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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
31 October 2002 (31.10.2002)

PCT

(10) International Publication Number
WO 02/085527 A3

(51) International Patent Classification[7]: C10G 11/18, B04C 5/14, 5/18

(21) International Application Number: PCT/EP02/04144

(22) International Filing Date: 11 April 2002 (11.04.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/285,359 20 April 2001 (20.04.2001) US

(71) Applicant *(for all designated States except US)*: **SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.** [NL/NL]; Carel van Bylandtlaan 30, NL-2596 HR The Hague (NL).

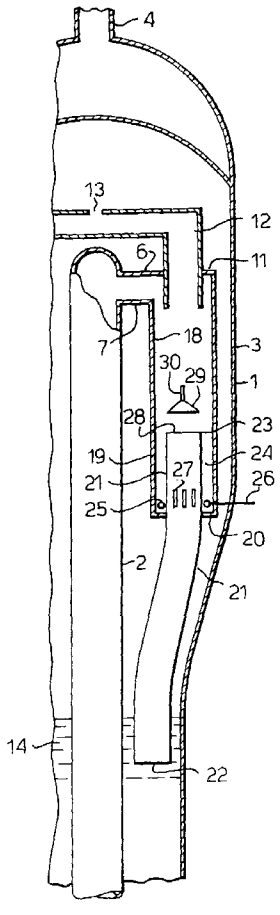
(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **CHEN, Ye-Mon** [US/US]; 2215 Bent River Drive, Sugar Land, TX 77479 (US). **DEWITZ, Thomas, Shawn** [US/US]; 4613 Valerie Street, Bellaire, TX 77401 (US). **DIRKSE, Hendricus, Arien** [NL/NL]; Badhuisweg 3, Nl-1031 Cm Amsterdam (NL). **DRIES, Hubertus, Wilhelmus, Albertus** [NL/NL]; Badhuisweg 3, NL-1031 CM Amsterdam (NL). **SANBORN, Richard, Addison** [US/US]; 12418 Mossycup Drive, Houston, TX 77024 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, 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, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: CYCLONE SEPARATOR



(57) Abstract: Cyclone separator provided with an inlet for receiving gas and solid particles, a gas outlet at its upper end and a lower tubular part, wherein the lower tubular part is provided with a closed lower end, through which closed lower end a substnatially vertical particle withdrawal conduit extends from a position below the closed lower end to a position in the tubular part and below the inlet for receiving gas and solid particles, said conduit being provided with openings to withdraw solid particles from the cyclone separator and wherein said conduit has a smaller cross-sectional area than the lower tubular part, thereby defining a space between conduit and inner wall of the lower tubular part, wherein in the lower part of said space main means to add a primary fluidizing medium are present.

WO 02/085527 A3

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, 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, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(88) Date of publication of the international search report:
13 February 2003

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.