



- (51) International Patent Classification:
H05G 1/02 (2006.01)
- (21) International Application Number:
PCT/US2012/036310
- (22) International Filing Date:
3 May 2012 (03.05.2012)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/482,031 3 May 2011 (03.05.2011) US
- (71) Applicant (for all designated States except US): **THE REGENTS OF THE UNIVERSITY OF CALIFORNIA** [US/US]; 1111 Franklin Street, Oakland, California 94607-5200 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **CAMARA, Carlos** [US/US]; 5 Westminster Avenue, PH1, Venice, California 90291 (US). **PUTTERMAN, Seth J.** [US/US]; 28778 Sea Ranch Way, Malibu, California 90265 (US). **HIRD, Jonathan** [GB/US]; 19 Chedworth Street, Cambridge BC3 9JF (GB).
- (74) Agent: **DALEY, Henry J.**; Venable LLP, P.O. Box 34385, Washington, District of Columbia 20043-9998 (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, 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).

[Continued on next page]

(54) Title: APPARATUS AND METHOD TO GENERATE X-RAYS BY CONTACT ELECTRIFICATION

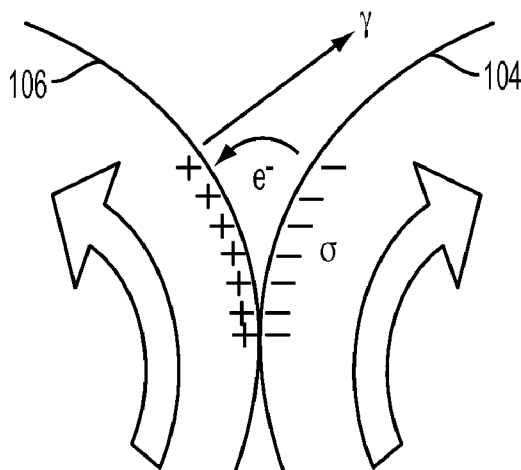


FIG. 3

(57) Abstract: An x-ray source includes an enclosing vessel, a first roller arranged at least partially within the enclosing vessel, a second roller arranged at least partially within the enclosing vessel and to be in rolling contact with the first roller, and a drive assembly operatively connected to at least one of the first and second rollers. The drive assembly causes the first and second rollers to rotate while in contact to bring portions of the first and second rollers into and out of contact within the enclosing vessel as the first and second rollers rotate. The first roller has a surface at least partially of a first triboelectric material and the second roller has a surface at least partially of a second triboelectric material, the first triboelectric material having a negative triboelectric potential relative to the second triboelectric material. The enclosing vessel is structured to provide a controlled atmospheric environment, and the first triboelectric material, the second triboelectric material and the controlled atmospheric environment are selected such that rolling contact between the first and second rollers produces x-rays.

**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))*

— *of inventorship (Rule 4.17(iv))*

Published:

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