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(54) Title: BONDED MICROELECTROMECHANICAL ASSEMBLIES

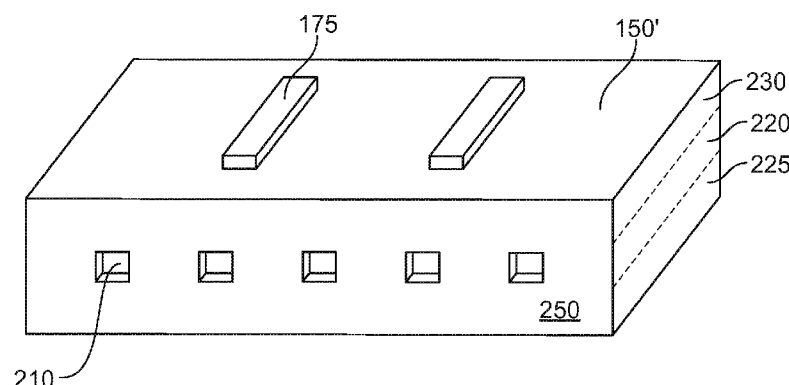


FIG. 7

(57) Abstract: A MEMS device is described that has a body with a component bonded to the body. The body has a main surface and a side surface adjacent to the main surface and smaller than the main surface. The body is formed of a material and the side surface is formed of the material and the body is in a crystalline structure different from the side surface. The body includes an outlet in the side surface and the component includes an aperture in fluid connection with the outlet.

A. CLASSIFICATION OF SUBJECT MATTER***B81C 1/00(2006.01)i, B81B 7/02(2006.01)i, H01L 21/60(2006.01)i, B41J 2/045(2006.01)i***

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: B41J 2/00

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

Korean utility models and applications for utility models since 1975

Japanese utility models and applications for utility models since 1975

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

eKOMPASS (KIPO internal) & key words: ink, jet, head, nozzle, print, dicing, die.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 08-001952 A (SEIKO EPSON CORP.) 09 January 1996 See abstract; claims 5, 11, 14, 16; figures 1, 3.	1, 14
A	US 2001-0055053 A1 (MASAKI KATAOKA et al.) 27 December 2001 See abstract; figures 2, 7.	1
A	US 07090325 B2 (KENICHIROH HASHIMOTO et al.) 15 August 2006 See abstract; claims 1, 2.	1
A	JP 2000-103059 A (SEIKO EPSON CORP.) 11 April 2000 See abstract; claims 1, 2; figure 4.	14



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"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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PCT/US2010/021470

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 08-001952 A	09.01.1996	EP 0678387 A3	19.06.1996
		EP 0867289 B1	15.03.2000
		EP 0678387 A2	25.10.1995
		EP 0678387 B1	02.12.1998
		EP 0867289 A1	30.09.1998
		JP 3389732 B2	24.03.2003
		JP 2002-059549 A	26.02.2002
		JP 03454258 B2	25.07.2003
		JP 03389732 B2	17.01.2003
		US 06213590 B1	10.04.2001
		US 05992978 A	30.11.1999
		US 06371598 B1	16.04.2002
US 2001-0055053 A1	27.12.2001	JP 2001-315337 A	13.11.2001
		US 06634741 B2	21.10.2003
US 07090325 B2	15.08.2006	CN 1289298 C	13.12.2006
		CN 1551832 A	01.12.2004
		CN 100478178 C	15.04.2009
		CN 1876378 A	13.12.2006
		CN 1551832 C0	13.12.2006
		CN 1876378 C0	13.12.2006
		EP 1423282 A4	14.06.2006
		EP 1423282 A1	02.06.2004
		JP 04159317 B2	01.10.2008
		JP 2004-050716 A	19.02.2004
		JP 2003-072090 A	12.03.2003
		US 07731861 B2	08.06.2010
		US 2006-0238579 A1	26.10.2006
		US 2004-0246292 A1	09.12.2004
		WO 2003-022584 A1	20.03.2003
JP 2000-103059 A	11.04.2000	JP 3555653 B2	18.08.2004