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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, BN, 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, KN, KP, KR,

[Continued on next page]

(54) Title: SONDE DEVICES INCLUDING A SECTIONAL FERRITE CORE STRUCTURE

(57) Abstract: Sonde devices for providing magnetic field signals for use with utility locators or other devices are disclosed. In one embodiment a sonde device includes a housing, a core comprising a plurality of core sections, and one or more support structures, which may include windings. Circuit and/or power supply elements may be disposed fully or partially within the core to

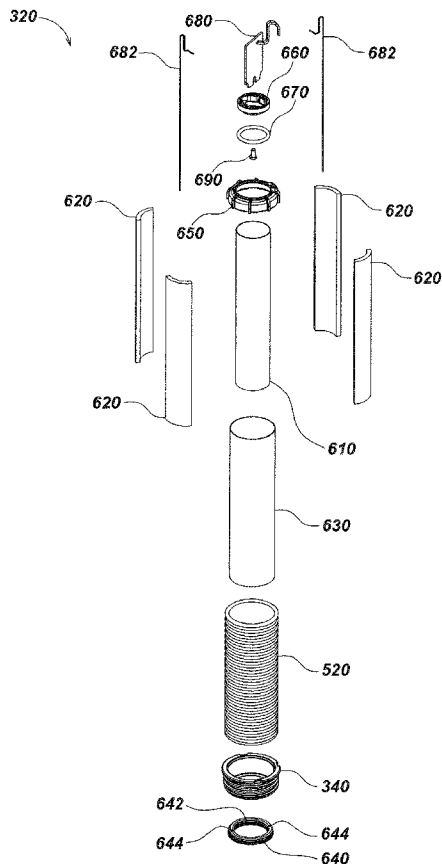


FIG. 6



WO 2014/043580 A3

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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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.

**(84) Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, 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, KM, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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6 November 2014

**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/US2013/059814

**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. G01V3/11 G01V3/165  
 ADD. H01Q7/06 G01V3/10

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)  
 G01V H01Q

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 practicable, search terms used)  
 EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 7 733 086 B2 (PRAMMER MANFRED G [US] ET AL) 8 June 2010 (2010-06-08)	1-4, 6-16, 31-33, 51,57, 59,64,65
Y	figures 1,4A,5,7,7A,11,18,19 column 1, line 15 - line 21 column 7, line 15 - column 8, line 34 column 9, line 29 - column 10, line 14 column 10, line 45 - line 58 column 11, line 9 - line 25 column 12, line 25 - column 13, line 67 column 14, line 51 - line 57 column 16, line 11 - line 56 column 17, line 38 - line 58 column 4, line 31 - line 33 column 6, line 55 - line 58 ----- -/--	5-7, 9-13, 17-21, 24-36, 50,59,66

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 another 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  7 July 2014	Date of mailing of the international search report  19/09/2014
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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, Fax: (+31-70) 340-3016	Authorized officer  Sartoni, Giovanni
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## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/059814

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/189945 A1 (REIDERMAN ARCADY [US]) 1 September 2005 (2005-09-01)	1-3,8, 17,51, 57,58, 64,65
Y	paragraphs [0003], [0004], [0007], [0008], [0012] - [0014], [0031] - [0034] paragraphs [0043] - [0055] paragraphs [0058] - [0065]	4-7, 9-13, 17-21, 24-36, 50,59,66
A		14-16
X	----- US 2 820 959 A (BELL JAMES E) 21 January 1958 (1958-01-21)	1,4,5, 8-11,17, 51,64-66
Y	figures 1-5,7 column 1, line 15 - column 2, line 68 column 3, line 5 - column 4, line 44	4,12,13, 17-21, 24-30, 50,66
A		2,3,6,7, 14-16, 31-36, 57-59
X	----- US 6 002 253 A (BORNHOFFT WOLFGANG [DE] ET AL) 14 December 1999 (1999-12-14)	1,4,5,8, 17,18,51
Y	figures 1-6 column 1, line 17 - column 2, line 64 column 3, line 12 - line 23 column 5, line 35 - column 6, line 58	4,18-21, 24-30,50
A		2,3,6,7, 9-16, 31-36, 57-59, 64-66
Y	----- US 2006/006875 A1 (OLSSON MARK S [US] ET AL) 12 January 2006 (2006-01-12)	9-13, 19-21, 24-30, 50,66
A	figures 7-19 paragraphs [0001] - [0004], [0033], [0040], [0042], [0045] - [0049] paragraphs [0054], [0057] - [0061]	1-8, 14-18, 31-36, 51, 57-59, 64,65
Y	----- US 2006/132278 A1 (REYAL JEAN-PIERRE [FR] ET AL) 22 June 2006 (2006-06-22)	5
A	figures 7A-7C,8 paragraphs [0001], [0084] - [0087]	2-4
Y	----- US 6 644 421 B1 (LONG DAVID [US]) 11 November 2003 (2003-11-11)	31-36
A	figures 1A,1B column 1, line 5 - line 9 column 2, line 28 - column 3, line 67 column 3, line 14 - line 30	1,64,65
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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2013/059814

## 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.:  
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 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:

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 fees, this Authority did not invite payment of additional fees.
  
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.:

1-21, 24-36, 50, 51, 57-59, 64-66

### 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.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

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

1. claims: 1-21, 24-36, 50, 51, 57-59, 64-66

All searchable inventions

1.1. claims: 1-18, 31-36, 50, 51, 57-59, 64-66

A sonde device comprising a core including: a plurality of core section elements.

1.2. claims: 19-21, 24-30

A sonde device comprising one or more lights to indicate a sonde status.

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2. claims: 22, 23, 37-43

A sonde device comprising a transmitter or transceiver module.

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3. claim: 44

A sonde device wherein power to the sonde is regulated at a known or controlled current.

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4. claims: 45, 46

A sonde device wherein the sonde includes a precision time reference circuit.

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5. claims: 47-49

A sonde device wherein the sonde includes a circuit for receiving an electromagnetic field signal and charging a battery.

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6. claims: 52-56

A sonde device wherein the frequency of an output of the sonde is switched at a predefined rate.

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7. claims: 60-63

A sonde device including a circuit for measuring the signal strength of a transmitted signal.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2013/059814
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