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(11) Publication number:

0 352 979 A3

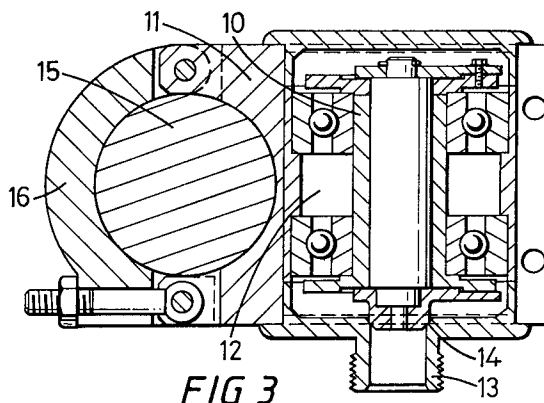
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EUROPEAN PATENT APPLICATION(21) Application number: **89307415.3**(51) Int. Cl.⁵: **E21B 7/24**, E21B 25/00,
B06B 1/16(22) Date of filing: **20.07.89**(30) Priority: **28.07.88 GB 8818024**(43) Date of publication of application:
31.01.90 Bulletin 90/05(84) Designated Contracting States:
BE DE ES FR GB IT NL SE(88) Date of deferred publication of the search report:
05.02.92 Bulletin 92/06(71) Applicant: **The British Petroleum Company
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BP INTERNATIONAL LIMITED Patents
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7LN(GB)**(54) **Variable amplitude drill.**

(57) A vibratory core drill comprises a housing (11) adapted for connection to a drill string and a variable amplitude rotor (10) rotably mounted in the housing (11), the variable amplitude rotor (10) comprising a central shaft (1), an inner shell (2), the inner and outer shells (2) and (3) being capable of rotation relative to one another and capable of being locked in any desired relationship and released.

The variable amplitude rotor enables the amplitude of oscillation to be varied to cope with formations of different characteristics, eg, sand and clay.

The drill is suitable for use in drilling core samples for evaluating the mineral potential of deposits and for environmental monitoring to detect possible contamination.





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EUROPEAN SEARCH REPORT

Application Number

EP 89 30 7415

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.5)
X	DE-A-1 558 869 (VEB) * Page 3, line 29 - page 4, line 7 *	1-3	E 21 B 7/24
Y	---	4-8	E 21 B 25/00
Y,D	GB-A-2 152 100 (WINK) * Page 2, lines 57-61 *	4	B 06 B 1/16
X	GB-A-2 188 398 (ANDREWS) * Whole document *	1-3	
X	BE-A- 894 355 (CALLENS) * Page 5, lines 2-17 *	1-3	
X	US-A-4 211 121 (BROWN) * Abstract *	1-3	
X	FR-A-2 639 376 (ALBARET) * Abstract *	1,2	
X	DE-C-3 515 690 (LINDENMEYER) * Column 5, lines 6-20 *	1,3	
X	FR-A-2 372 275 (STAVOSTROJ NARODNI) * Whole document *	1	
X	DE-A-1 634 474 (R. WOLF AG) * Whole document *	1,3	
X	US-A-4 176 983 (GARDNER) * Abstract *	1,3	
A	DE-U-8 530 160 (KRINGS INTERN AG) * Whole document *	1,2	
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13-11-1991	Examiner SOGNO M.G.
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			



CLAIMS INCURRING FEES

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

- ☐ All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the claims fees 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 claims:
- ☐ 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 requirement 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:
- ☐ None of the further search fees has 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:



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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.5)		
Y	US-A-3 289 774 (BODINE) * Column 8, line 68 - column 9, line 26; column 11, lines 26-72 *	5-8			
Y	GB-A-1 183 066 (FYNE MACHINERY) * Claim 1 *	7-8			
A	* Claim 3 *	5			
A	US-A-3 734 212 (PERLEWITZ) * Column 5, lines 19-24 *	1-8			
A	DE-C- 932 182 (HERBOLD) * Page 4, lines 77-81 *	7,8			
A	US-A-3 155 163 (BODINE) * Column 3, line 71 - column 4, line 2 *	5			
A	US-A-4 073 353 (BODINE) * Column 3, lines 31-34,51-54 *	5,6			
A	US-A-3 217 551 (BODINE) * Whole document *	5,6			
A	US-A-3 199 614 (BODINE) * Whole document *	5,6			
The present search report has been drawn up for all claims					
Place of search THE HAGUE		Date of completion of the search 13-11-1991	Examiner SOGNO M.G.		
<table><tr><td>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</td><td>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</td></tr></table>				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
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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:

1. Claims 1-4: Vibratory core drill with a variable amplitude rotor.
2. Claims 5-8: Vibratory core drill with a housing adapted for side mounting.