



(51) International Patent Classification:

H01M 10/052 (2010.01) H01M 50/204 (2021.01)
H01M 10/613 (2014.01) H01M 50/367 (2021.01)

(21) International Application Number:

PCT/US2023/061493

(22) International Filing Date:

27 January 2023 (27.01.2023)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/303,697 27 January 2022 (27.01.2022) US

(71) Applicant: **ALTECT, INC.** [US/US]; 1509 Princeton Ave, Austin, TX 78757 (US).

(72) Inventors: **MARR, Kevin**; 1509 Princeton Ave, Austin, Texas 78757 (US). **CABRERA, Jan-Michael**; 1509 Princeton Ave, Austin, Texas 75787 (US).

(74) Agent: **THOMPSON, Craige et al.**; 1320 Arrow Point Dr, Suite 501 #142, Cedar Park, Texas 78613 (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.

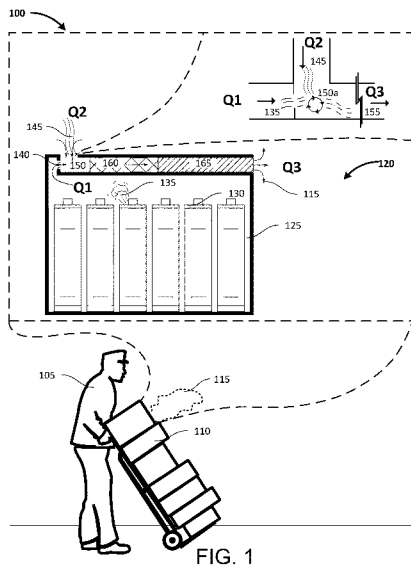
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, 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).

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

(54) Title: PASSIVE AUTOMATIC INJECTOR REACTOR SYSTEM

(57) Abstract: Apparatus and associated methods relate to a passive automatic injector reactor system (PAIRS). In an illustrative example, an energy storage enclosure may contain energy storage modules (e.g., batteries) releasing target gas(es) (e.g., toxic, flammable). The PAIRS may, for example, include an injector in fluid communication with the enclosure. The injector may, for example, passively direct target gases released from the enclosure to a mixing area where supplemental gas(es) are entrained with the target gases to create a target gas air mixture that is directed to a reactor. The reactor may, for example, utilize one or more chemical, physical, and/or physiochemical processes to convert the target air gas mixture into a processed gas before release. Various embodiments may advantageously prevent fire, explosion, and/or the release of toxic gas from batteries.



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:

23 May 2024 (23.05.2024)

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2023/061493

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01M10/052 H01M10/613 H01M50/204 H01M50/367
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
H01M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2018/368613 A1 (WELLES CLIFFORD G [US] ET AL) 27 December 2018 (2018-12-27) claims 1-15; figures 5A, 5B, 8, 12, 16, 23A, -----	1-20
A	WO 2017/181283 A1 (CORVUS ENERGY INC [CA]) 26 October 2017 (2017-10-26) paragraphs [0028], [0029]; figures 1, 5, 6 -----	1-20
A	WO 2010/032313 A1 (MITSUBISHI HEAVY IND LTD [JP]; OYA TAKUMI [JP] ET AL.) 25 March 2010 (2010-03-25) claims 1-15; figures 1-4 -----	1-20
A	US 2019/006650 A1 (BRYLA MARK [US]) 3 January 2019 (2019-01-03) paragraphs [0014], [0023], [0024]; claims 1-20; figures 1, 2 -----	1-20
	-/--	

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 5 April 2024	Date of mailing of the international search report 15/04/2024
--	---

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Badcock, Gordon
--	--

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2023/061493

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2019/057656 A1 (SIEMENS AG [DE]) 28 March 2019 (2019-03-28) claims 1-6; figures 1-4 -----	1-20
A	US 8 474 240 B1 (NAIL CHARLES ROBIN [US]) 2 July 2013 (2013-07-02) claims 1-18; figure 1 -----	1-20
A	US 2008/187794 A1 (WEINGAERTNER DAVID [US] ET AL) 7 August 2008 (2008-08-07) paragraph [0002]; claims 1-18; figures 1-6 -----	1-20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2023/061493
--

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2018368613	A1	27-12-2018	NONE
<hr style="border-top: 1px dashed black;"/>			
WO 2017181283	A1	26-10-2017	CA 3021577 A1 26-10-2017
			CN 109565096 A 02-04-2019
			EP 3446357 A1 27-02-2019
			JP 7004697 B2 21-01-2022
			JP 2019514191 A 30-05-2019
			KR 20190022485 A 06-03-2019
			SG 10202010361Q A 27-11-2020
			SG 11201809267P A 29-11-2018
			US 2019140235 A1 09-05-2019
			WO 2017181283 A1 26-10-2017
<hr style="border-top: 1px dashed black;"/>			
WO 2010032313	A1	25-03-2010	NONE
<hr style="border-top: 1px dashed black;"/>			
US 2019006650	A1	03-01-2019	CA 3062702 A1 03-01-2019
			US 2019006650 A1 03-01-2019
			US 2021135314 A1 06-05-2021
			WO 2019005502 A1 03-01-2019
<hr style="border-top: 1px dashed black;"/>			
WO 2019057656	A1	28-03-2019	CA 3073876 A1 28-03-2019
			CN 111133605 A 08-05-2020
			DK 3685454 T3 22-01-2024
			EP 3685454 A1 29-07-2020
			FI 3685454 T3 21-03-2024
			KR 20200044053 A 28-04-2020
			PT 3685454 T 30-01-2024
			US 2021036283 A1 04-02-2021
			WO 2019057656 A1 28-03-2019
<hr style="border-top: 1px dashed black;"/>			
US 8474240	B1	02-07-2013	US 8474240 B1 02-07-2013
			US 2014041392 A1 13-02-2014
			WO 2014025450 A1 13-02-2014
<hr style="border-top: 1px dashed black;"/>			
US 2008187794	A1	07-08-2008	US 2008187794 A1 07-08-2008
			WO 2008097474 A1 14-08-2008
<hr style="border-top: 1px dashed black;"/>			