



(51) International Patent Classification:

B01D 1/28 (2006.01) **B01D 3/14** (2006.01)
B01D 3/00 (2006.01)

(21) International Application Number:

PCT/US2011/054854

(22) International Filing Date:

5 October 2011 (05.10.2011)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/390,358 6 October 2010 (06.10.2010) US

(71) Applicant (for all designated States except US):
EXXONMOBIL RESEARCH AND ENGINEERING COMPANY [US/US]; 1545 Route 22 East, P.O. Box 900, Annandale, NJ 08801-0900 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GUPTA, Ramesh** [US/US]; 57 Lawrence Drive, Berkley Heights, NJ 07922 (US). **WEISSMAN, Walter** [US/US]; 6 Dickens Road, Basking Ridge, NJ 07920 (US). **STOBER, Berne, K.** [US/US]; 8471 Sevan Court, Annandale, VA 22003 (US).

CODY, Ian, A. [US/AU]; 41/223 North Terrace, Adelaide, South Australia, 5000 (AU).

(74) Agents: **PURWIN, Paul, E.** et al.; Exxonmobil Research And Engineering Company, 1545 Route 22 East, P.O. Box 900, Annandale, NJ 08801-0900 (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, 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,

[Continued on next page]

(54) Title: LOW ENERGY DISTILLATION SYSTEM AND METHOD

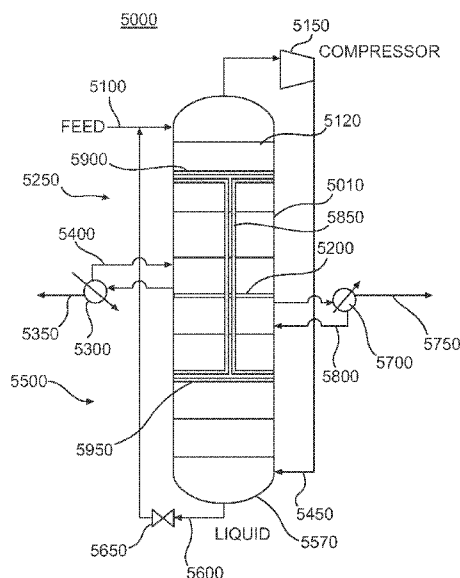


FIG. 5

(57) Abstract: A distillation system for separating at least two components of a multi-component fluid feed that includes a stripper section including (i) an inlet to receive a feed of fluid containing at least two components, (ii) a compressor in fluid communication with a more volatile portion of the fluid within the stripper section to provide an output feed, and (iii) a reboiler to receive a heating fluid and in fluid communication with a less volatile portion of fluid within the stripper section. The distillation system also includes a rectifier section aligned vertically with and disposed below the stripper section, the rectifier section to receive the output feed from the compressor and further including (i) a condenser to receive a cooling fluid and in fluid communication with a more volatile portion of the output feed from the compressor, the condenser including an exit to remove at least one component from the more volatile portion of the output feed, and (ii) an outlet to recycle a less volatile portion of the output feed from the compressor for recycle back to the stripper section. Heat pipes are provided between the lower rectifier section and the upper stripper section so as to transfer thermal energy from the rectifier to the stripper section and thereby improve the exergy efficiency of such distillation.



SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, —
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*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))*

Published:

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