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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:** INTEGRATED PROTECTION DEVICES WITH MONITORING OF ELECTRICAL CHARACTERISTICS

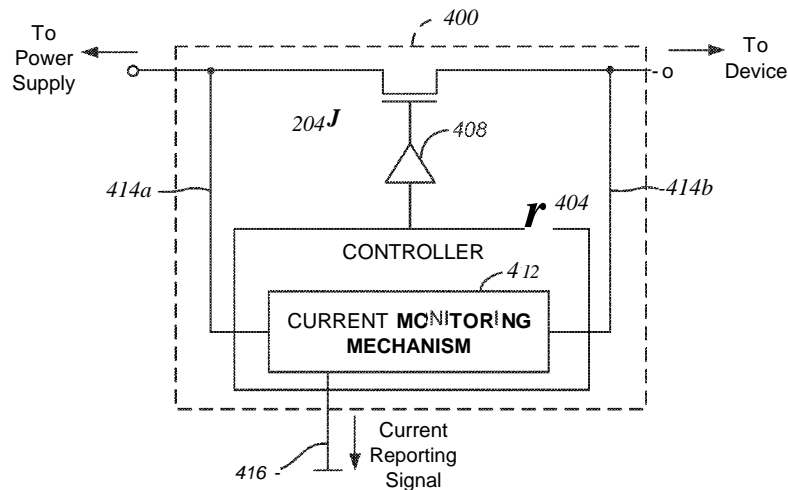


FIG. 4A

(57) **Abstract:** Disclosed are systems, devices, circuits, components, mechanisms, and processes in which a switching mechanism can be coupled between components. The switching mechanism is configured to have an on state or an off state, where the on state allows current to pass along a current path. A monitoring mechanism has one or more sensing inputs coupled to sense an electrical characteristic at the current path. The electrical characteristic can be a current, voltage, and/or power by way of example. The monitoring mechanism is configured to output a reporting signal indicating the sensed electrical characteristic. The monitoring mechanism can be integrated with the switching mechanism on a chip.



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## INTERNATIONAL SEARCH REPORT

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**PCT/US2012/034262****A. CLASSIFICATION OF SUBJECT MATTER****H02H 3/08(2006.01)i, GOIR 19/165(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)

H02H 3/08; H02H 3/00; H02H 5/04; G01K 13/00; G01R 19/25; H02H 3/24; G01R 31/02; G03F 7/20

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) &amp; Keywords: power, protection, switch, breaker, over current, over voltage

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6373671 B1 (WATANABE; MITSUHIKO et al.) 16 April 2002 See column 3, line 40 - column 5, line 22; column 16 line 32-56; claim 1 and figures 1,21,22.	1-68
X	US 7719812 B2 (PHADKE VIJAY et al.) 18 May 2010 See column 6, line 32-55; claims 1,2,7,9,11,13,19,20 and figure 8.	1-68
A	W0 2004-111665 A1 (POWERTECH INDUSTRIES LIMITED et al.) 23 December 2004 See abstract and claims 1,3.	16,17,19,27,55
A	US 2010-0254058 A1 (KIRCHBAUM ANDREAS et al.) 07 October 2010 See paragraph [0047], [0048]; claim 16 and figures 1,2.	1,12,50,55-57,63 ,67
A	US 7535690 B2 (FAN CHENG-HSUAN et al.) 19 May 2009 See abstract, column 4, line 48 - column 5, line 15 and figure 4.	1,12,50
A	US 05528446 A (SANKARAN; VENKATESWARA et al.) 18 June 1996 See abstract, column 3, line 22-61; claim 1 and figure 1.	1,12,50
A	US 7265958 B2 (OSAMU SOUMA, KAWASAKI) 04 September 2007 See claims 1,3,14,15 and figures 1,2,3,4.	63-66

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

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"A" document defining the general state of the art which is not considered to be of particular relevance

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"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

"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

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"&amp;" document member of the same patent family

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2002-135965 A (NIKON CORP) 10 May 2002 See abstract , claim 1 and figure 2.	67,68

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

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