

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
01 February 2018 (01.02.2018)



(10) International Publication Number
WO 2018/022520 A2

(51) International Patent Classification:

B24B 37/32 (2012.01) *B24B 37/04* (2006.01)
H01L 21/687 (2006.01) *H01L 21/306* (2006.01)

(21) International Application Number:

PCT/US2017/043551

(22) International Filing Date:

24 July 2017 (24.07.2017)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/366,550 25 July 2016 (25.07.2016) US

(71) Applicant: **APPLIED MATERIALS, INC.** [US/US];
3050 Bowers Avenue, Santa Clara, California 95054 (US).

(72) Inventors: **NAGENGAST, Andrew J.**; 659 Santa Paula
Avenue, Sunnyvale, California 94085 (US). **LEE, Christo-
pher Heung-Gyun**; 646 Kiowa Circle, San Jose, California
95123 (US). **LI, Thomas**; 330 Elan Village Ln, Unit 111,
San Jose, California 95134 (US). **IYER, Anand N.**; 10630
N. Blaney Ave., Cupertino, California 95014 (US). **DIAO,
Jie**; 4471 Macbeth Circle, Fremont, California 94555 (US).

ZHANG, Huanbo; 2204 Heritage Drive, San Jose, Cal-
ifornia 95124 (US). **RONDUM, Erik S.**; 572 Colombia
Creek Drive, San Ramon, California 94582 (US). **LEE,
Wei-Cheng**; 12100 Old Snakey Rd., Los Altos Hills, Cali-
fornia 94022 (US). **OH, Jeonghoon**; 18372 Purdue Drive,
Saratoga, California 95070 (US).

(74) Agent: **GOREN, David J.**; Fish & Richardson P.C., P.O.
Box 1022, Minneapolis, Minnesota 55440-1022 (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, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP,
KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,

(54) Title: RETAINING RING FOR CMP

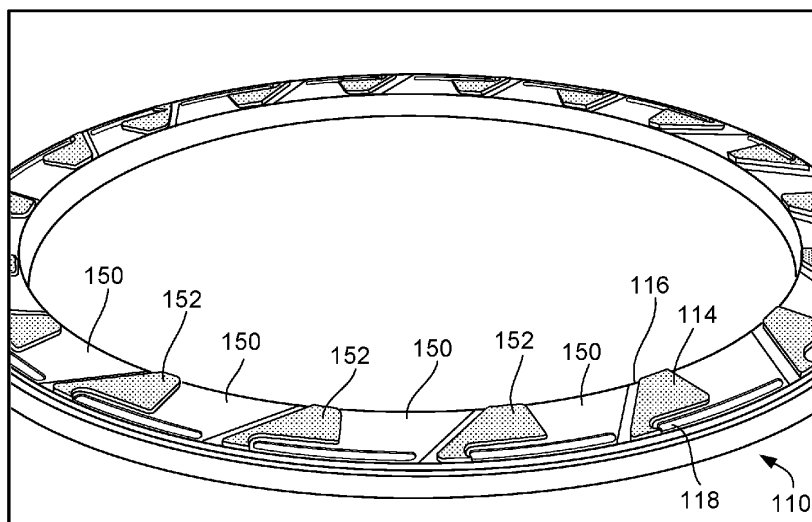


FIG. 2

(57) Abstract: A retaining ring includes a generally annular body having an inner surface to constrain a substrate and a bottom surface, the bottom surface having a plurality of channels extending from an outer surface to the inner surface, and a plurality of islands separated by the channels and providing a contact area to contact a polishing pad, wherein the contact area is about 15-40% of a plan area of the bottom surface.

[Continued on next page]

WO 2018/022520 A2

UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*