

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 687 801 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
01.10.1997 Bulletin 1997/40

(51) Int Cl.⁶: **E21B 33/12**, E21B 23/02,
E21B 23/04

(43) Date of publication A2:
20.12.1995 Bulletin 1995/51

(21) Application number: **95304034.2**

(22) Date of filing: **12.06.1995**

(84) Designated Contracting States:
DE GB NL

(72) Inventor: **Boyle, Colin S.**
Aberdeen AB1 9ND (GB)

(30) Priority: **14.06.1994 GB 9411865**

(74) Representative: **Cooper, John et al**
Murgitroyd & Company,
Chartered Patent Agents,
373 Scotland Street
Glasgow G5 8QA (GB)

(71) Applicant: **SSR (International) Limited**
Dyce, Aberdeen AB2 0GA (GB)

(54) Metal sealing wireline plug

(57) A plug for creating a pressure barrier within an oil or gas well comprises a plug body (5) and a metal primary seal element (7) having a frusto-conical seal face (7A) adapted to engage a corresponding seal surface of a profiled well conduit to create a metal-to-metal seal having a relatively large contact area. The primary seal is energised by pressure applied above the plug,

prior to the plug been set by a running tool which operates an actuating member (5) to displace locking keys (4) radially outwards so as to engage corresponding formations in the well profile and lock the plug against axial movement within the well conduit. The plug may be retrieved using a pulling tool and re-used, and includes a secondary elastomeric or polymeric seal (6).

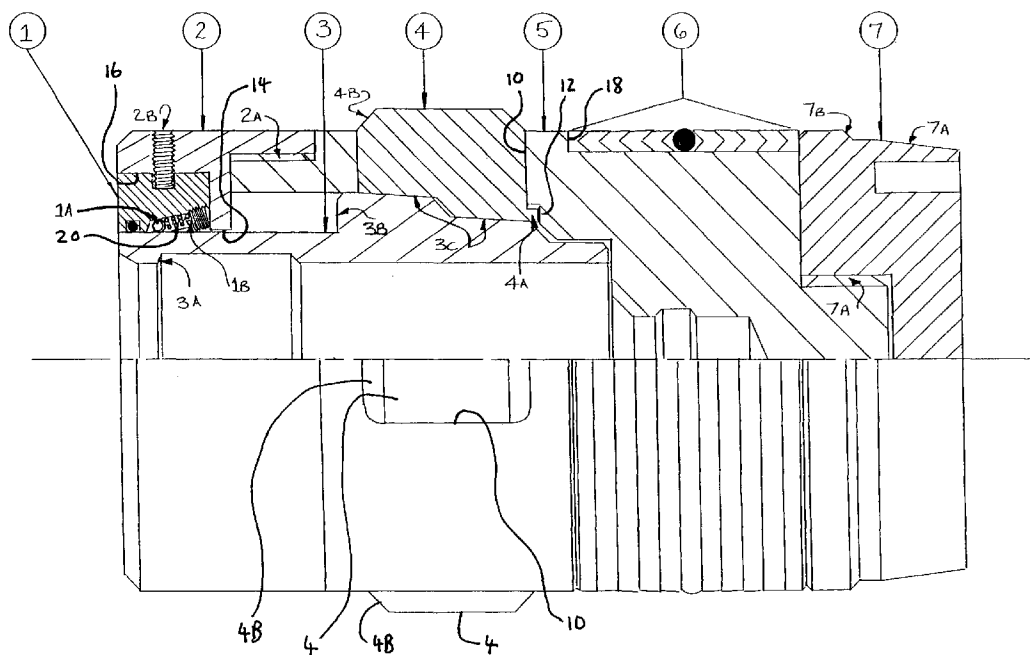


FIG. 1

EP 0 687 801 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 4034

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 4 178 992 A (REGAN) * column 2, line 9 - line 20 * * column 3, line 19 - line 55 * * column 3, line 21 - line 26 * * column 3, line 57 - line 59 * ---	1-3,9-13	E21B33/12 E21B23/02 E21B23/04
X	US 4 302 018 A (HARVEY) * abstract *	1,2	
Y	* column 4, line 3-16; claim 5 * ---	7,8	
X	US 4 127 168 A (HANSON) * column 8, line 51 - column 9, line 4 * ---	1-3	
X	US 4 651 818 A (JOHNSON) * column 2, line 55 - column 3, line 8 * * column 2, line 10 - line 21 * * column 4, line 21 - line 24 *	1-6,9-13	
Y	---	7,8,14,15	
Y	FR 2 519 687 A (ORZAGOS KOOLAJ ES GAZIPARI TROSZT) * page 9, line 3 - line 8 * ---	14,15	TECHNICAL FIELDS SEARCHED (Int.Cl.6) E21B
X	US 4 901 794 A (BAUGH) * column 3, line 33 - line 38 * * column 4, line 14 - line 26 *	1,2 14	
A	---		
X	US 4 907 651 A (BOU-MIKAEL) * claim 1 * * column 6, line 7 - line 15 * * figures FIG.2-8 * ---	1-6,9-11	
A	GB 2 272 718 A (MASX ENERGY SERVICES GROUP 1 INC.) * abstract * ---		
	-/--		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 8 August 1997	Examiner Sogno, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1501 01/92 (Pct/Ch)



European Patent
Office

Application Number
EP 95 30 4034

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

SEE SHEET B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
1-15
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 4034

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 3 208 531 A (TAPLEN) * the whole document *	1	
A	US 3 138 207 A (PEPPERS) * the whole document *	1	
A	EP 0 294 264 A (SOCIETE DE PROSPECTION ELECTRIQUE SCHLUMBERGER) * the whole document *	1	
A	GB 2 092 206 A (OTIS ENGINEERING CORPORATION) * the whole document *	1	
A	US 4 969 515 A (DOLLISON) * the whole document *	1	
A	US 5 066 060 A (COOKSEY) * the whole document *	1	
E	GB 2 285 822 A (ZWART) * page 9, line 10 - line 22 *	1-4, 9-11	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 8 August 1997	Examiner Sogno, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 (03.92) (P04C01)



European Patent Office

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions, or groups of inventions, namely:

A plug with a metal sealing, according to claim 1, is already known, see for instance the X documents cited in the search report. Thus claim 1 is lacking in novelty. The subject-matter of dependent claims 2 and 3 is also not new. The only specifically common features between claims 4, 9 and 16 are the features of claim 1.

Therefore three inventions can be distinguished:

- 1): claims 4-8 (first invention): plug with a frusto-conical seal surface and further provided with a no-go shoulder.
- 2): claims 9-15 (second invention): plug with radially movable locking members and further including a blind bore.
- 3): claims 16, 17 (third invention) : plug with a secondary sealing barrier,

The general problem of providing a plug with an efficient metal sealing means and holding means has already been solved by the plugs according to the cited X documents.

Therefore the special technical features of the three inventions cannot be considered as corresponding special technical features. Thus there exists lack of unity of invention.