

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
17 July 2025 (17.07.2025)



(10) International Publication Number
WO 2025/151539 A1

(51) International Patent Classification:

F28F 7/02 (2006.01) *F28F 3/12* (2006.01)
F28F 9/02 (2006.01) *H01L 23/473* (2006.01)
F28F 3/08 (2006.01) *F28D 21/00* (2006.01)

(72) Inventor: **FOGG, David**; 24 Colonel Ashley Lane, Claremont, New Hampshire 03743 (US).

(74) Agent: **HUQ, Abhik A.** et al.; 3001 West Big Beaver Road, Suite 624, Troy, Michigan 48084 (US).

(21) International Application Number:

PCT/US2025/010780

(22) International Filing Date:

08 January 2025 (08.01.2025)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/619,654 10 January 2024 (10.01.2024) US

(71) Applicant: **MIKROS TECHNOLOGIES LLC** [US/US];
24 Colonel Ashley Lane, Claremont, New Hampshire
03743 (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, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UY, UZ, VC, VN, WS, ZA, ZM, ZW.

(54) Title: TWO-PHASE HEAT EXCHANGER FOR HIGH-HEAT FLUX CHIP SETS

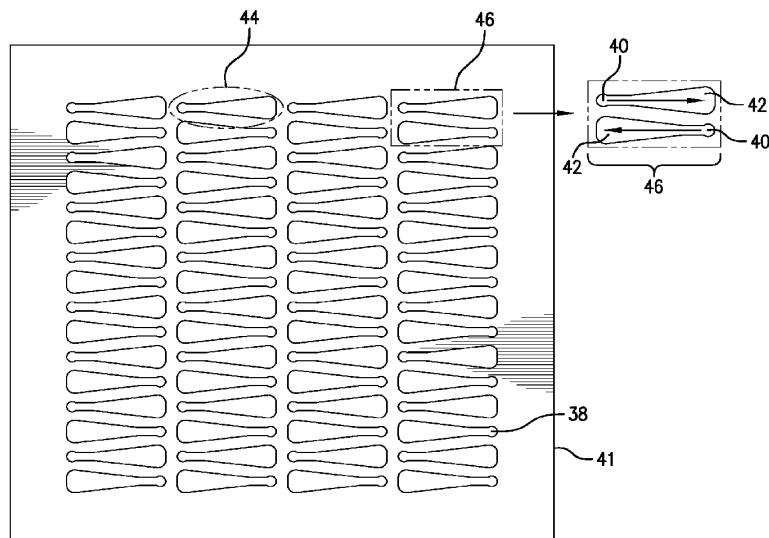


FIG. 9

(57) Abstract: A two-phase heat exchanger includes a manifold assembly configured to have an input manifold for fluid inlet flow and an output manifold for two-phase output flow, and a heat transfer matrix coupled to the manifold assembly. The heat transfer matrix includes a plurality of microchannels that are in fluid communication with the input manifold and the output manifold. Each of the plurality of microchannels includes a flow restriction configured to inhibit redistribution of fluid inlet flow and balance pressure drop between certain ones of the plurality of microchannels. Pairs of the plurality of microchannels are in a counterflow configuration with an inlet of a microchannel adjacent to an outlet of a neighbor microchannel, where the counterflow configuration increases packing density and reduces pressure drop in the heat transfer matrix.

[Continued on next page]

WO 2025/151539 A1

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, 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, ME, 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))