

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
23 October 2003 (23.10.2003)

PCT

(10) International Publication Number
WO 03/087022 A1

(51) International Patent Classification⁷: **C07C 7/04**,
7/00, 7/09, F25J 3/06

(21) International Application Number: PCT/US03/10873

(22) International Filing Date: 9 April 2003 (09.04.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/121,151 11 April 2002 (11.04.2002) US

(71) Applicant: **ABB LUMMUS GLOBAL INC.** [US/US];
1515 Broad Street, Bloomfield, NJ 07003-3096 (US).

(72) Inventors: **WEI, Vitus Tuan**; 2100 Tanglewilde #112,
Houston, TX 77063 (US). **MA, Qi**; 22410 Laura's Glen
Court, Katy, TX 77450 (US). **WU, James, Tzong-Chaur**;
14822 Earlswood Drive, Houston, TX 77083 (US).

(74) Agents: **BERNEIKE, Richard, H.** et al.; Alix, Yale &
Ristas, LLP, 750 Main Street, Hartford, CT 06103 (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, 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,
NO, NZ, PL, PT, RO, RU, SD, SE, SG, 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, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (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)) for all designations
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

Published:

- with international search report
- with amended claims

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.

(54) Title: OLEFIN PLANT REFRIGERATION SYSTEM

(57) Abstract: The refrigeration system for an ethylene plant comprises a closed loop tertiary refrigerant system containing methane, ethylene and propylene. The tertiary refrigerant from a compressor is separated into an inter-stage discharge and the final compressor discharge to produce a methane-rich vapor fraction and two levels of propylene-rich liquids so as to provide various temperatures and levels of refrigeration in various heat exchange stages while maintaining a nearly constant refrigerant composition flowing back to the compressor and with the bulk of the total return refrigerant flow going to the first stage compressor section. This tertiary system can also be applied to an ethylene plant with a high pressure demethanizer.



WO 03/087022 A1