

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
21 March 2002 (21.03.2002)

PCT

(10) International Publication Number  
**WO 02/023539 A3**

(51) International Patent Classification<sup>7</sup>: **G11B 5/31 // 5/39**

Superior, CO 80027 (US). **BIESECKER, John P.**; 3025 Broadway, Unit 13, Boulder, CO 80304 (US).

(21) International Application Number: PCT/US01/28676

(22) International Filing Date:  
12 September 2001 (12.09.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
09/660,662 13 September 2000 (13.09.2000) US

(71) Applicant: **STORAGE TECHNOLOGY CORPORATION** [US/US]; Wayne P. Bailey, One StorageTek Drive, MS-4309, Louisville, CO 80028-4309 (US).

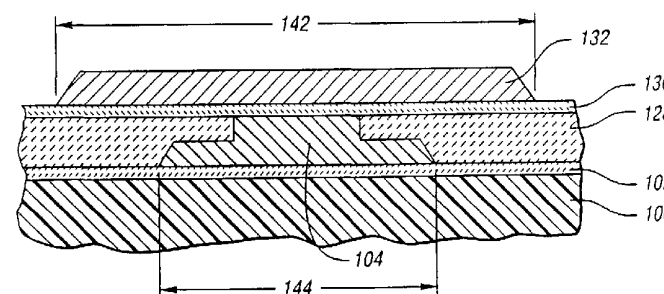
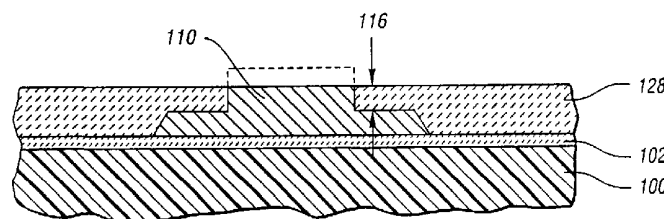
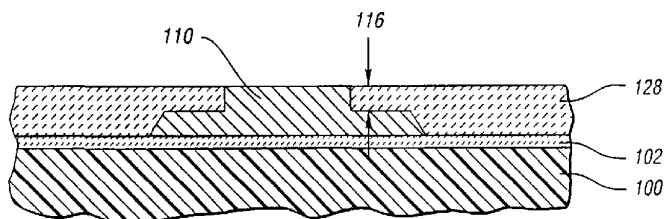
(72) Inventors: **DABY, Larry E.**; 130 Stearman Court, Erie, CO 80516 (US). **CATES, James C.**; 2051 Emerson Lane,

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: INVERTED WRITE HEAD WITH HIGH-PRECISION TRACK WIDTH DEFINITION



(57) Abstract: A method of fabricating a thin film magnetic transducer and the resulting transducer structure is disclosed. The method starts with the formation of a bottom pole (104) having an upper portion (110) and a lower portion (126) in a zero throat region (112). The upper portion has an upper portion width (114) and the lower portion had a lower portion width (144), wherein the lower portion width is greater than the upper portion width. A gap layer (130) is then formed over the bottom pole, and the top pole (132) is formed over the gap layer. The top pole width (142) is greater than the bottom pole's lower portion width. In one embodiment, a planarization layer (128) is deposited overlaying the bottom pole prior to formation of the gap layer. Lapping is then performed to reduce the planarization layer and the bottom pole's upper portion to a flat surface suitable for receiving the gap layer deposition.



WO 02/023539 A3



**Published:**

— with international search report

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**(88) Date of publication of the international search report:**

10 October 2002

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/28676

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G11B5/31 //G11B5/39

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 7 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)

EPO-Internal, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 719 730 A (TAO ARTHUR HUNGSHIN ET AL) 17 February 1998 (1998-02-17) the whole document ----	1,8
A	US 6 055 138 A (SHI ZHUPEI) 25 April 2000 (2000-04-25) the whole document ----	1-4,8, 10,11
A	US 5 894 389 A (KANAMINE MICHIAKI) 13 April 1999 (1999-04-13) figure 5A ----	1,8
A	US 5 652 687 A (ROBERTSON NEIL LESLIE ET AL) 29 July 1997 (1997-07-29) figure 20 ----	1,8
A	US 5 831 801 A (SHOUJI SHIGERU ET AL) 3 November 1998 (1998-11-03) ----- -/--	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

\* Special categories of cited documents:

\*A\* document defining the general state of the art which is not considered to be of particular relevance

\*E\* earlier document but published on or after the international filing date

\*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

\*O\* document referring to an oral disclosure, use, exhibition or other means

\*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*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.

\*&amp;\* document member of the same patent family

Date of the actual completion of the international search

18 June 2002

Date of mailing of the international search report

25/06/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Fux, J

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/28676

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>PATENT ABSTRACTS OF JAPAN vol. 1998, no. 05, 30 April 1998 (1998-04-30) -&amp; JP 10 021508 A (SONY CORP), 23 January 1998 (1998-01-23) abstract</p> <p>-----</p>	1,8

# INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/US 01/28676

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5719730	A	17-02-1998	NONE	
US 6055138	A	25-04-2000	NONE	
US 5894389	A	13-04-1999	JP 10302219 A DE 19748875 A1 KR 263805 B1	13-11-1998 12-11-1998 16-08-2000
US 5652687	A	29-07-1997	JP 2784431 B2 JP 7296328 A KR 149971 B1 US 5802700 A	06-08-1998 10-11-1995 15-04-1999 08-09-1998
US 5831801	A	03-11-1998	JP 2996224 B2 JP 10269524 A JP 11353617 A US 6033580 A	27-12-1999 09-10-1998 24-12-1999 07-03-2000
JP 10021508	A	23-01-1998	NONE	