

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
30 April 2009 (30.04.2009)

PCT

(10) International Publication Number
WO 2009/055116 A3

- (51) **International Patent Classification:**
C25D 17/00 (2006.01) *C25D 21/10* (2006.01)
- (21) **International Application Number:**
PCT/US2008/072287
- (22) **International Filing Date:**
6 August 2008 (06.08.2008)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
11/836,903 10 August 2007 (10.08.2007) US
- (71) **Applicant (for all designated States except US):** FARADAY TECHNOLOGY, INC. [US/US]; 315 Huls Drive, Clayton, OH 45315 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** GEBHART, Lawrence, E. [US/US]; 7595 Meeker Road, Dayton, OH 45414 (US). TAYLOR, E., Jennings [US/US]; 1841 Laurel Creek Drive, Troy, OH 45373 (US).
- (74) **Agents:** LEVY, Mark, P. et al.; Thompson Hine LLP, Post Office Box 8801, Dayton, OH 45401-8801 (US).
- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) **Title:** ELECTROPLATING CELL WITH HYDRODYNAMICS FACILITATING MORE UNIFORM DEPOSITION ON A WORKPIECE WITH THROUGH HOLES DURING PLATING

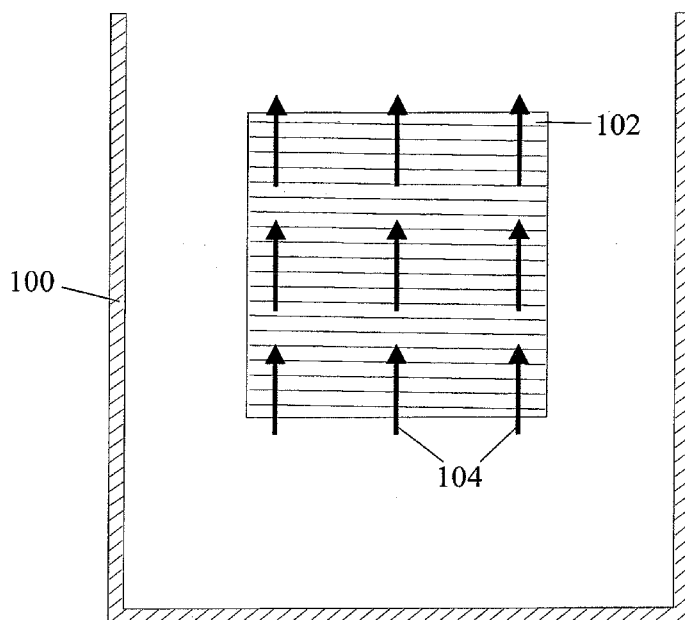


FIG. 1

(57) **Abstract:** A method and apparatus for establishing more uniform deposition across one or more faces of a workpiece in an electroplating process. The apparatus employs eductors in conjunction with a flow dampener member and other measures to provide a more uniform current distribution and a more uniform metal deposit distribution as reflected in a coefficient of variability that is lower than conventional processes.



WO 2009/055116 A3

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

- *with international search report (Art. 21(3))*

(88) Date of publication of the international search report:
7 January 2010

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 08/72287

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - C25D 17/00; 21/10 (2009.01) USPC - 204/273; 205/148 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) USPC - 204/273; 205/148 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC - 204/273; 205/148; 205/157 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PubWest: PGPB,USPT,USOC,EPAB,JPAB; Google; electroplating, anode, cathode, hole, eductor, flow, metal, electrolyte, board, vibrate, oscillate, virtual anode, porous		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2006/0151328 A1 (Reents et al.) 13 July 2006 (13.07.2006), para [0096] and para [0098]	1-30
Y	US 7,223,690 B2 (Kondo et al.) 29 May 2007 (29.05.2007) Figs. 28 and 62A; col 1, ln 28-45, col 2, ln 9-33, col 9, ln 25-31, col 15, ln 1-17, col 42, ln 26-31, col 66, ln 28-33 and col 70, ln 2-11	1-30
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>		
* 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 application or patent 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 "&" document member of the same patent family		
Date of the actual completion of the international search 14 June 2009 (14.06.2009)		Date of mailing of the international search report 16 JUL 2009
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774