

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
19 June 2008 (19.06.2008)

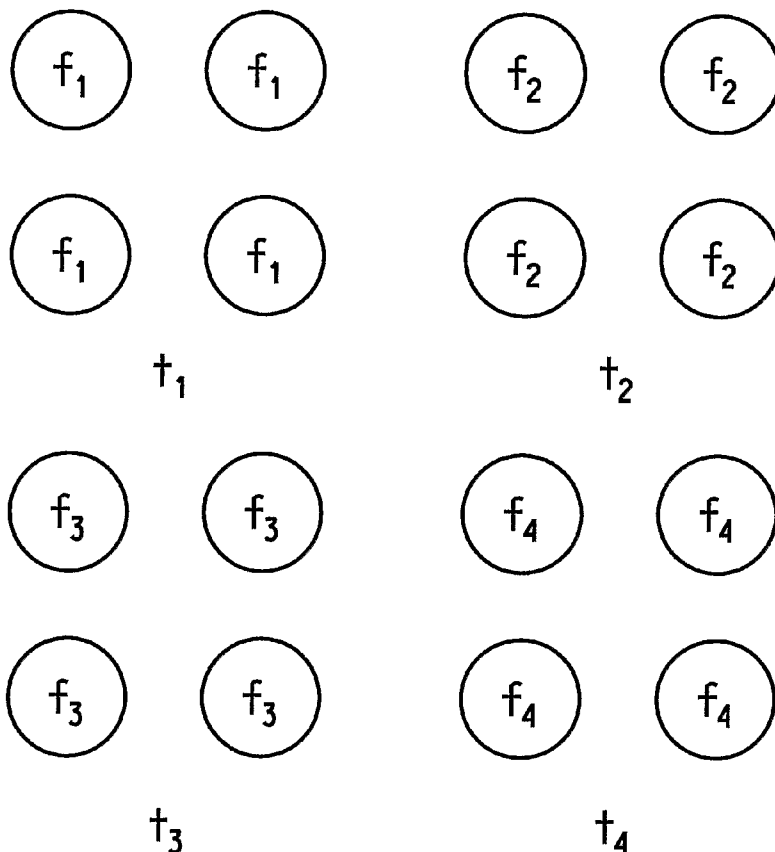
PCT

(10) International Publication Number
WO 2008/073066 A3

- (51) **International Patent Classification:**
GOIR 33/44 (2006.01)
- (21) **International Application Number:**
PCT/US2006/0 15469
- (22) **International Filing Date:** 24 April 2006 (24.04.2006)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
11/1 19,081 29 April 2005 (29.04.2005) US
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- (74) **Agent:** **MEDWICK, George, M.;** E. I. du Pont de Nemours and Company, Legal Patent Records Center, 4417 Lancaster Pike, Wilmington, Delaware 19805 (US).
- (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, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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),

[Continued on next page]

(54) **Title:** SCANNING A BAND OF FREQUENCIES USING AN ARRAY OF HIGH TEMPERATURE SUPERCONDUCTOR SENSORS TUNED TO DIFFERENT FREQUENCIES



(57) **Abstract:** The methods of the invention for scanning a band of frequencies using a nuclear quadrupole resonance detection system with an array of high temperature superconductor sensors to detect nuclear quadrupole resonance signals improve the nuclear quadrupole resonance detection system performance.

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European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

— *with information concerning one or more priority claims considered void*

Published:

— *with international search report*

(88) Date of publication of the international search report:

18 September 2008

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/015469

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01R33/44

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)
GOIR

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 , INSPEC, WPI Data, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No |
|-----------|--|----------------------|
| E | WO 2006/073452 A (DU PONT [US]; ALVAREZ ROBBY L [US]; MCCAMBRIDGE JAMES D [US]) 13 July 2006 (2006-07-13) the whole document | 1-21 |
| P,X | WO 2005/059582 A (E.I. DUPONT DE NEMOURS AND COMPANY; LAUBACHER, DANIEL, B; MCCAMBRIDGE,) 30 June 2005 (2005-06-30) the entire document | 1,2,4-8, 10-21 |
| P,Y | | 3,9 |
| | ----- -/-- | |

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 25 July 2008 | Date of mailing of the international search report 11/08/2008 |
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| Name and mailing address of the ISA/ 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 | Authorized officer Lersch, Wilhelm |
|--|--|

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2006/015469

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No |
|----------|---|--------------------------|
| P,Y | wo 2005/109023 A (DU PONT [US] ; LAUBACHER DANIEL B [US] ; MCCAMBRIDGE JAMES D [US]; WILKE) 17 November 2005 (2005-11-17) page 5, line 28 - page 10, line 15 page 11, line 32 - page 13, line 17; figures 1,2 | 3,9 |
| P,A | ----- | 6,7, 10-14, 16-20 |
| P,A | wo 2005/078469 A (DU PONT [US] ; LAUBACHER DANIEL B [US] ; MCCAMBRIDGE JAMES D [US] ; WILKE) 25 August 2005 (2005-08-25) page 4, line 4 - page 10, line 23 | 1,6-8, 10-21 |
| X | wo 99/45409 A (BTG INTERNATIONAL LTD; ROWE, MICHAEL, DAVID; SMITH, JOHN, ALEC, SYDNEY) 10 September 1999 (1999-09-10) page 5, line 8 - page 11, line 31 page 18, line 21 - page 19, line 27 page 23, line 18 - page 30, line 2; figure d | 1-10, 14-16, 20,21 |
| Y | ----- | 11-13, 17-19 |
| X | wo 03/096041 A (QRSCIENCES TECHNOLOGIES PTY LTD; RUDAKOV, TARAS, NIKOLAEVITCH; MIKHALT) 20 November 2003 (2003-11-20) page 13, line 13 - page 14, line 3 page 18, line 1 - page 20, line 19; figures 7-9 | 1-10, 13-16, 19-21 |
| Y | ----- | 11, 17 |
| X | wo 98/37438 A (ADVANCED IMAGING RESEARCH, INC) 27 August 1998 (1998-08-27) page 2, line 25 - page 3, line 19 page 7, line 4 - page 7, line 29 page 21, line 1 - page 21, line 40; claim 12; figures 6,13 | 1-10, 13-16, 19-21 |
| Y | ----- | 11, 12, 17, 18 |
| Y | wo 99/50689 A (THE GOVERNMENT OF THE UNITED STATES OF AMERICA AS) 7 October 1999 (1999-10-07) page 4, line 25 - page 5, line 9 page 6, line 30 - page 9, line 4 page 10, line 15 - page 12, line 3; figures 4,5 | 11, 17 |
| Y | US 2002/190715 AI (MAREK DANIEL) 19 December 2002 (2002-12-19) paragraphs [0100] -- [0102] ; figures 19,21 | 12, 13, 18, 19 |
| | ----- -/- | |

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/015469

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No |
|-----------|--|-----------------------------|
| A | WO 92/17793 A (BRITISH TECHNOLOGY GROUP LIMITED) 15 October 1992 (1992-10-15) page 2, line 6 - page 5, line 27 page 6, line 31 - page 9, line 15 page 11, line 16 - page 12, line 3 page 16, line 25 - page 17, line 16; figures 1,5,6,9 ----- | 1-21 |
| A | WO 94/05022 A (SUPERCONDUCTOR TECHNOLOGIES, INC) 3 March 1994 (1994-03-03) page 11, line 34 - page 12, line 19 page 14, line 18 - page 15, line 2; figure 6 ----- | 7,10,16 |
| A | WO 00/70356 A (INTERMAGNETICS GENERAL CORPORATION) 23 November 2000 (2000-11-23) ----- page 5, line 1 - page 5, line 8; figures Ia, Ie, 2a ----- | 3,6,7,9, 10,12, 16,18 |
| A | WO 92/17794 A (BRITISH TECHNOLOGY GROUP LIMITED) 15 October 1992 (1992-10-15) page 3, line 7 - page 5, line 2 page 6, line 19 - page 7, line 15 page 9, line 8 - page 12, line 13 page 15, line 33 - page 16, line 21 ----- | 1-21 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/015469

| Patent document cited in search report | | Publication date | | Patent family member(s) | Publication date |
|--|----|------------------|------|-------------------------|------------------|
| WO 2006073452 | A | 13-07-2006 | EP | 1740967 A2 | 10-01-2007 |
| WO 2005059582 | A | 30-06-2005 | US | 2008094061 A1 | 24-04-2008 |
| WO 2005109023 | A | 17-11-2005 | EP | 1711840 A2 | 18-10-2006 |
| WO 2005078469 | A | 25-08-2005 | NONE | | |
| WO 9945409 | A | 10-09-1999 | AU | 3267999 A | 20-09-1999 |
| | | | CA | 2322500 A1 | 10-09-1999 |
| | | | EP | 1060404 A1 | 20-12-2000 |
| WO 03096041 | A | 20-11-2003 | US | 2005146331 A1 | 07-07-2005 |
| WO 9837438 | A | 27-08-1998 | AU | 6182798 A | 09-09-1998 |
| WO 9950689 | A | 07-10-1999 | AU | 759922 B2 | 01-05-2003 |
| | | | AU | 4182099 A | 18-10-1999 |
| | | | CA | 2325492 A1 | 07-10-1999 |
| | | | EP | 1068546 A1 | 17-01-2001 |
| | | | JP | 2003512592 T | 02-04-2003 |
| | | | US | 6054856 A | 25-04-2000 |
| US 2002190715 | A1 | 19-12-2002 | DE | 10118835 A1 | 31-10-2002 |
| | | | EP | 1251361 A2 | 23-10-2002 |
| | | | JP | 2002341001 A | 27-11-2002 |
| WO 9217793 | A | 15-10-1992 | DE | 69231859 D1 | 12-07--2001 |
| | | | DE | 69231859 T2 | 20-09--2001 |
| | | | EP | 0578686 A1 | 19-01--1994 |
| | | | GB | 2254923 A | 21-10--1992 |
| | | | IL | 101421 A | 15-04--1997 |
| | | | JP | 3428641 B2 | 22-07--2003 |
| | | | JP | 6506299 T | 14-07--1994 |
| | | | US | 5583437 A | 10-12--1996 |
| | | | US | 5457385 A | 10-10--1995 |
| WO 9405022 | A | 03-03-1994 | US | 6335622 B1 | 01-01-2002 |
| | | | US | 2002135373 A1 | 26-09-2002 |
| WO 0070356 | A | 23-11-2000 | AU | 5441100 A | 05-12-2000 |
| WO 9217794 | A | 15-10-1992 | EP | 0578685 A1 | 19-01-1994 |
| | | | FI | 934328 A | 01-10-1993 |
| | | | GB | 2255830 A | 18-11-1992 |
| | | | IL | 101434 A | 16-10-1996 |
| | | | JP | 6507484 T | 25-08-1994 |
| | | | JP | 3652682 B2 | 25-05-2005 |
| | | | JP | 2003232754 A | 22-08-2003 |