



- (51) **International Patent Classification:**
F25B 30/02 (2006.01) *F25B 7/00* (2006.01)
F25B 1/00 (2006.01)
- (21) **International Application Number:**
PCT/US2013/053119
- (22) **International Filing Date:**
1 August 2013 (01.08.2013)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/678,419 1 August 2012 (01.08.2012) US
- (71) **Applicant:** E. I. DU PONT DE NEMOURS AND COMPANY [US/US]; 1007 Market Street, Wilmington, Delaware 19898 (US).
- (72) **Inventor:** KONTOMARIS, Konstantinos; 702 Abbey Road, Wilmington, Delaware 19808 (US).
- (74) **Agent:** TUCKER, N., Lynn; 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, BN, 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, 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, PA, 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, 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, KM, ML, MR, NE, SN, TD, TG).

Published:

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

(54) **Title:** USE OF E-1,1,1,4,4,4-HEXAFLUORO-2-BUTENE IN HEAT PUMPS

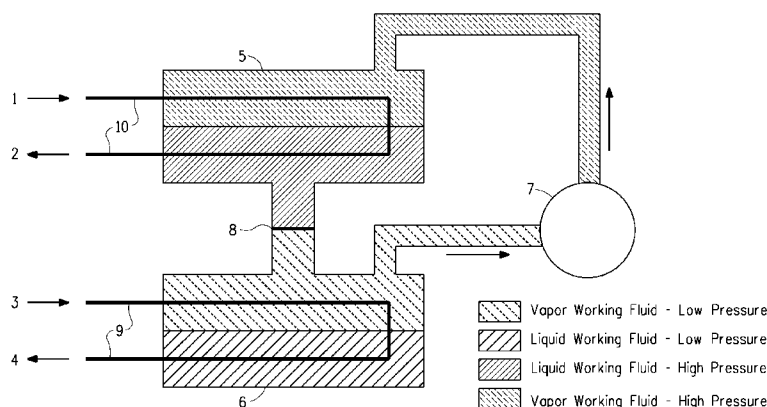


FIG. 1

(57) **Abstract:** Disclosed is a method for producing heating in a heat pump that involves extracting heat from a working fluid comprising E-HFO-1336mzz, in a heat exchanger, thereby producing a cooled working fluid. Also disclosed is a method for producing heating in a heat pump wherein heat is exchanged between at least two cascade stages. Also disclosed is a heat pump apparatus including a working fluid heater, compressor, working fluid cooler and expansion device and said apparatus contains a working fluid comprising E-HFO-1336mzz. Also disclosed is a method for replacing CFC-114, HFC-245fa, HFC-236fa, HCFC-124, HFC-134a, CFC-12 working fluid in a heat pump designed for said working fluid that involves providing a replacement working fluid comprising E-HFO-1336mzz. Also disclosed is a composition containing (i) a working fluid consisting essentially of E-HFO-1336mzz; and (ii) a stabilizer; or (iii) a lubricant; or both (ii) and (iii).