



(51) International Patent Classification:
F25B 7/00 (2006.01)

(21) International Application Number:

PCT/US2010/055218

(22) International Filing Date:

3 November 2010 (03.11.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/257,527 3 November 2009 (03.11.2009) US

(71) Applicant (for all designated States except US): **E.I. DU PONT DE NEMOURS AND COMPANY** [US/US]; 1007 Market Street, Wilmington, Delaware 19898 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MINOR, Barbara, Haviland** [US/US]; 233 Greenhaven Drive, Elkton, Maryland 21921 (US). **KONTOMARIS, Konstantinos** [US/US]; 63 Quail Hollow Drive, Hockessin, Delaware 19707 (US). **LECK, Thomas, J.** [US/US]; 703 Regency Hill Drive, Hockessin, Delaware 19707 (US).

(74) Agent: **HEISER, David, E.**; E.I. du Pont de Nemours and Company, Legal Patent Records Center, 4417 Lancaster Pike, Wilmington, Delaware 19805 (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,

[Continued on next page]

(54) Title: CASCADE REFRIGERATION SYSTEM WITH FLUOROOLEFIN REFRIGERANT

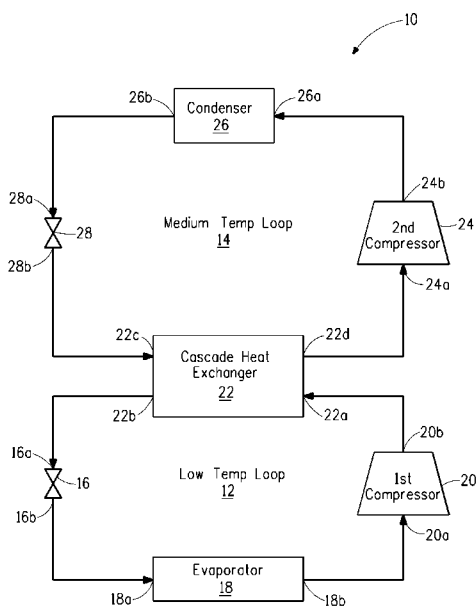


FIG. 1

(57) Abstract: The present invention relates to a cascade refrigeration system which circulates a refrigerant comprising a fluoroolefin therethrough. The cascade refrigeration system includes a low temperature refrigeration loop and a medium temperature refrigeration loop. The fluoroolefin circulates through either loop, or both. In a particular embodiment, the fluoroolefin circulates through the medium temperature loop. In a particular embodiment, where the cascade refrigeration system includes a first and a second cascade heat exchanger, and a secondary heat transfer loop which extends between the first and second cascade heat exchangers, either the first and/or second refrigerant may be, but need not necessarily be, a fluoroolefin.



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG). **Published:**

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*