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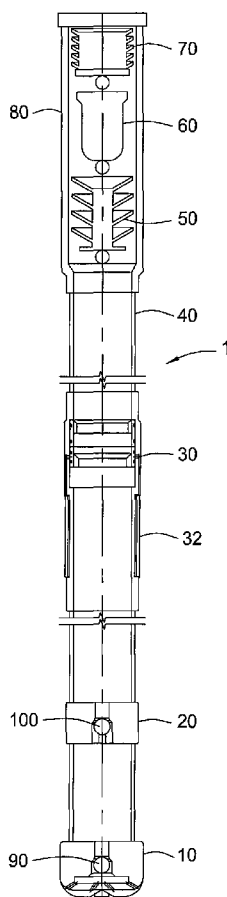
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[Continued on next page]

(54) Title: STAGE CEMENTING METHODS USED IN CASING WHILE DRILLING



(57) Abstract: Apparatus and methods are provided for a cementing operation for use with a drilling with casing application. In one embodiment, an apparatus (1) is provided for stage cementing using a full opening stage tool (30). In another embodiment, an apparatus is provided for reverse cementing of the casing.

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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, MT, 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*

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## INTERNATIONAL SEARCH REPORT

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PCT/US2007/068814A. CLASSIFICATION OF SUBJECT MATTER  
INV. E21B33/14 E21B7/20

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)  
E21B

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

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2004/118560 A1 (JOHNSON MICHAEL R [US] ET AL) 24 June 2004 (2004-06-24) paragraphs [0010] - [0012], [0018], [0019]; claim 1; figures 1-3	1-22
Y	US 4 260 017 A (NELSON WAYNE F ET AL) 7 April 1981 (1981-04-07) column 1, line 16 - line 21 column 2, line 35 - column 3, line 61; figures 1-3	1-22
A	US 4 246 968 A (JESSUP ROBERT L ET AL) 27 January 1981 (1981-01-27) abstract	1,11

 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 document 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

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Name and mailing address of the ISA/

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## INTERNATIONAL SEARCH REPORT

International application No  
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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.
A	GB 2 393 988 A (WEATHERFORD LAMB [US] WEATHERFORD LAMB [US]; WEATHERFORD LAMB [US]) 14 April 2004 (2004-04-14) abstract -----	1,11
X	US 2 425 202 A (OZINGA PETER K) 5 August 1947 (1947-08-05) column 5, line 68 - column 6, line 43; figures 8-10 -----	23,24
X	US 3 412 805 A (GRIBBIN FRANKLIN P ET AL) 26 November 1968 (1968-11-26) column 5, line 4 - line 66; figures 2,3 -----	23,24
A	US 6 244 342 B1 (SULLAWAY BOBBY L [US] ET AL) 12 June 2001 (2001-06-12) figure 4 -----	23,24

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2007/068814

## 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 allsearchable 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.:

### 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: 1-22

Drilling with casing comprising a stage tool.  
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2. claims: 23-24

Reverse cementing  
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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/068814

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
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