



(51) International Patent Classification:
F28D 9/00 (2006.01) *F28F 3/02* (2006.01)

(21) International Application Number:
PCT/US2010/050685

(22) International Filing Date:
29 September 2010 (29.09.2010)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant (for all designated States except US): **AIR PRODUCTS AND CHEMICALS, INC.** [US/US]; 7201 Hamilton Boulevard, Allentown, PA 18195 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SUNDER, Swaminathan** [US/US]; c/o Air Products and Chemicals, Inc., 7201 Hamilton Boulevard, Allentown, PA 18195 (US). **GERSHTEIN, Vladimir, Yliy** [US/US]; c/o Air Products and Chemicals, Inc., 7201 Hamilton Boulevard, Allentown, PA 18195 (US). **MESKI, George, A.** [US/US]; c/o Air Products and Chemicals, Inc., 7201 Hamilton Boulevard, Allentown, PA 18195 (US). **HOUGHTON, Patrick, A.** [US/US]; c/o Air Products and Chemicals, Inc., 7201 Hamilton Boulevard, Allentown, PA 18195 (US).

(74) Agent: **NEAGLE, Damon, A.**; Design IP, P.C., 5100 W. Tilghman Street, Suite 205, Allentown, PA 18104 (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, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

[Continued on next page]

(54) Title: HEAT EXCHANGER PERFORATED FINS

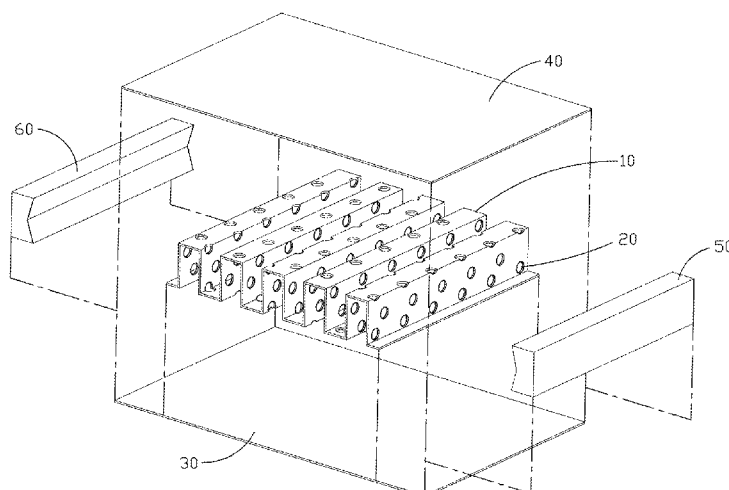


FIG. 1

(57) Abstract: A plate fin heat exchanger comprises a folded fin sheet comprising fins wherein the fin sheet comprises a plurality of perforations, such plurality of perforations are positioned on the fin sheet in parallel rows when such fin sheet is in an unfolded state, such parallel rows of perforations on the fin sheet comprise a first spacing between the parallel rows of perforations (S1), a second spacing between sequential perforations within the parallel row of perforations (S2), a third spacing (or offset) between the perforations in adjacent parallel rows of perforations (S3), and a perforation diameter (D), wherein the ratio of the first spacing between the parallel rows of perforations to the perforation diameter (S1/D) is in the range of 0.75 to 2.0, and wherein the angle between the fins and the parallel rows of perforations is less than or equal to five degrees ($\leq 5^\circ$).



Published:

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