

(43) International Publication Date
5 April 2012 (05.04.2012)(10) International Publication Number
WO 2012/044658 A1

(51) International Patent Classification:

C23C 16/52 (2006.01) C23C 16/448 (2006.01)
C23C 16/455 (2006.01) G05D 7/06 (2006.01)

(21) International Application Number:

PCT/US2011/053614

(22) International Filing Date:

28 September 2011 (28.09.2011)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/893,554 29 September 2010 (29.09.2010) US

(71) Applicant (for all designated States except US): **MKS INSTRUMENTS, INC.** [US/US]; 2 Tech Drive, Suite 201, Andover, Massachusetts 01810 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **DING, Junhua** [US/US]; 41 Orchard Street, Tewksbury, Massachusetts 01876 (US).

(74) Agents: **KUSMER, Toby. H.** et al.; 28 State Street, Boston, Massachusetts 02109 (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, CL, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, 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, ML, MR, NE, SN, TD, TG).

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))

(54) Title: SYSTEM FOR AND METHOD OF FAST PULSE GAS DELIVERY

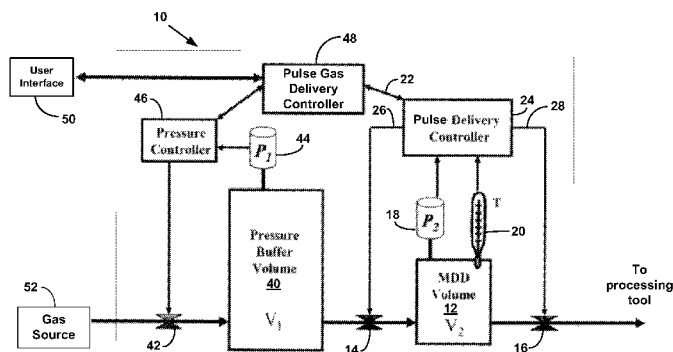


Fig. 1

(57) Abstract: A system for and method of delivering pulses of a desired mass of gas to a tool is described. A system for delivering pulses of a desired mass of gas to a process chamber or tool, comprising: a gas delivery chamber; a first valve arranged so as to control the flow of gas into the gas delivery chamber; a second valve arranged so as to control the flow of gas leaving the gas delivery chamber so that the gas can leave the gas delivery chamber in pulses, each of a selected mass as a function of the initial pressure of the gas in the gas delivery chamber and the duration of the respective pulse; and a pressure control arrangement configured and arranged so as to control the flow of gas into the gas delivery chamber so as to precharge the gas in the gas delivery chamber to an initial pressure set point prior to delivering the pulses of gas such that the variance of the starting pressure of the gas in the gas delivery chamber is controlled prior to delivering the pulses of gas, and the repeatability of the mass delivery is improved as a function of the duration of each of the pulses.