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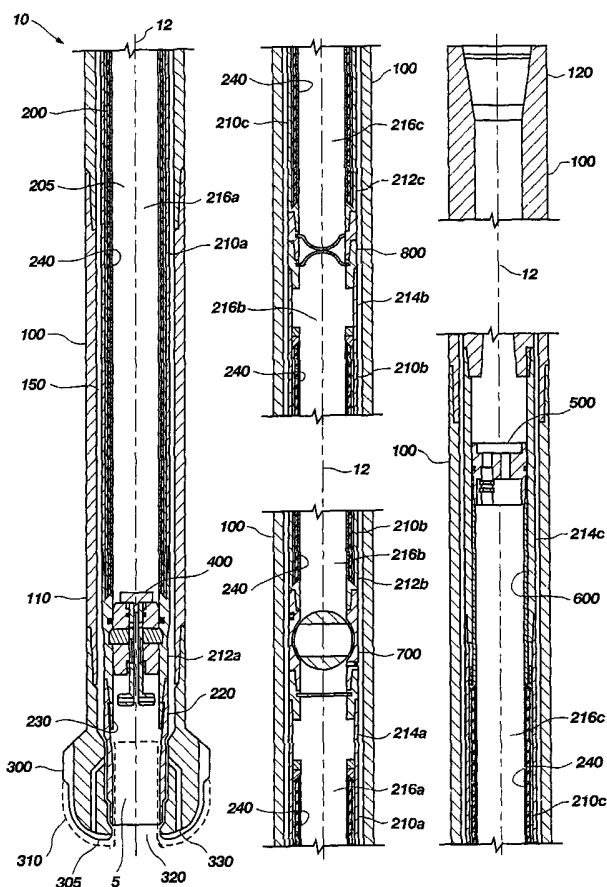
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[Continued on next page]

(54) Title: APPARATUS AND METHODS FOR SPONGE CORING



(57) Abstract: A sponge core barrel for use in performing sponge coring and methods of assembling the sponge core barrel, as well as methods of performing sponge coring. The sponge core barrel includes an outer barrel assembly, a core bit secured to a lower end thereof, and an inner barrel assembly disposed therein. The inner barrel assembly may comprise multiple, sponge-lined inner tube sections. One or more sponge liners comprising an annular sponge layer secured within a tubular sleeve may be disposed within the inner barrel assembly. The present invention encompasses a number of embodiments of an improved sponge liner, as well as an inner barrel assembly comprised of one or more integrated sponge barrels.



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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

Intern I Application No
PCT/US 01/43768

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E21B25/08 E21B25/06

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 7 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.
X	US 4 312 414 A (PARK) 26 January 1982 (1982-01-26) column 3, line 3 - line 34 column 2, line 49 - line 52 column 4, line 11 - line 13	1,4,71, 84,111
Y		2,3,7,8, 11,30, 31,78, 79,85, 86,89, 93-99
Y	US 5 042 598 A (SHERMAN) 27 August 1991 (1991-08-27) column 5, line 44 - line 57 --- -/--	7,8,98, 99



Further documents are listed in the continuation of box C.



Patent family members are listed in 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
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- *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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15. 08. 2002

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/43768

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 255 751 A (STOGNER) 26 October 1993 (1993-10-26) column 5, line 7 - line 27 ---	7,8,98, 99
X	GB 2 000 824 A (AMERICAN COLDSET CORPORATION) 17 January 1979 (1979-01-17) abstract page 6, line 32 - line 33 page 6, line 54 - line 59	10,18,19
Y	---	11,30, 31,78,79
X	US 4 598 777 A (PARK) 8 July 1986 (1986-07-08) cited in the application column 2, line 47 - line 63 column 3, line 39 - line 48 abstract column 6, line 56 - line 57	10,11, 18,19, 30,31, 71,78, 79,111
Y	---	2,3,85, 86,89, 93-99
X	US 4 479 557 A (PARK) 30 October 1984 (1984-10-30) cited in the application column 4, line 1 - line 7 ---	10,11, 18,19, 30,31, 71,78, 79,111
X	US 4 502 553 A (PARK) 5 March 1985 (1985-03-05) abstract column 3, line 40 - line 48 column 4, line 27 - line 29 ---	58,60, 62,71, 72,74, 75, 109-111
X	US 4 787 983 A (DIFOGGIO) 29 November 1988 (1988-11-29) column 4, line 18 - line 23; figure 1 ---	58,60, 71,72, 74, 109-111
A	US 3 511 324 A (PIETERS) 12 May 1970 (1970-05-12) column 1, line 54 - line 58 ---	9,65,66, 69,76, 77,92, 100,106, 114

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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	<p>US 4 566 545 A (STORY) 28 January 1986 (1986-01-28)</p> <p>abstract</p> <p>-----</p>	<p>9, 65, 66, 69, 76, 77, 92, 100, 106, 114</p>

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/43768

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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 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.:
1-11, 18-21, 30-33, 40-50, 58-81, 84-107, 109-115
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.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 01/43768

Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

A sponge core barrel for use in performing sponge coring and methods of assembling the sponge core barrel, as well as methods of performing sponge coring. The sponge core barrel (10) includes an outer barrel assembly (100), a core bit (300) secured to a lower end thereof, and an inner barrel assembly (200) disposed therein. The inner barrel assembly may comprise multiple, sponge-lined inner tube sections. One or more sponge liners (240) comprising an annular sponge layer secured within a tubular sleeve (242) may be disposed within the inner barrel assembly. The present invention encompasses a number of embodiments of an improved sponge liner, as well as an inner barrel assembly comprised of one or more integrated sponge barrels.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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