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(54) Title: DOWNHOLE TOOL WITH COMPOSITE SLIP SYSTEM

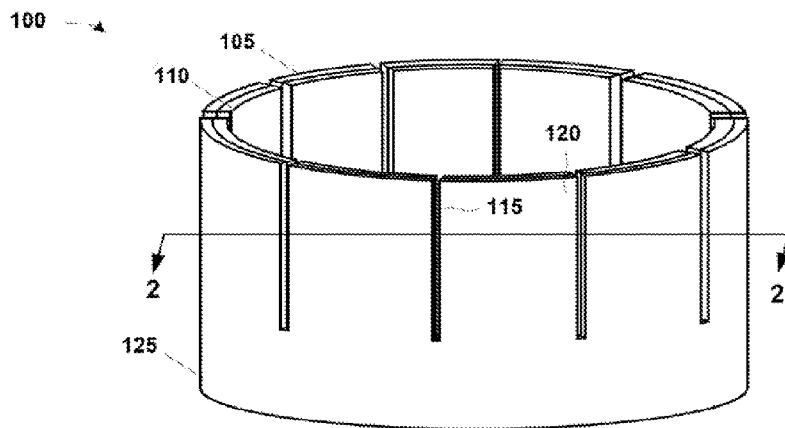


FIG. 1

(57) Abstract: A downhole slip system includes a metal slip structure; and a composite undercarriage adhered to the inner surface of the metal slip structure. A method for manufacturing a downhole slip system includes: disposing a bulk molding compound in contact with the inner surface of a metal slip structure within a mold; compressing the metal slip structure and the bulk molding compound; and curing the compressed bulk molding compound.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US13/47699

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - E21B 33/12 (2013.01)

USPC - 166/386

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)

IPC(8) Classification(s): E21B 33/12 (2013.01)

USPC Classification(s): 166/386, 382

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)

MicroPatent (US Granted, US Applications, EP-A, EP-B, WO, JP, DE-G, DE-A, DE-T, DE-U, GB-A, FR-A); Google, Google Scholar; DialogPro (Derwent, INSPEC, NTIS, PASCAL, Current Contents Search, Dissertation Abstracts Online, Inside Conferences);

KEYWORDS: downhole, drilling equipment, boring, drilling, oilfield, slip, anchor, framework, composite, hardened

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------------|---|----------------------------|
| X ----- Y | US 2012/0125637 A1 (CHENAULT L.W. et al.) May 24, 2012; figures 1c and 1d; paragraphs [0040], [0041], [0042], [0044] and [0057] | 1-3 and 5-12 ----- 4 |
| Y | US 2012/0012306 A1 (TREADAWAY S.J. et al.) January 19, 2012; paragraphs [0003] and [0004] | 4 |
| A | US 7,124,831 B2 (TURLEY R.A. et al.) October 24, 2006; entire document | 1-12 |
| A | WO 2012/136960 A2 (STANDRIDGE W.E.) October 11, 2012; entire document | 1-12 |
| A | US 2011/0005779 A1 (LEMBCKE L.) January 13, 2011; entire document | 1-12 |

Further documents are listed in the continuation of Box C.

* 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

09 December 2013 (09.12.2013)

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US13/47699

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:

----Continued Within the Next Supplemental Box----

- 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 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.:
1-12

- 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

International application No.

PCT/US13/47699

-***-Continued from Box No. III: Observations where unity of invention is lacking-***-

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-12 are directed toward a metal slip structure and a composite undercarriage.

Group II: Claims 13-23 are directed toward compressing and curing a bulk molding compound.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons.

The special technical features of Group I include a composite undercarriage adhered to the inner surface of the metal slip structure, which is not present in Group II.

The special technical features of Group II include disposing a bulk molding compound in contact with the inner surface of a metal slip structure within a mold; compressing the metal slip structure and the bulk molding compound; and curing the compressed bulk molding compound, which are not present in Group I.

The common technical feature of Groups I and II is a metal slip structure.

These common technical features are disclosed by US 2012/0125637 A1 to Chenault, et al. (hereinafter "Chenault"). Chenault discloses a metal slip structure (metal slip inserts (metal slip structure) attached to a slip carrier made of a non-metallic material, such as composite material; abstract).

Because Chenault discloses the common technical features, these features are not special. Therefore, Groups I and II lack unity.