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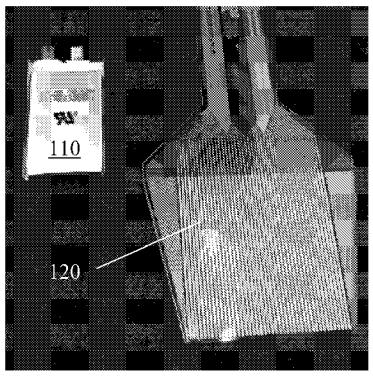
(54) Title: BATTERY AND BATTERY-SENSING APPARATUSES AND METHODS



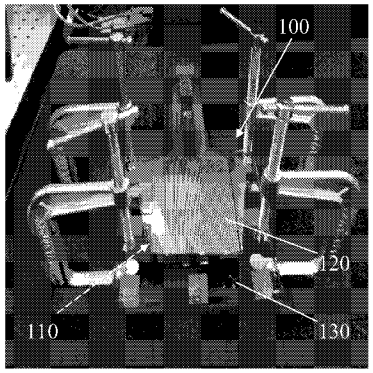


FIG. 1

(57) Abstract: Apparatuses and methods for determining one or more performance related characteristics (such as state of charge and/or health) of one or more electrochemical cells that store and release electrical energy are disclosed. Embodiments include pressure and/or temperature sensors that sense a change in pressure resulting from the tendency of the electrochemical cell to change volume and/or the temperature of the one or more electrochemical cells as the electrochemical cell(s) are charged or discharged. Alternate embodiments include one or more calculating members that receive pressure and/or temperature information from the pressure and/or temperature sensing members and calculate a performance related characteristic of the electrochemical cell. Still further embodiments include determining one or more performance related characteristics of an electrochemical cell by sensing the tendency of an electrochemical cell to change volume (such as by sensing pressure) and/or by sensing the temperature as the electrochemical cell is charged or discharged.

WO 2012/170873 A3

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).

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B. FIELDS SEARCHED

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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

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

eKOMPASS(KIPO internal) & Keywords: pressure, temperature, sensing, performance, electrochemical cell, and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2006-012761 A (TOYOTA MOTOR CORP.) 12 January 2006 See abstract, paras. 0001, 0002, 0020, 0025, 0034, 0037, 0042, 0052, 0057, 0080, and claims 5-7, 12.	1,5,6,15,16,19-21,24,25,34,35,37,42,43,54,55,58,59,69-72
A		2-4,7-14,17,18,22,23,26-33,36,38-41,44-53,56,57,60-68
A	US 2008-0090134 A1 (BERG, C.) 17 April 2008 See paras. 0127, 0128, 0132, 0133, 0150, and claims 3-6.	1-72
A	US 05321627 A (REHER, M. T.) 14 June 1994 See abstract, fig. 1, col. 4, ll. 57-67, col. 5, ll. 1-31, and claim 2.	1-72

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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