

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
29 June 2023 (29.06.2023)



(10) International Publication Number
WO 2023/122749 A3

(51) International Patent Classification:

F24F 3/147 (2006.01) *B01D 53/26* (2006.01)
F24F 3/14 (2006.01) *B01D 53/18* (2006.01)
F24F 1/0083 (2019.01) *B01D 53/22* (2006.01)

(21) International Application Number:

PCT/US2022/082272

(22) International Filing Date:

22 December 2022 (22.12.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

17/559,172 22 December 2021 (22.12.2021) US

(71) Applicant: **MOJAVE ENERGY SYSTEMS, INC.**
[US/US]; 438 Addison Ave, Palo Alto, California 94301 (US).

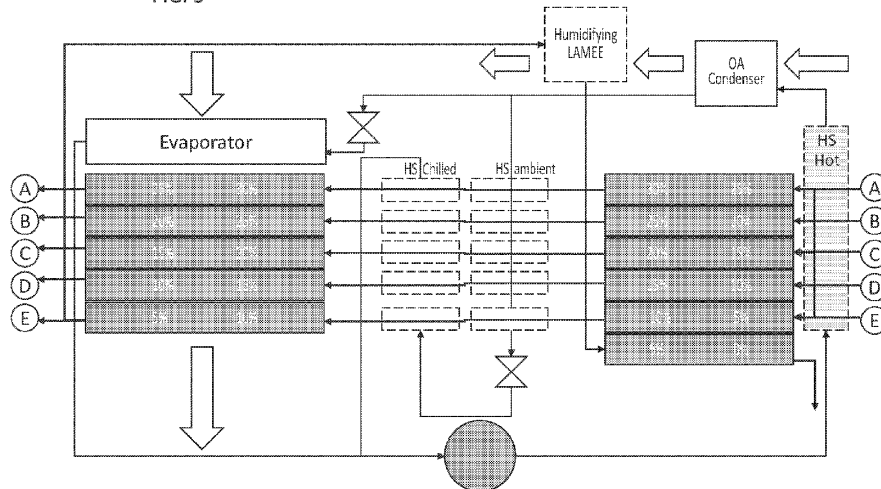
(72) Inventors; and

(71) Applicants: **FARESE, Philip** [—/US]; 438 Addison Ave, Palo Alto, California 94301 (US). **KIENITZ, Brian** [—/US]; 438 Addison Ave, Palo Alto, California 94301 (US).

(72) Inventors: **BENEDICT, Michael**; 438 Addison Ave, Palo Alto, California 94301 (US). **MELES, Aaron**; 438 Addison Ave, Palo Alto, California 94301 (US). **BEH, Eugene S.**; 438 Addison Ave, Palo Alto, California 94301 (US). **ZHANG, Benjamin A.**; 438 Addison Ave, Palo Alto, California 94301 (US). **TORRES, Francisco E.**; 438 Addison Ave, Palo Alto, California 94301 (US).

(54) Title: ELECTROCHEMICALLY REGENERATED LIQUID DESICCANT DEHUMIDIFICATION SYSTEM USING A SECONDARY HEAT PUMP

FIG. 5



(57) Abstract: A liquid desiccant regenerator configured to produce a first output stream with a higher concentration of a liquid desiccant than a first input stream. The regenerator also produces a second output stream with a lower concentration of the liquid desiccant than a second input stream. Regeneration of the liquid desiccant in the liquid desiccant regenerator decreases a temperature of the liquid desiccant regenerator. The system includes an air contactor coupled to the first output stream and exposing an input air stream to the first output stream. The first output stream absorbs water from the input air stream to form at least one diluted output desiccant stream. A heat pump of the system is thermally coupled to move the heat from the first output stream to the liquid desiccant regenerator. The heat moved to the liquid desiccant regenerator increases an efficiency of the liquid desiccant regenerator.

[Continued on next page]

(74) **Agent:** TALBOT, C. Scott et al.; Cooley LLP, 1299 Pennsylvania Ave., Suite 700, Washington, District of Columbia 20004 (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, 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, UZ, VC, VN, WS, ZA, ZM, ZW.

(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, 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).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) **Date of publication of the international search report:**
24 August 2023 (24.08.2023)