



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : G11B 5/702, 5/704	A3	(11) International Publication Number: WO 93/24924 (43) International Publication Date: 9 December 1993 (09.12.93)
(21) International Application Number: PCT/US93/04151 (22) International Filing Date: 3 May 1993 (03.05.93) (30) Priority data: 07/893,912 4 June 1992 (04.06.92) US (71) Applicant: MINNESOTA MINING AND MANUFACTURING COMPANY [US/US]; 3M Center, Post Office Box 33427, Saint Paul, MN 55133-3427 (US). (72) Inventors: CHERNEGA, John, G. ; MUGGEE, John, M. ; ELLIS, Richard, J. ; MOSBEY, Deral, T. ; ANDERSON, Jeffrey, T. ; Post Office Box 33427, Saint Paul, MN 55133-3427 (US).		(74) Agents: KAGAN, David, B. et al.; Minnesota Mining and Manufacturing Company, Office of Intellectual Property Counsel, Post Office Box 33427, Saint Paul, MN 55133-3427 (US). (81) Designated States: AT, AU, BB, BG, BR, CA, CH, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, LK, LU, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 3 February 1994 (03.02.94)
(54) Title: MAGNETIC RECORDING MEDIUM COMPRISING BINDER THAT MAY BE CURED USING BOTH ISOCYANATE AND RADIATION CURING TECHNIQUES (57) Abstract A magnetic recording medium comprising a magnetizable layer provided on a nonmagnetizable support. The magnetizable layer comprises a magnetic pigment dispersed in a cured binder. The cured binder is derived from binder materials comprising: (a) a first polymer having a T _g of about 60 °C or more, wherein said first polymer comprises a plurality of isocyanate cross-linkable hydroxy groups and a plurality of radiation cross-linkable groups; and (b) a second polymer having a T _g of about 25 °C or less, wherein said second polymer comprises a plurality of isocyanate cross-linkable hydroxy groups and a plurality of radiation cross-linkable curable groups, wherein the weight ratio of the second polymer to the first polymer is in the range from 1:19 to 19:1.		

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US 93/04151

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 G11B5/702 G11B5/704

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 5 G11B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE WPI Week 9007, Derwent Publications Ltd., London, GB; AN 90-048025 & JP,A,2 000 618 (TOYOCO KK) 5 January 1990 see abstract	1-3,6, 8-10,21
A	--- PATENT ABSTRACTS OF JAPAN vol. 13, no. 322 (P-902)20 July 1989 & JP,A,10 089 020 (FUJI PHOTO FILM CO LTD) 3 April 1989 see abstract --- -/-	1-3,9,21

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

22 November 1993

Date of mailing of the international search report

07.12.93

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 93/04151

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 15, no. 192 (P-1202)17 May 1991 & JP,A,30 044 819 (FUJI PHOTO FILM CO LTD) 26 February 1991 see abstract ---	1-3,9,21
A	EP,A,0 464 827 (MATSUSHITA ELECTRIC INDUSTRIAL CO.) 8 January 1992 see page 4, line 10 - line 13 see page 5, line 10 - line 13 see page 17, line 20 - page 20, line 26 see claims 1,2 ---	17,18
A	US,A,4 745 017 (TAKAHITO MIYOSHI ET AL.) 17 May 1988 see column 2, line 57 - column 3, line 29 see claims 1-4 -----	17,18

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 93/04151

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. claims 1-16,21-23
2. claims 17-20

For further information see form PCT/ISA/206 dated 15/09/93.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
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- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 93/04151

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0464827	08-01-92	JP-A- 4245022	01-09-92
		JP-A- 4064917	28-02-92
		JP-A- 4114314	15-04-92
US-A-4745017	17-05-88	JP-A- 59223937	15-12-84