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(21) International Application Number: PCT/US99/05771 (22) International Filing Date: 17 March 1999 (17.03.99) (30) Priority Data: 09/197,127 20 November 1998 (20.11.98) US (71) Applicant: MINNESOTA MINING AND MANUFACTURING COMPANY [US/US]; 3M Center, P.O. Box 33427, Saint Paul, MN 55133-3427 (US). (72) Inventors: TREADWELL, Daniel, J.; 3M Center, P.O. Box 33427, Saint Paul, MN 55133-3427 (US). SHOEMAKER, Curtis, L.; 3M Center, P.O. Box 33427, Saint Paul, MN 55133-3427 (US). (74) Agents: MCNUTT, Matthew, B. et al.; Office of Intellectual Property Counsel, P.O. Box 33427, Saint Paul, MN 55133-3427 (US).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, 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, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>With amended claims.</i>
(54) Title: LASER ABLATED FEATURE FORMATION DEVICE (57) Abstract A method and apparatus for ablating features in a substrate, the apparatus including a radiation source and first and second rotating transparent uniformly thick disks positioned between the radiation source and a substrate to be irradiated. The method comprises irradiating the substrate with radiation that has passed through the first and second rotating disks, wherein the first and second disks are independently rotating at different angular velocities to create a predetermined irradiation pattern on the substrate. The disks may have a relative acceleration. The method and apparatus may be used to ablate nozzles having longitudinal axes which are non-orthogonal with the surface of the substrate and which are not parallel to each other.		

