



(51) International Patent Classification:
B01J 19/08 (2006.01)

(21) International Application Number:
PCT/US2011/024010

(22) International Filing Date:
8 February 2011 (08.02.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/337,701 11 February 2010 (11.02.2010) US
13/021,020 4 February 2011 (04.02.2011) US

(71) Applicant (for all designated States except US): **ILLINOIS TOOL WORKS INC.** [US/US]; 3600 West Lake Avenue, Glenview, Illinois 60026 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **GEFTER, Peter** [US/US]; c/o Illinois Tool Works Inc., 3600 West Lake Avenue, Glenview, Illinois 60026 (US).

(74) Agent: **HAUPTMAN, Benjamin J.**; 1700 Diagonal Road, Suite 300, Alexandria, Virginia 22314 (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, RO, RS, RU, 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, 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))

Published:

— with international search report (Art. 21(3))

(54) Title: SEPARATING CONTAMINANTS FROM GAS IONS IN CORONA DISCHARGE IONIZING BARS

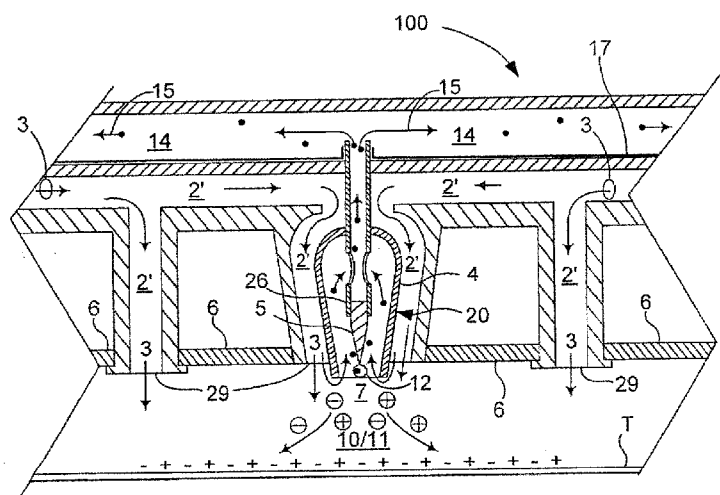


Figure 1a

(57) Abstract: Clean corona ionization bars separate contaminant byproducts from corona generated ions by establishing a non-ionized gas stream having a pressure and directed toward an attractive non-ionizing electric field of a charge neutralization target, by establishing a plasma region of ions and contaminant byproducts in which the pressure is sufficiently lower than the pressure of the non-ionized gas stream to prevent byproducts from migrating into the non-ionized gas stream. The ionization bar(s) may be located sufficiently close to the charged neutralization target that a non-ionizing electric field of the target induces at least a substantial portion of the ions to migrate into the non-ionized gas stream and to the neutralization target as a clean ionized gas stream.