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**Declarations under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

**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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(54) Title: TOOLS FOR USE IN SUBTERRANEAN BOREHOLES HAVING EXPANDABLE MEMBERS AND RELATED METHODS

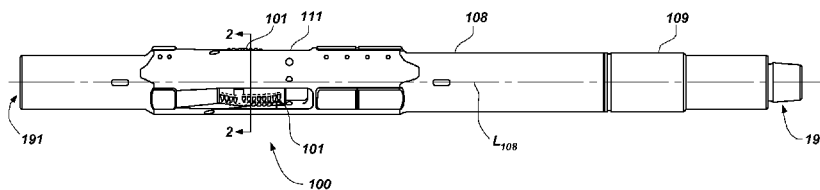


FIG. 1

(57) Abstract: Expandable apparatus for use in subterranean boreholes include at least one member configured to move between a retracted position and an extended position. Components of the expandable apparatus may include at least one surface for removing debris proximate to the tubular body. Components of the expandable apparatus may be configured to enable the expandable apparatus to increase a diameter of a subterranean borehole by greater than twenty percent. Components of the expandable apparatus may be configured to restrict fluid flow to nozzle assemblies. The expandable apparatus may include a protect sleeve having a push sleeve disposed therein. Methods of operating an expandable apparatus may include removing debris with a surface of the expandable apparatus. Methods of operating an expandable apparatus may also include selectively flowing fluid to nozzle assemblies.

**A. CLASSIFICATION OF SUBJECT MATTER***E21B 10/32(2006.01)i, E21B 10/62(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)

E21B 10/32; E21B 7/28

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: expandable, reamer, mill, debris, yoke and similar terms

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2008-0128175 A1 (RADFORD, STEVEN R. et al.) 05 June 2008 See paragraphs 46-49 and figures 3, 6	1-7, 18, 19
A	US 2009-0145666 A1 (RADFORD, STEVEN R. et al.) 11 June 2009 See paragraphs 58-61 and figures 3, 6	1-7, 18, 19
A	US 2008-0128169 A1 (RADFORD, STEVEN R. et al.) 05 June 2008 See paragraphs 31-44 and figures 4, 7	1-7, 18, 19
A	US 2005-0205305 A1 (STOUT, MARK et al.) 22 September 2005 See paragraphs 60-74 and figure 6A	1-7, 18, 19

 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 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

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

Date of the actual completion of the international search

14 SEPTEMBER 2012 (14.09.2012)

Date of mailing of the international search report

**08 OCTOBER 2012 (08.10.2012)**

Name and mailing address of the ISA/KR

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**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:

Independent claims 1, 18 share "member positioned within the opening of the tubular body", "a yoke coupled to the member" and "apex for removing debris" as common technical features.

However, the technical features which independent claims 8, 12, 16, 20 share with each other or with independent claims 1, 18 lack novelty/inventive step in that US 2008/0128175 A1 discloses an expandable reamer comprising tubular body, blades disposed in the opening of the tubular body, push sleeve, traveling sleeve and nozzle.

Thus independent claims 8, 12, 16, 20 do not share any technical relationship left over the prior art with each other and with independent claims 1, 18 leaving the claims without a single general inventive concept. Hence, there is lack of unity a posteriori (PCT Rule 13.1 and 13.2).

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.: 1-7,18,19

**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.

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2012/024318**

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