

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
12 January 2023 (12.01.2023)



(10) International Publication Number
WO 2023/283486 A1

(51) International Patent Classification:

F28D 1/053 (2006.01) *F28F 1/02* (2006.01)
F28D 15/02 (2006.01) *F28F 9/04* (2006.01)

(21) International Application Number:

PCT/US2022/036680

(22) International Filing Date:

11 July 2022 (11.07.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/220,368 09 July 2021 (09.07.2021) US

(71) Applicant: **PHONONIC, INC.** [US/US]; 800 Capitola Drive, Suite 7, Durham, North Carolina 27713 (US).

(72) Inventors: **EDWARDS, Jesse**; 3501 W. Stone Dr., Wake Forest, North Carolina 27587 (US). **YADAV, Abhishek**;

1902 Whirlaway Ct., Cary, North Carolina 27519 (US). **NYIKA, Simbarashe**; 106 Corn Crib Ct, Durham, North Carolina 27703 (US). **NEWMAN, Devon**; 6725 South Wakefield Way, Salt Lake City, Utah 84081 (US).

(74) Agent: **MACENKO, Marc**; 106 Pinedale Springs Way, Cary, North Carolina 27511 (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, 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, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH,

(54) Title: HIGH RELIABILITY, MICROCHANNEL HEAT PIPE ARRAY FOR IMPROVED EFFICIENCY, SIMPLIFIED CHARGING/DISCHARGING AND LOW-COST MANUFACTURE

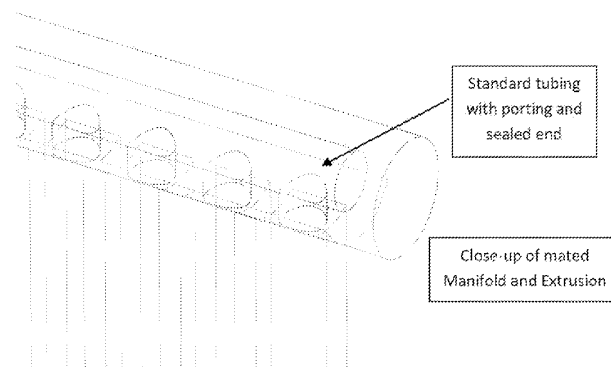


FIG. 2A

(57) Abstract: Systems and method for providing a micro-channel array are provided. In some embodiments, a micro-channel array includes a plurality of micro-channels having a first end and a second end; where at least one of the first end and the second end allows fluid connectivity between the plurality of micro-channels. In some embodiments, the micro-channel array includes external manifolding for fluid connectivity between the plurality of micro-channels. In some embodiments, the micro-channel array includes internal manifolding for fluid connectivity between the plurality of micro-channels. This may solve one of the largest causes of low yields and poor performance consistency in the production process while at the same time simplifying production and reducing production costs.

[Continued on next page]

WO 2023/283486 A1

TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS,
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, 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, 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))