

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
19 February 2009 (19.02.2009)

PCT

(10) International Publication Number
WO 2009/023155 A3

(51) International Patent Classification:
H02J 17/00 (2006.01) **H01P 7/00** (2006.01)

(21) International Application Number:
PCT/US2008/009572

(22) International Filing Date: 11 August 2008 (11.08.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/954,941 9 August 2007 (09.08.2007) US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:
US 60/954,941 (CON)
Filed on 9 August 2007 (09.08.2007)

(71) Applicant (for all designated States except US):
NIGELPOWER, LLC [US/US]; 11512 El Camino
Real, Suite 100, San Diego, CA 92130 (US).

(74) Agent: **HARRIS, Scott, C.**; Law Office Of Scott C Harris,
Inc., P.O. Box.1389, Rancho Santa Fe, CA 92067 (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, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US (patent), UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

(88) Date of publication of the international search report:
28 May 2009

(54) Title: INCREASING THE Q FACTOR OF A RESONATOR

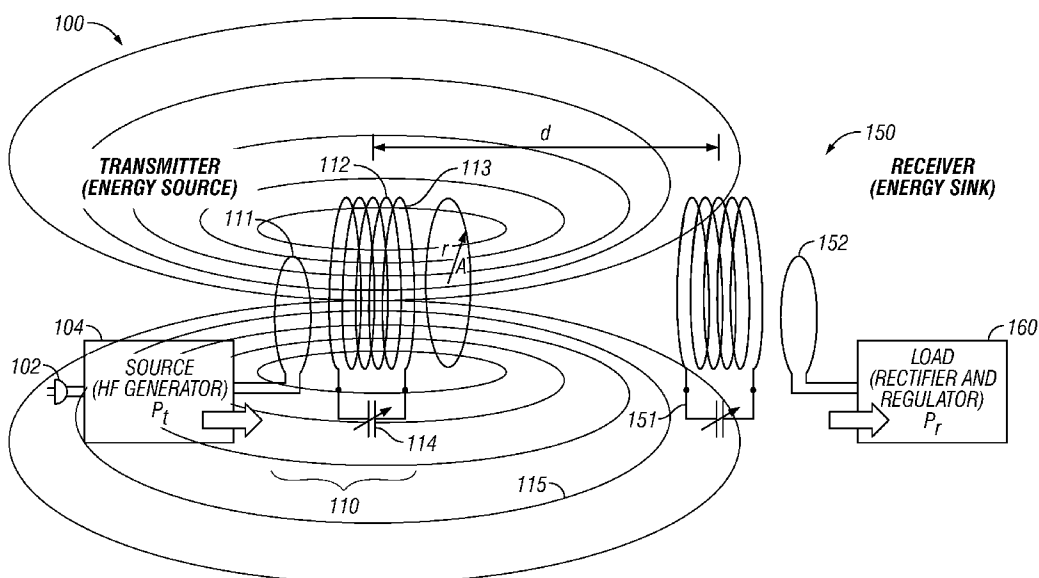


FIG. 1

(57) Abstract: A wireless powering and charging system is described. The antennas can be high q loop antennas. The antennas can use coupling between a first part and a second part.

WO 2009/023155 A3

A. CLASSIFICATION OF SUBJECT MATTER***H02J 17/00(2006.01)i, H01P 7/00(2006.01)i***

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)

IPC H02J 17/00, H04B 7/00, H01Q 1/36, H01Q 1/22

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 since 1975

Japanese Utility models and applications for Utility models since 1975

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

eKIPASS(KIPO internal) "energy", "power", "wireless", "transmitting", "coupling", "coil"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|-----------------------|
| Y | US 5153583 A (GRAHAM A.M. MURDOCH) 06 October 1992 See the abstract, column 8 line 11-column 18 line 52, claims 1-62 and figures 1-18 | 1-26, 30-39 |
| Y | US 7076206 B2 (REINHOLD ELFERICH et al.) 11 July 2006 See the abstract, column 7 line 56-column 9 line 28, claims 1-15 and figures 1-2 | 1-26, 30-39 |
| Y A | US 5608417 A (FRANKLIN B. DE VAIL) 04 March 1997 See the abstract and claims 1-19 | 3 1-2, 4-26, 30-39 |
| A | WO 2007/048052 A2 (THE REGENTS OF THE UNIVERSITY OF COLORADO) 26 April 2007 See the abstract and claims 1-87 | 1-26, 30-39 |



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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

Date of the actual completion of the international search

13 MARCH 2009 (13.03.2009)

Date of mailing of the international search report

13 MARCH 2009 (13.03.2009)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-
gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Lee, Kyu Jae

Telephone No. 82-42-481-8512



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2008/009572**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 27-29
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

the problem is that the claims compare the Q-factor of the transmitter with the Q-factor of itself but it is impossible to compare the Q-factor of the transmitter with the Q-factor of itself.
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2008/009572

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|--|--|
| US 5153583 A | 06.10.1992 | AT 124829 A DE 3854129 T2 EP 0393089 B1 WO 8905067 A1 | 14.06.1989 14.12.1995 05.07.1995 01.06.1989 |
| US 7076206 B2 | 11.07.2006 | US 2002154518 A1 | 24.10.2002 |
| US 5608417 A | 07.03.1997 | EP 0704928 A2 JP 08226966 A | 03.04.1996 03.09.1996 |
| WO 2007/048052 A2 | 26.04.2007 | NONE | — |