (C) and a thickness of not more than 10 μm , said protective covering layer being laminated to said conductive covering layer (C)."

Claims 2 to 20 are dependent on Claim 1.

The text of Claim 21 is:

"21. A method for electric recording, which comprises contacting a receptor sheet with the protective layer (D) of an electric recording material as claimed in any one of the preceding claims, contacting a recording stylus with the metal-containing resin layer (B) of the electric recording

material; and applying a voltage of not more than 120 V to the recording material through said recording stylus, thereby breaking down said semiconductive resin layer (A), said conductive covering layer (C) and also said protective layer (D), and thus transferring the broken layers to said receptor sheet.

Claim 22 is dependent on Claim 21.

Reasons for the decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.
2. The current version of the claims and description does not offend against Article 123(2) EPC.

Apart from the upper limit of 1.4×10^4 , specified for the ratio of the surface resistance of the layers (A) and (C), all the features recited in Claim 1 can be found in originally filed Claims 1, 9, 12, 13, 15, 17, 18, 19, 21 and 29 and on originally filed page 6, lines 8 to 11. The upper limit of 1.4×10^4 can be readily deduced from the values of 0.7×10^5 and 5 ohms given for the surface resistance of layers (A) and (C) on originally filed page 30, lines 12 to 14, 21 and 22.

All the features specified in Claims 2 to 22 can be found in originally filed Claims 2 to 8, 10, 11, 14, 16, 18, 20 and 23 to 30.

The description has been amended to meet the requirements of Rule 27(1)(c) and (d) EPC and to delete some of the examples in the originally filed description.

Thus the current version of the application does not contain any subject-matter which extends beyond the content of the application as filed.

3. Electric discharge recording material according to the prior art portion of Claim 1 is known from document (1), namely FR-A-2 357 377, which, together with its family member GB-A-1 545 726, is acknowledged on page 3 of the description.
4. Electric discharge recording material according to Claim 1 differs from that known from (1) in that:

(i) the layer (A) has a surface resistance of more than 1 ohm to less than 10^5 ohms and a volume resistance of not more than 10^3 ohms-cm [in (1) the surface resistance and the volume resistance of layer (A) are 10^5 to 10^{16} ohms and 10^3 to 10^{14} ohms-cm];

(ii) the ratio of the surface resistances of the layers (A) and (C) is from 10:1 to 1.4×10^4 :1 [in (1) this ratio is not specified at all, the surface resistance of the layer (C) is not more than 10^4 ohms, preferred values for the surface resistance of the layer (A) are 10^9 to 10^{14} ohms and in all the specific examples the surface resistance of the layer (A) is more than 2.5×10^8 , implying a ratio of the surface resistances of the layers (A) and (C) of at least 2.5×10^4];

(iii) and the layer (D) is provided [in (1) the recording material only has three layers].

In the opinion of the Board, none of the other documents (2) to (6) cited by the Examining Division comes closer.

Electric discharge recording material according to Claim 1 is, therefore, new.

5. Electric discharge recording material according to Claim 1 permits discharge recording at lower voltages than the material known from (1).
6. The Board agrees with the Examining Division that this is an obviously desirable property which a person skilled in the art could be expected to try to obtain by choosing lower values of surface and volume resistance of the layer (A). This would entail a lower ratio of the surface resistances of the layers (A) and (C). In the opinion of the Board, therefore, the Examining Division was correct in refusing the application in the form it had before them.
7. However, according to the present version of Claim 1, the recording material also comprises a protective covering layer (D) comprising a resin matrix and a conductivity-imparting agent dispersed therein and having a higher surface resistance than that of said layer (C) and a thickness of not more than 10 μm , said layer (D) being laminated to said layer (C).
8. Document (2), namely FR-A-2 142 406, discloses several examples of electric discharge recording material consisting of a layer of high quality paper (B) on which various recording layers (R_1, R_2, R_3) are laminated, each recording layer consisting of a coloured layer (C_1, C_2, C_3) and an overlying conductive layer (E_1, E_2, E_3), and having a covering layer (F) on the upper surface remote from the paper (B). The covering layer (F) is described as having a relatively high resistance and a maximum thickness of 10 μm .

However, the recording material disclosed in (2) is not suitable for use in a transfer printing process. On the contrary, as described in (2) a voltage is applied to a

stylus (D) contacting the upper layer to break down the layer (F) and one or more of the other layers to expose one of the coloured layers. There is no suggestion in (2) of forming an image by transfer of a broken layer to a receptor sheet.

9. Neither (2) nor any of the other documents cited by the Examining Division suggests that a protective layer could be provided on recording material for use in transfer printing on the surface which in use contacts the receptor sheet. Furthermore, in the opinion of the Board, a person skilled in the art seeking to modify the prior art recording material known from (1) in order to permit discharge recording at lower voltages, would be deterred from providing a protective layer on layer (C), which is the surface of the recording material which in use contacts the receptor sheet, since this protective layer would also have to be broken by the discharge and could be expected to make it more difficult to obtain high quality printing at low voltages.
10. In the opinion of the Board, therefore, the electric discharge recording material claimed in Claim 1 and dependent Claims 2 to 20 must be considered as involving an inventive step within the meaning of Article 56 EPC.
11. It follows that the methods for electric recording claimed in Claims 21 and 22, which are limited to the use of recording material as claimed in any one of Claims 1 to 20, must likewise involve an inventive step within the meaning of Article 56 EPC.
12. Claims 1 to 22 are therefore allowable under Article 52(1) EPC.

13. Since the use of the recording material as an electro-stencil master sheet no longer forms part of the application, the title should be amended to: "Electric recording material and method of electric recording."

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance for grant of a patent on the basis of the claims and pages of description listed in paragraph V above, the title being amended as indicated in paragraph 13 above.

The Registrar

The Chairman

S. Fabiani

P.K.J. van den Berg