(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
31 May 2001 (31.05.2001)

PCT

(10) International Publication Number
WO 01/37783 A3

(51) International Patent Classification[7]: B05B 5/04

(21) International Application Number: PCT/US00/42084

(22) International Filing Date:
10 November 2000 (10.11.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/438,801 12 November 1999 (12.11.1999) US

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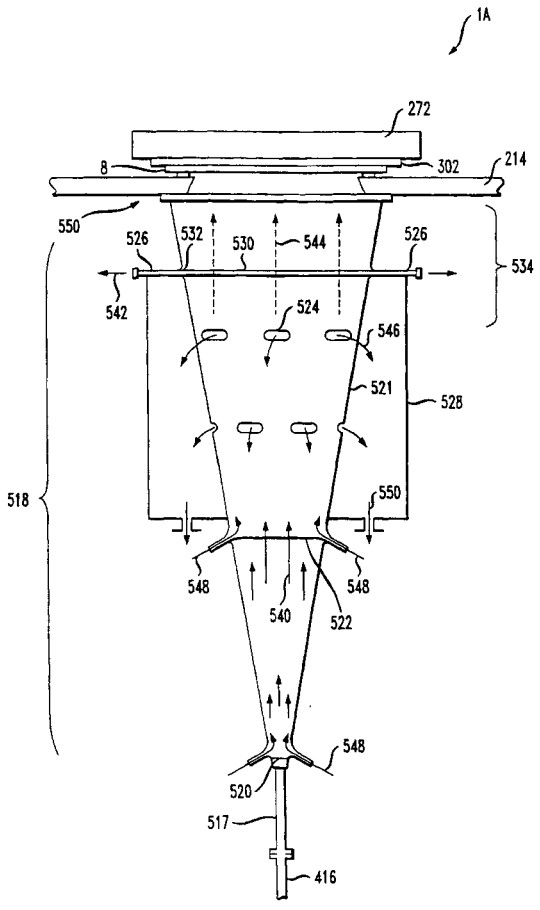
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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, 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, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

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(54) Title: ARTICLE COMPRISING A DIFFUSER WITH FLOW CONTROL FEATURES



(57) Abstract: A diffuser (518) comprises a conduit having a cross-sectional area that increases in a direction fluid flow. In one embodiment, the diffuser is used to reduce the incidence and severity of flow fluctuations that occur in an electrostatic deposition apparatus. In some embodiments, the diffuser includes one or more flow control features. A first flow-control feature comprises one or more appropriately-shaped annular slits (520) through which fluid having a greater momentum than a primary fluid moving through the diffuser is injected into the "boundary layer" near the wall of the diffuser. A second flow control feature comprises one or more annular slits (548) or, alternatively, slots or holes that are disposed at appropriate locations around the circumference of the diffuser through which a portion of fluid flowing in the boundary layer is removed. Boundary-layer flow removal is effected, in one embodiment, by creating a pressure differential across such annular slit or slots. Among other benefits, such flow control features reduce any tendencies for flow separation of the primary fluid in the diffuser.

WO 01/37783 A3

Published:
— *with international search report*

(88) Date of publication of the international search report:
27 December 2001

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.