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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
26 January 2012 (26.01.2012)

PCT

(10) International Publication Number
WO 2012/011990 A1

(51) International Patent Classification:
B01J 8/04 (2006.01) *C10G 49/00* (2006.01)
B01J 19/26 (2006.01)

(21) International Application Number:
PCT/US2011/033285

(22) International Filing Date:
20 April 2011 (20.04.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12/839,222 19 July 2010 (19.07.2010) US

(71) Applicant *(for all designated States except US)*: **CHEVRON U.S.A. INC.** [US/US]; 6001 Bollinger Canyon Road, San Ramon, CA 94583 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **KILLEN, Ralph, E.** [US/US]; 70 Martha Avenue, San Francisco, CA 94131 (US). **BOYAK, Craig** [US/US]; 901 Avis Drive, El Cerrito, CA 94530 (US). **SONG, Steven, X.** [CA/US]; 555 Pierce Street, Apt # 1341, Albany, CA 94706 (US). **KEMOUN, Abdenour** [CA/US]; 455 Viking Drive, Pleasant Hill, CA 94523 (US). **SOUERS, Steve** [US/US]; 3801 Bergerac Lane, Ocean Springs, MS 39564 (US). **PARIMI, Krishniah** [US/US]; 2426 Heritage Oaks Drive, Alamo, CA 94507 (US). **AKIN, Zackory** [US/US]; 1444 Cloudview Drive, Pleasant Hill, CA 94523 (US).

(74) Agents: **KLAASSEN, Alan, W.** et al.; Chevron Corporation, Law Department, Post Office Box 6006, San Ramon, CA 94583-0806 (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).

[Continued on next page]

(54) Title: MULTIPHASE CONTACT AND DISTRIBUTION APPARATUS FOR HYDROPROCESSING

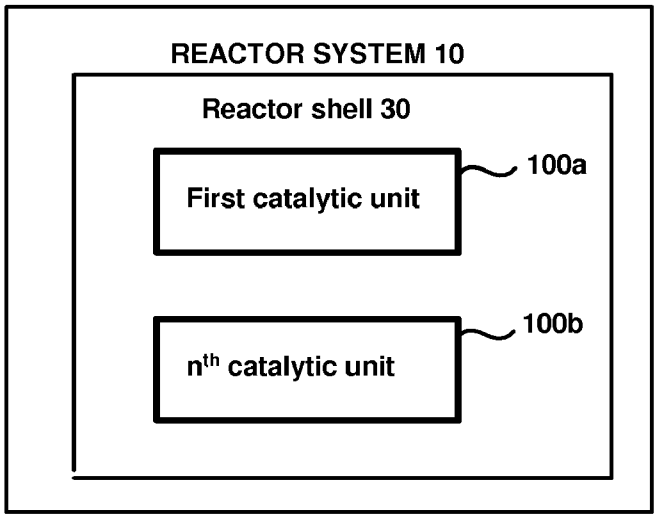


FIG. 1

(57) Abstract: Systems and apparatus for mixing, cooling, and distributing multiphase fluid mixtures within a reactor, wherein reactor internal apparatus of the present invention provides not only improved fluid mixing and distribution to each underlying catalyst bed surface, but also offers other advantages including: decreased mixing tray height; easier maintenance, assembly and disassembly; and decreased amounts of fabrication material. In an embodiment, fluid may be evenly distributed to a catalyst bed from a fluid distribution unit comprising a nozzle tray including a plurality of nozzles, wherein the nozzles include at least one liquid inlet disposed tangentially to an inner surface of the nozzle.

WO 2012/011990 A1

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))*

Published:

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

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*