(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
26 August 2004 (26.08.2004)

PCT

(10) International Publication Number
WO 2004/073283 A3

(51) International Patent Classification[7]: H01F 38/14, 5/02, 27/06

(21) International Application Number: PCT/US2004/001731

(22) International Filing Date: 22 January 2004 (22.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/357,932 4 February 2003 (04.02.2003) US
10/689,224 20 October 2003 (20.10.2003) US

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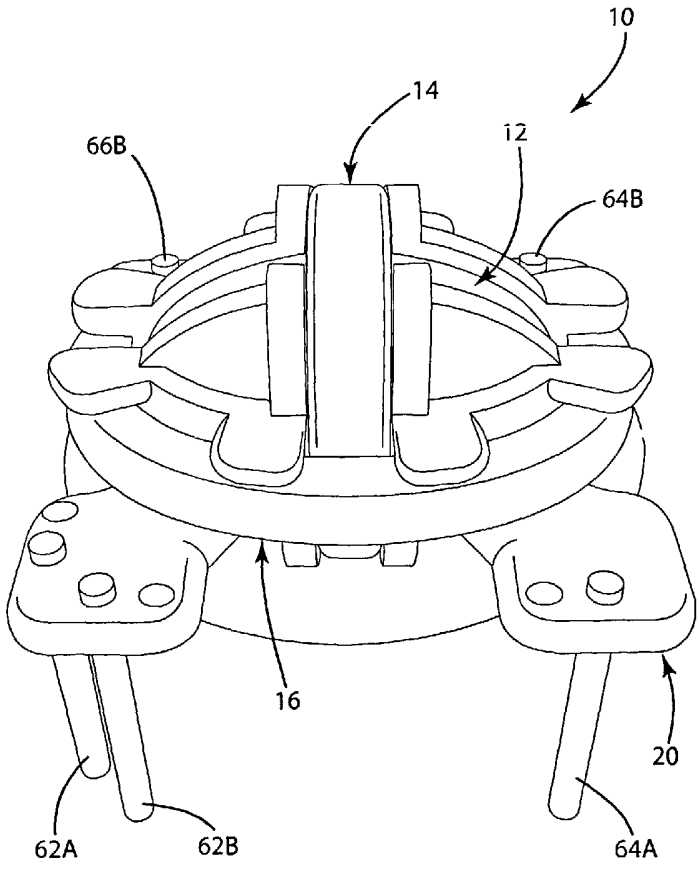
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: INDUCTIVE COIL ASSEMBLY



(57) Abstract: An inductive coil assembly having multiple coils arranged at distinct orientations to provide efficient inductive coupling of power or communications or both to a device when the device is arranged at different orientations with respect to the inductive primary coil. In one embodiment, the inductive coil assembly includes three coils, each oriented along one of the x, y and z axes of a standard Cartesian three-dimensional coordinate system. The three separate coils provide effective transfer of power and communication when the device is at essentially any orientation with respect to the primary coil. In an alternative embodiment, the multi-axis inductive coil assembly of the present invention can function as a primary to inductively transmit power or communication or both over a plurality of magnetic fields at distinct orientations.

WO 2004/073283 A3

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, 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, HU, IE, IT, LU, MC, NL, 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:
3 February 2005

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/001731

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01F38/14 H01F5/02 H01F27/06

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 7 H01F

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 281 941 A (BERNSTEIN ELLIOT) 25 January 1994 (1994-01-25) abstract column 1, lines 7-10 column 2, line 45 - column 3, line 23; figures 2,3	1-7,9, 10, 18-21, 25,26, 30-35, 39,40, 44,45,55
Y		27-29, 41-43, 46-49
X	WO 01/67046 A (ABB RESEARCH LTD ; GARRELS KAI (DE); SCHEIBLE GUNTRAM (DE)) 13 September 2001 (2001-09-13) the whole document	1-8, 11-26, 30-40, 44,45,55

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
9 September 2004	18. 11. 04

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Reder, M

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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.
P,X	& US 2003/062980 A1 (GARRELS KAI ET AL) 3 April 2003 (2003-04-03) the whole document	1-8, 11-26, 30-40, 44,45,55
X	US 4 287 809 A (EGLI WERNER H ET AL) 8 September 1981 (1981-09-08) column 6, line 46 - column 7, line 15; figures 3,4	1-7,9, 10,55
X	GB 2 326 769 A (SIEMENS AG) 30 December 1998 (1998-12-30) abstract page 7, lines 13-32	1-5,8, 27,55
X	US 2002/118004 A1 (GARRELS KAI ET AL) 29 August 2002 (2002-08-29) paragraphs '0056!, '0057!; figure 5 paragraph '0063!; figure 8	1-4, 8-14, 18-21, 32-35,55
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X	US 5 913 820 A (ANDERSON ALAN PATRICK ET AL) 22 June 1999 (1999-06-22) column 4, lines 44-55; figure 1 column 15, lines 29-43; figure 14	1-7,9, 10,55
Y	EP 1 174 082 A (BIOSENSE INC) 23 January 2002 (2002-01-23) paragraphs '0027!, '0029!, '0032!; figures 2,5,9	27,28, 41,42
Y	US 5 047 715 A (MORGENSTERN JUERGEN) 10 September 1991 (1991-09-10) abstract column 5, lines 35-58; figures 7,8,10	29,43,48
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X	US 4 779 068 A (BANDO MASAHIRO ET AL) 18 October 1988 (1988-10-18) column 5, line 60 - column 6, line 23; figure 12	50

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INTERNATIONAL SEARCH REPORT

Internal Application No
PCT/US2004/001731

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 03, 3 April 2002 (2002-04-03) -& JP 2001 327109 A (FUJI ELECTRIC CO LTD), 22 November 2001 (2001-11-22) abstract	50
A	DE 34 12 237 A (WEINER NORBERT) 17 October 1985 (1985-10-17) figure 1	50

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2004/001731

Box 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.:
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:

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 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:

see additional sheet

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.

☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-26,30-40,44,45,55

   Details of the electric circuits connected with the coils of an inductive coil assembly for inductivly receiving or transmitting power or signals.

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2. claims: 27-29,41-43

   Inductive coil assembly for inductivly receiving or transmitting power or signals with three orthogonal coils being mounted on three separate bobbins.

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3. claims: 46-48

   Inductive coil assembly for inductivly receiving or transmitting power or signals with three coils with different orientation being mounted on a one-piece bobbin with a special arrangement of guiding structures.

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4. claim: 49

   Bobbin for an inductive coil assembly for with three coils with different orientations manufactured by a moulding process with specifically shaped moulds.

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5. claims: 50-54

   Bobbin for an inductive coil assembly with guide walls and a mounting arm.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/001731

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