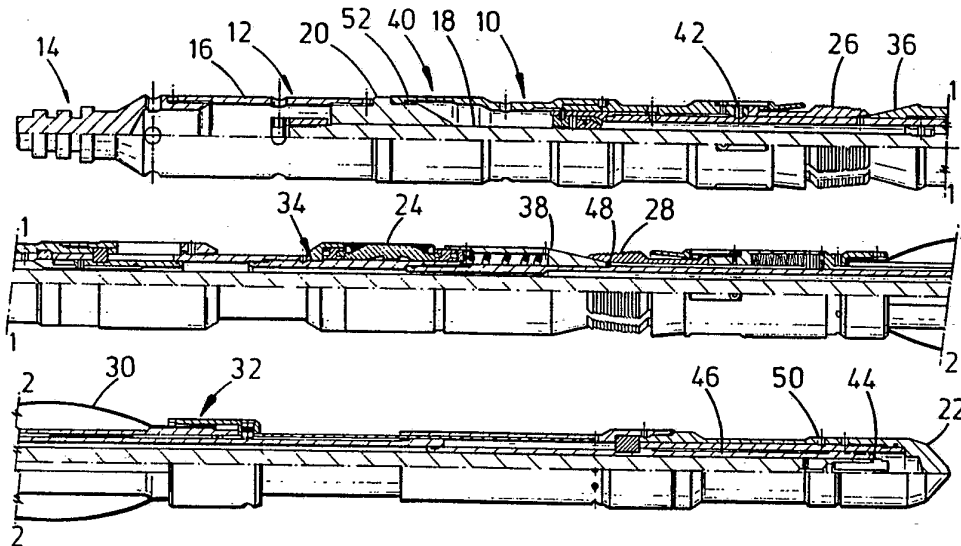




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>5</sup> : E21B 33/129, 33/128, 23/06 E21B 33/134, 23/04, 17/02</p>	<p>A3</p>	<p>(11) International Publication Number: <b>WO 92/17681</b> (43) International Publication Date: 15 October 1992 (15.10.92)</p>
<p>(21) International Application Number: PCT/GB92/00605 (22) International Filing Date: 3 April 1992 (03.04.92) (30) Priority data: 9107282.7 6 April 1991 (06.04.91) GB (71) Applicant (for all designated States except US): PETROLINE WIRELINE SERVICES LIMITED [GB/GB]; Howe Moss Terrace, Kirkhill Industrial Estate, Dyce, Aberdeen AB2 0GR (GB). (72) Inventor; and (75) Inventor/Applicant (for US only): KLAAS, Johannes, Zwart [NL/GB]; Drumgarth, Inchgarth Road, Cults, Aberdeen AB1 9NX (GB). (74) Agents: McCALLUM, William, Potter et al.; Cruikshank &amp; Fairweather, 19 Royal Exchange Square, Glasgow G1 3AE (GB).</p>	<p>(81) Designated States: AT (European patent), AU, BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, LU (European patent), MC (European patent), NL (European patent), RU, SE (European patent), US.  <b>Published</b> <i>With a revised version of the international search report.</i> (88) Date of publication of the international search report: 18 February 1993 (18.02.93) (88) Date of publication of the revised version of the international search report: 28 October 1993 (28.10.93)</p>	

(54) Title: RETRIEVABLE BRIDGE PLUG AND A RUNNING TOOL THEREFOR



(57) Abstract

A tool (10) for downhole use in oil and gas wells comprises a number of relatively-axially-slidable members (32, 34, 40). Upper and lower toothed locking slips (26, 28) are mounted on respective upper and lower members (40, 32) and a resilient ring member (24) is mounted on a further member between (34) the locking slips (26, 28) and is compressible into sealing engagement with a bore wall on relative movement of the slips (26, 28) towards each other. The locking slips (26, 28) are moved into radially extended bore wall engaging positions by relative axial movement of the respective members (32, 40) and the central member (34). The upper and lower locking slips (26, 28) are extended by application of downward force to the central member (34) and the upper member (40), respectively, and the ring member (24) is compressed into sealing engagement with the bore wall by application of an upward force to the lower member (32).

\* (Referred to in PCT Gazette No. 26/1993, Section II)

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**REVISED  
VERSION**

**INTERNATIONAL SEARCH REPORT**

International Application

PCT/GB 92/00605

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl.5	E 21 B 33/129	E 21 B 33/128 E 21 B 23/06
E 21 B 33/134	E 21 B 23/04	E 21 B 17/02
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.Cl.5	E 21 B	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>o</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X	US,A,2901046 (WEBBER) 25 August 1959, see column 4, line 56 - column 5, line 70; column 6, lines 13-20	1,2,4
A	---	3
X	US,A,2756827 (FARRAR) 31 July 1956, see column 3, lines 33-67; column 3, line 74 - column 4, line 13	1,2,4
A	---	3,10
X	US,A,4635716 (ZUNKEL) 13 January 1987, see column 6, lines 8-30; column 7, lines 39-48	1,2,4
	---	-/-
<sup>o</sup> Special categories of cited documents : <sup>10</sup> "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 "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		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
04-08-1992	12.01.93	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	M.G. Sogno	

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	---	3
X	US,A,4627491 (ZUNKEL) 9 December 1986, see column 4, lines 34-57; column 5, lines 3-10	1,2,4
A	---	3
X	US,A,3374840 (CURRENT) 26 March 1968, see column 3, line 67 - column 4, line 27	1,2
A	---	3
X	US,A,3356142 (CROW) 5 December 1967, see column 13, lines 24-60; column 11, lines 2-5; column 13, line 65 - column 14, line 11	1,2,4,5
A	---	3,10
X	US,A,3991826 (BAUGH) 16 November 1976, see column 5, lines 3-9; column 2, lines 43-46	1
Y	---	4,6,8,9
Y	US,A,3631924 (McGILL) 4 January 1972, see column 5, lines 14-43	4,6,8,9
Y	---	9
X	US,A,3199906 (CHENOWETH) 10 August 1965, see the whole document	9
X	---	1,2,4
X	US,A,4156460 (CROWE) 29 May 1979, see column 6, line 62 - column 7, line 25; column 7, lines 27-32	1,2,4
X	---	30
A	US,A,4300636 (LAWRENCE) 17 November 1981, see column 5, lines 14-33	14
	---	-/-

## III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category <sup>a</sup>	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	GB,A,2200388 (TEXAS IRON WORKS) 3 August 1988, see page 15, lines 3-17; figures 88,9B	30
X	--- GB,A,2160241 (GRASER) 18 December 1985, see abstract	31
X	--- US,A,2595014 (SMITH) 29 April 1952, see column 4, lines 41-60	31
A	--- US,A,2747673 (LAWRENCE) 29 May 1956, see whole document	31
A	--- US,A,4307781 (PRESTON) 29 December 1981, see column 6, line 54 - column 7, line 5; column 7, lines 29-58 -----	1

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB92/00605

## 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:

- claims 1-3, (10-22)(partial)
- claims 4-9, (10-22)(partial)
- claims (10-22)(partial), 23-26
- claims (10-22)(partial), 27-29
- claims (14-22)(partial), 30
- claims 31-33

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.:
  - 1-3, (10-22)(partial)
  - 4-9, (10-22)(partial)
  - (14-22)(partial), 30
  - 31-33
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.

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.**

GB 9200605  
SA 58029

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 21/12/92. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 2901046		None	
US-A- 2756827		None	
US-A- 4635716	13-01-87	None	
US-A- 4627491	09-12-86	None	
US-A- 3374840		None	
US-A- 3356142		None	
US-A- 3991826	16-11-76	None	
US-A- 3631924	04-01-72	None	
US-A- 3199906		None	
US-A- 4156460	29-05-79	None	
US-A- 4300636	17-11-81	US-A- 4270620 US-A- 4298078	02-06-81 03-11-81
GB-A- 2200388	03-08-88	US-A- 4898245	06-02-90
GB-A- 2160241	18-12-85	None	
US-A- 2595014		None	
US-A- 2747673		None	
US-A- 2747781		None	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82