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[Continued on next page]

(54) Title: SEISMIC DEVICE WITH SEALED HOUSING AND RELATED METHODS

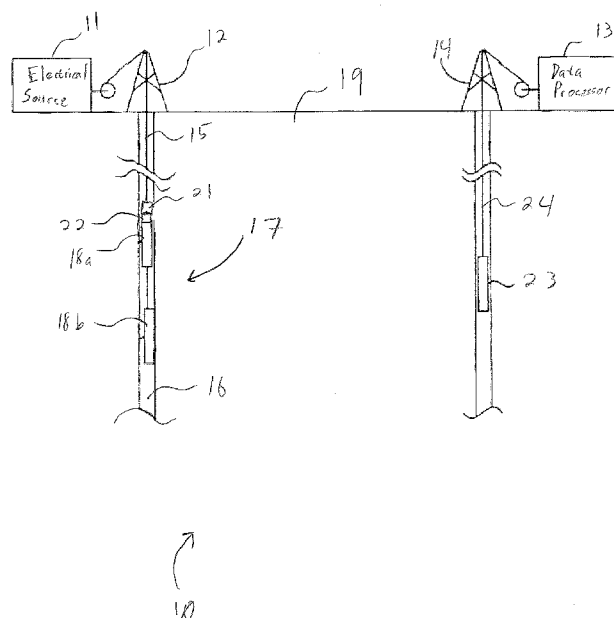


FIG. 1

(57) Abstract: A seismic generation system may include an electrical source, a conductor coupled to the electrical source and to be positioned in a wellbore in a subterranean formation with a casing therein, and a seismic generation source assembly to be positioned in the wellbore and coupled to the conductor. The seismic generation source assembly may include a source element having a sealed housing, an armature within the sealed housing, source electromagnets coupled to the armature, and electromagnetic clamps coupled to the armature, each electromagnetic clamp having opposite magnetic poles. The sealed housing may include respective ferromagnetic portions adjacent the opposite magnetic poles of each electromagnetic clamp, and non-ferromagnetic portions between the opposite magnetic poles of each electromagnetic clamp.



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## INTERNATIONAL SEARCH REPORT

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**PCT/US2012/042929****A. CLASSIFICATION OF SUBJECT MATTER****G01V 1/40(2006.01)i, G01V 1/02(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)

G01V 1/40; G01V 1/143; H01F 7/04; G01V 1/00

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: seismic, source, conductor, electromagnetic clamp, armature

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                        | Relevant to claim No. |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | US 2009-0283355 A1 (MINTO, JAMES et al.) 19 November 2009<br>See paragraphs [0025],[0034],[0038],[0065]–[0067], claim 1, and figures 1,9. | 1–28                  |
| A         | US 4715470 A (PAULSSON, BJORN N. P.) 29 December 1987<br>See column 2 line 53–column 3 line 47, claim 1, and figure 1.                    | 1–28                  |
| A         | US 4700803 A (MALLETT, A.J. et al.) 20 October 1987<br>See claim 1 and figure 1.                                                          | 1–28                  |
| A         | US 2007-0211572 A1 (REIDERMAN, ARCADY et al.) 13 September 2007<br>See claim 1 and figures 1,7.                                           | 1–28                  |
| A         | US 5041806 A (ENDERLE, ECKHARD, et al.) 20 August 1991<br>See claim 1.                                                                    | 1–28                  |

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

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"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

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

Date of the actual completion of the international search

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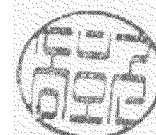


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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2012/042929**

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)                                                                                                                                                                                                                                              | Publication<br>date                                                                                                                                                                              |
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