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(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, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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[Continued on nextpage]

(54) **Title:** NICKEL ALLOYS FOR HYDROGEN STORAGE AND THE GENERATION OF ENERGY THEREFROM

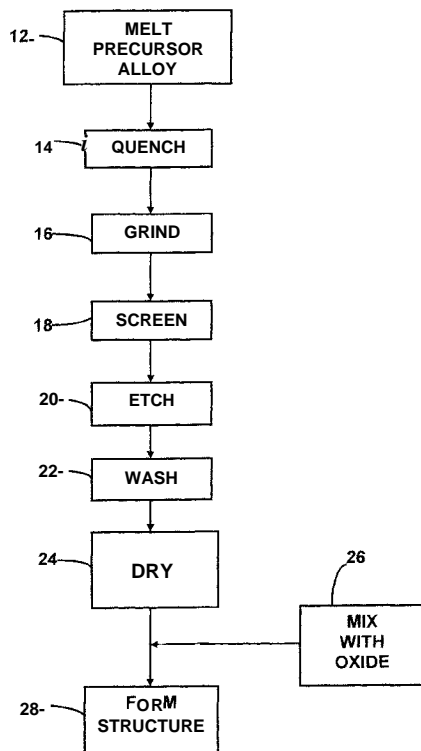


FIG.1

(57) **Abstract:** An apparatus for the generation of thermal energy comprises a reactor vessel containing a volume of pressurized hydrogen; a hydrogen-storing nickel alloy structure in the reactor vessel and configured to have an electric potential applied across it and to be heated to at least about 100 C; and a heat exchange conduit configured to carry a heat exchange medium past the nickel alloy structure so as to allow thermal energy generated in the nickel alloy structure to be transferred to the heat exchange medium. The hydrogen-storing nickel alloy structure comprises a nickel alloy skeletal catalyst mixed with an oxide. The applied electric potential, and the increase in the gas pressure and temperature of the hydrogen from the applied heat, create a reaction between hydrogen nuclei and nickel nuclei in the nickel alloy structure whereby thermal energy is generated by the emission of phonons from the nickel alloy structure.

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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).

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/040017**A. CLASSIFICATION OF SUBJECT MATTER***C22C 19/03(2006.01)i, C22C 19/05(2006.01)1, C22C 1/04(2006.01)1*

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)

C22C 19/03; B22F 7/04; B01J23/74; B01J 21/04; G21B 3/00; B32B 15/02; COIB 3/02

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: porous nickel catalyst; oxide; nuclear reaction; hydrogen; powder; and heat.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	wo 2010-058288 AI (PIANTELLI, SILVIA et al.) 27 May 2010 See abstract ; page 2 line 18-page 6 line 13, page 24 lines 11-25 ; claims 1,7, 8,13,14; and figures 1,3,16,24.	11,18-20,27-31
A	US 2002-0106527 AI (STEPHEN RAYMOND SCHMIDT) 08 August 2002 See abstract and paragraphs [0004H0006] , [0010] .	1-46
A	US 6024935 A (MILLS RANDELL L. et al.) 15 February 2000 See abstract ; column 33 line 46-column 37 line 5; and figure 5,7,8.	1-46
A	US 4657889 A (GANGULI; KESHAB L. et al.) 14 April 1987 See abstract ; column 1 lines 5-46; and claim 1.	1-46

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

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"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

"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

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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