



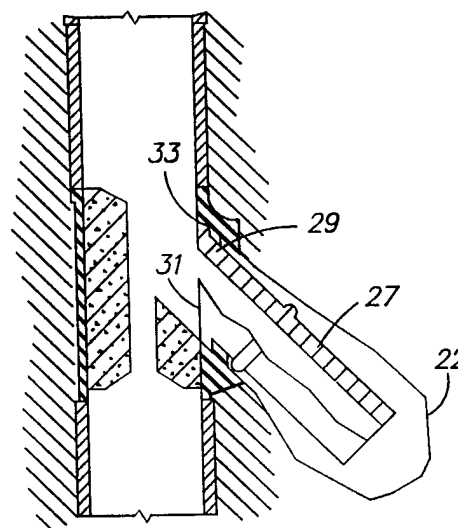
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : E21B 33/14, 43/30	A3	(11) International Publication Number: WO 98/09053 (43) International Publication Date: 5 March 1998 (05.03.98)
(21) International Application Number: PCT/US97/15275 (22) International Filing Date: 29 August 1997 (29.08.97) (30) Priority Data: 60/025,139 30 August 1996 (30.08.96) US (71) Applicant: BAKER HUGHES INCORPORATED [US/US]; 3900 Essex Lane, Houston, TX 77027 (US). (72) Inventors: MURRAY, Douglas, J.; 5922 Culross Close, Hum- ble, TX 77346 (US). SMITH, Robert, C.; 23 Elmfield Av- enue, Aberdeen (GB). MYRON, Walter, J.; 23 McDon- ald Drive, Ellon, Aberdeenshire AB41 8BD (GB). JOHN- SON, John, J.; 4027 Markley, Houston, TX 77087 (US). HIRTH, David, E.; 4306 Argentina, Pasadena, TX 77504 (US). SMITH, Sidney, K.; 1406 Axleridge, Conroe, TX 77384 (US). WEAVER, Chris; 5727 Georgetown Colony Drive, Houston, TX 77084 (US). (74) Agent: MURPHY, Keith, J.; Fishman, Dionne, Cantor & Colburn, 88 Day Hill Road, Windsor, CT 06095 (US).		(81) Designated States: AU, CA, GB, NO. Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims</i> <i>and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 11 June 1998 (11.06.98)

(54) Title: METHOD AND APPARATUS FOR SEALING A JUNCTION ON A MULTILATERAL WELL

(57) Abstract

Methods and apparatus for forming multilateral wells and sealing the junction between the main well bore and a lateral well. In a first embodiment of the invention, a main well bore liner includes windows or openings formed in the liner. A drillable insert is positioned near the window for support when the lateral well is drilled. The window is also filled with a drillable material. A second embodiment of the invention uses inflatable casing packers which are inflated with cement to form junction having pressure integrity from the inside and the outside with a full opening lateral and a main bore restricted only by the inner diameter of the inflatable casing packers. A third embodiment of the invention uses a layered sealing sleeve at the opening of the lateral well. A tie back liner top mandrel is wedged through an opening in the layered sealing sleeve. The mandrel includes a flange, at the top and the interference fit between the flange and the opening in the sealing sleeve forms a hydraulic seal between the main well bore and the lateral well.



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INTERNATIONAL SEARCH REPORT

Internatio application No
PCT/US 97/15275

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 E21B33/14 E21B43/30

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 6 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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 388 648 A (JORDAN JR HENRY J) 14 February 1995 see column 6, line 35 - column 8, line 40 see column 13, line 17-19 see figures 2A-3C,9A ---	1,3
A	EP 0 701 045 A (HALLIBURTON CO) 13 March 1996 see page 12, column 19, line 19-32 see figure 4 ---	1,3
A	US 5 526 880 A (JORDAN JR HENRY J ET AL) 18 June 1996 see column 9, line 18-31 see figure 2H -----	1,3

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

10 December 1997

Date of mailing of the international search report

20.04.98

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 97/15275

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:

1. Claims: 1-4

2. Claims: 5-8

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.:

1-4

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

Information on patent family members

Internatic	Application No
PCT/US 97/15275	

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5388648 A	14-02-95	CA 2133240 A GB 2282835 A	09-04-95 19-04-95

EP 0701045 A	13-03-96	US 5564503 A CA 2156977 A CA 2156981 A CA 2156982 A CA 2156983 A CA 2156984 A CA 2156987 A EP 0701042 A EP 0701044 A EP 0701040 A EP 0701043 A EP 0701041 A NO 953303 A NO 953304 A NO 953323 A NO 953324 A NO 953325 A NO 953326 A SG 32473 A SG 34260 A SG 32475 A SG 32476 A SG 34261 A SG 32477 A US 5507346 A US 5499680 A US 5501281 A US 5499681 A US 5566763 A US 5613559 A	15-10-96 27-02-96 27-02-96 27-02-96 27-02-96 27-02-96 27-02-96 13-03-96 13-03-96 13-03-96 13-03-96 13-03-96 27-02-96 27-02-96 27-02-96 27-02-96 27-02-96 13-08-96 06-12-96 13-08-96 13-08-96 06-12-96 13-08-96 16-04-96 19-03-96 26-03-96 19-03-96 22-10-96 25-03-97

US 5526880 A	18-06-96	CA 2158291 A GB 2293186 A NO 953653 A	16-03-96 20-03-96 18-03-96
