

(51) International Patent Classification:
C25B 1/16 (2006.01)

(21) International Application Number:

PCT/US2010/056243

(22) International Filing Date:

10 November 2010 (10.11.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/632,058 7 December 2009 (07.12.2009) US

(71) Applicant: **BATTELLE ENERGY ALLIANCE, LLC**
[US/US]; P.O. Box 1625, Idaho Falls, ID 83415-3899
(US).(72) Inventors: **BINGHAM, Dennis, N.**; 2728 West 17th
South, Idaho Falls, ID 83402 (US). **KLINGLER, Kerry,
M.**; 2385 Bramble Lane, Idaho Falls, ID 83402 (US).
TURNER, Terry, D.; 4577 E. 9th N., Idaho Falls, ID
83401 (US). **WILDING, Bruce, M.**; 2818 Honeysuckle,
Idaho Falls, ID 83402 (US). **FROST, Lyman**; 1283
Links Drive, Midway, UT 84049 (US).(74) Agent: **CHRISTIAN, Stephen, R.**; Battelle Energy Al-
liance, LLC, P.O. Box 1625, Idaho Falls, ID 83415-3899
(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, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,
KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,
NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD,
SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR,
TT, TZ, UA, UG, UZ, VC, VN, 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, SD, SL, SZ, TZ, UG,
ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, 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, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR PRODUCING HYDROGEN USING SODIUM ION SEPARATION MEMBRANES

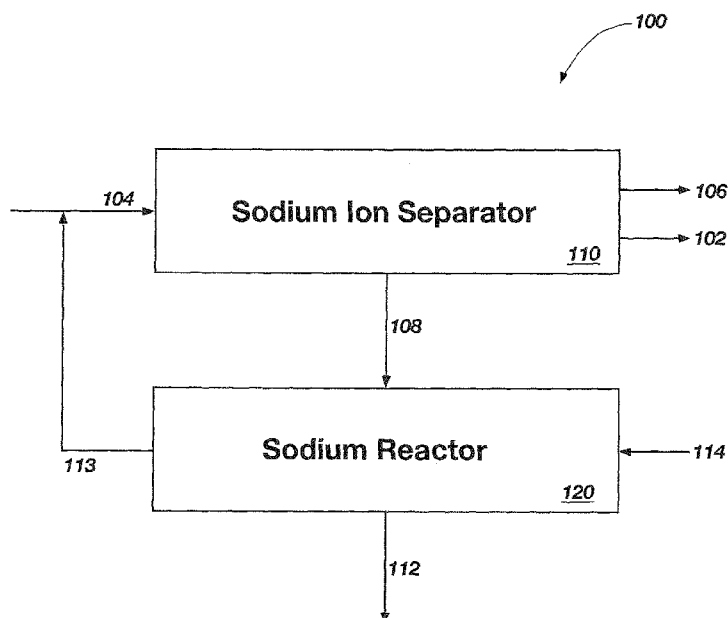


FIG. 1

(57) Abstract: A method of producing hydrogen
from sodium hydroxide and water is disclosed.
The method comprises separating sodium from a
first aqueous sodium hydroxide stream in a sodi-
um ion separator, feeding the sodium produced in
the sodium ion separator to a sodium reactor, re-
acting the sodium in the sodium reactor with wa-
ter, and producing a second aqueous sodium hy-
droxide stream and hydrogen. The method may
also comprise reusing the second aqueous sodium
hydroxide stream by combining the second aque-
ous sodium hydroxide stream with the first aque-
ous sodium hydroxide stream. A system of pro-
ducing hydrogen is also disclosed.



Published:

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