

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
14 September 2023 (14.09.2023)



(10) International Publication Number
WO 2023/172306 A1

(51) International Patent Classification:

F17C 9/02 (2006.01) F17C 13/04 (2006.01)
F17C 13/02 (2006.01)

(21) International Application Number:

PCT/US2022/050431

(22) International Filing Date:

18 November 2022 (18.11.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

17/687,949 07 March 2022 (07.03.2022) US

(71) Applicant: **MUSTANG SAMPLING, LLC** [US/US]; Ritmore Glen, Route 68 North, Ravenswood, West Virginia 26164 (US).

(72) Inventors: **THOMPSON, Kenneth O.**; Ritmore Glen, Route 68 North, Ravenswood, West Virginia 26164 (US). **WARNER, Kevin**; 2813 Crossbine Circle, The Woodlands, Texas 77380 (US). **PALUCH, William C.**; 15405 Clevedon Lane, Jersey Village, Texas 77040 (US). **HARTSON, William**; 3318 Ralston Edge Lane, Houston, Texas 77059 (US). **QUERREY, Timothy L.**; 395 Skull Run, Ravenswood, West Virginia 26164 (US).

(74) Agent: **CAHN, Maurice U.** et al.; CAHN & SAMUELS, LLP, 1100 17th Street N.W., Suite 401, Washington, District of Columbia 20036-4650 (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, 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).

(54) Title: IMPROVED LIQUID GAS SAMPLE VAPORIZER CONDITIONING SYSTEM AND METHOD

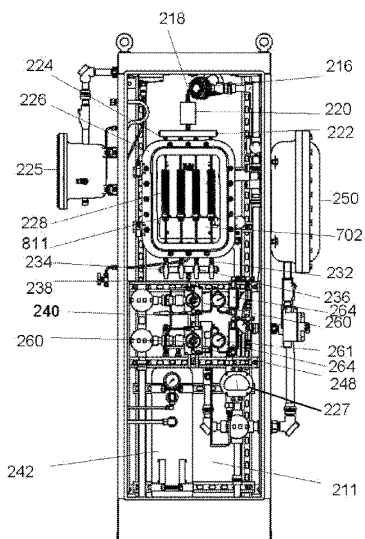


Fig. 3

(57) Abstract: An improved liquid vaporization and conditioning system, and associated method, for efficiently vaporizing a liquid sample for accurately determining the constituent components thereof providing enhanced flow rate, pressure and thermal control, the improvement including a combination of a resistance temperature detector, a sweeping bend to, an in-line thermal break, a flow buffering input manifold, enhanced multi-path heater vaporizer construction with four heater units, a vaporizer output mixing manifold and control elements providing a capability for partial shutdown in the event of compromised heating or flow anomalies without risk of flow loss/volume capacity beyond a permissible threshold and an improved, modular heat vaporizer enclosure.

WO 2023/172306 A1

[Continued on next page]

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

Published:

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