



⑫

EUROPEAN PATENT APPLICATION

⑬ Application number: **92106450.7**

⑮ Int. Cl. 5: **E21B 10/16, E21B 10/52**

⑯ Date of filing: **14.04.92**

⑰ Priority: **01.05.91 US 693900**

⑲ Date of publication of application:
04.11.92 Bulletin 92/45

⑳ Designated Contracting States:
DE FR GB IT NL

㉑ Date of deferred publication of the search report:
14.04.93 Bulletin 93/15

㉒ Applicant: **SMITH INTERNATIONAL, INC.**
16740 Hardy Street
Houston, Texas 77206(US)

㉓ Inventor: **Crockett, David P.**
15464 kernvale
Moorpark, California 93021(US)
Inventor: **Hooper, Michael E.**
19618 Enchanted Oaks
Spring, Texas 77388(US)

㉔ Representative: **Patentanwälte Grünecker,**
Kinkeldey, Stockmair & Partner
Maximilianstrasse 58
W-8000 München 22 (DE)

㉕ **Rock bit.**

㉖ A rock bit is disclosed having a plurality of rolling cone cutters each having a gage row of inserts oriented to face the borehole bottom for crushing the same, and a second row of heel gage inserts which are oriented to face the borehole sidewall for scraping the same. The heel row inserts are interleaved between the gage row inserts and the cutting surface profile of the heel row inserts overlaps the cutting surface profile of the gage inserts in order to alleviate most of the scraping action normally encountered by gage inserts. The crowns of the heel row inserts are within four millimeters up hole from the crowns of the gage row inserts. The heel inserts are made of a harder material than the gage row inserts for resisting the scraping action against the sidewall of the borehole.

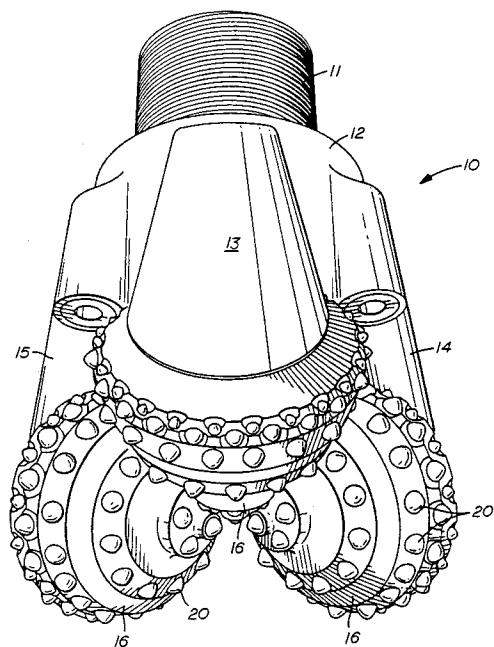


FIG. 1



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 10 6450

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.5)												
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim													
A	US-A-2 990 025 (TALBERT) * column 1, line 9 - line 12 * * column 2, line 55 - column 3, line 13; figures * ---	1-3, 9	E21B10/16 E21B10/52												
A	FR-A-2 029 550 (DRESSER INDUSTRIES INC.) * page 2, line 5 - line 19 * * page 4, line 36 - page 5, line 5; figures * ---	1-3, 9													
A, D	US-A-3 727 705 (NEWMAN) * column 1, line 57 - column 2, line 8; figure 2 * -----	1, 3, 7													
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)												
			E21B												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 33%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>17 FEBRUARY 1993</td> <td>LINGUA D.G.</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	THE HAGUE	17 FEBRUARY 1993	LINGUA D.G.						
Place of search	Date of completion of the search	Examiner													
THE HAGUE	17 FEBRUARY 1993	LINGUA D.G.													
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">CATEGORY OF CITED DOCUMENTS</td> <td style="width: 33%;">T : theory or principle underlying the invention</td> </tr> <tr> <td>X : particularly relevant if taken alone</td> <td>E : earlier patent document, but published on, or after the filing date</td> </tr> <tr> <td>Y : particularly relevant if combined with another document of the same category</td> <td>D : document cited in the application</td> </tr> <tr> <td>A : technological background</td> <td>L : document cited for other reasons</td> </tr> <tr> <td>O : non-written disclosure</td> <td>.....</td> </tr> <tr> <td>P : intermediate document</td> <td>& : member of the same patent family, corresponding document</td> </tr> </table>				CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention	X : particularly relevant if taken alone	E : earlier patent document, but published on, or after the filing date	Y : particularly relevant if combined with another document of the same category	D : document cited in the application	A : technological background	L : document cited for other reasons	O : non-written disclosure	P : intermediate document	& : member of the same patent family, corresponding document
CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention														
X : particularly relevant if taken alone	E : earlier patent document, but published on, or after the filing date														
Y : particularly relevant if combined with another document of the same category	D : document cited in the application														
A : technological background	L : document cited for other reasons														
O : non-written disclosure														
P : intermediate document	& : member of the same patent family, corresponding document														