

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
11 August 2005 (11.08.2005)

PCT

(10) International Publication Number
WO 2005/072338 A3

(51) International Patent Classification:

B24B 1/00 (2006.01) **B24B 21/18** (2006.01)
B24B 7/19 (2006.01) **B24B 7/00** (2006.01)
B24B 33/00 (2006.01) **B24B 5/00** (2006.01)
B24C 5/00 (2006.01) **B24B 9/00** (2006.01)
H01L 21/302 (2006.01) **B24B 29/00** (2006.01)
C03C 23/00 (2006.01) **H01L 21/46** (2006.01)
C23G 1/02 (2006.01) **B08B 7/00** (2006.01)
B08B 3/14 (2006.01)

(21) International Application Number:

PCT/US2005/002340

(22) International Filing Date: 25 January 2005 (25.01.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/539,162 26 January 2004 (26.01.2004) US
11/042,998 25 January 2005 (25.01.2005) US

(71) Applicant (for all designated States except US): **TBW INDUSTRIES, INC.** [US/US]; P.O. Box 336, Furlong, PA 18925 (US).

(71) Applicant and

(72) Inventor: **BENNER, Stephen, J.** [US/US]; 880 Troxel Road, Lansdale, PA 19446 (US).

(74) Agent: **KOBA, Wendy, W.**; P.O. Box 556, Springtown, PA 18081 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, 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, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

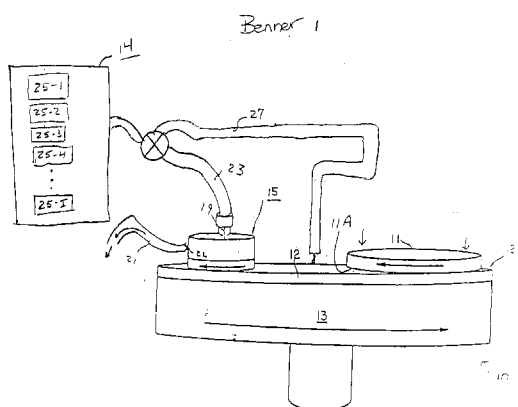
- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

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

1 June 2006

[Continued on next page]

(54) Title: MULTI-STEP PAD CONDITIONINGH SYSTEM AND METHOD FOR CHEMICAL PLANARIZATION



(57) Abstract: An arrangement for performing a multi-step polishing process on a single stage chemical mechanical planarization (CMP) apparatus utilizes an in-situ conditioning operation to continuously clean and evacuate debris and spent polishing slurry from the surface of the polishing pad. By presenting a clean, virtually "new" polishing pad surface at the beginning of each planarization cycle, polishing agents of different chemistries, morphologies, temperatures, etc. may be used without the need to remove the wafer to change the polishing source or transfer the wafer to another CMP polishing station. A multi-positional valve may be used to control the introduction of various process fluids, including a variety of different polishing slurries and conditioning/flushing agents. The use of different conditioning materials allows for the surface of the polishing pad to be altered for different process conditions (e.g., neutralizing prior polishing chemicals, modifying the surface temperature of the pad to control polishing rate, use of surfactants to dislodge particles that become attracted to the pad surface, etc.).

WO 2005/072338 A3



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.