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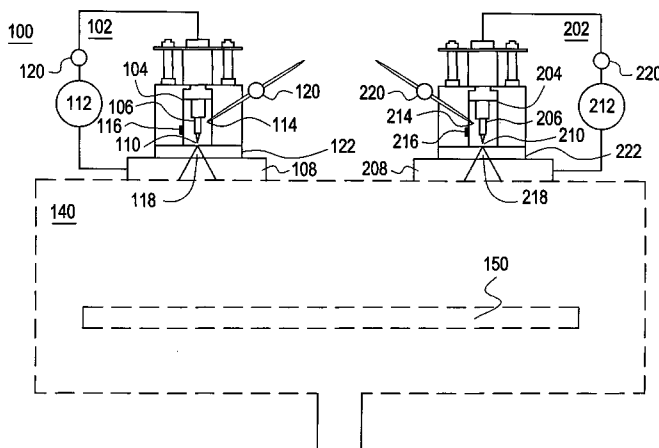
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[Continued on next page]

(54) Title: REPLACEABLE PLATE EXPANDED THERMAL PLASMA APPARATUS AND METHOD



(57) Abstract: A deposition process comprises determining a target process condition within a chamber of an expanding thermal plasma generator (102, 202) for plasma enhanced chemical vapor deposition of a coating on a substrate; the generator (102, 202) comprising a cathode (106, 206), replaceable cascade plate and generators (108, 208) with concentric orifice; and replacing the cascade plate with another plate having a configured orifice to effect the identified target process condition; and generating a plasma at the target process condition by providing a plasma gas to the plasma generator (102, 202) and ionizing the plasma gas in an arc between cathode (106, 206) and generators (108, 208) within the generator (102, 202) and expanding the gas as a plasma onto a substrate in a deposition chamber. A deposition apparatus (100) for generating a controllable plasma; comprises a deposition chamber; adapted to be maintained at subatmospheric pressure; an article support within the deposition chamber; an expanding thermal plasma generator (102, 202) comprising a cathode (106, 206), a single cascade plate and an generators (108, 208) and a communicating orifice through the cascade plate, the orifice having a length of 1mm to less than 20mm.

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**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations 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, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
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