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EUROPEAN PATENT APPLICATION

⑲ Application number: **85630095.9**

⑥ Int. Cl.⁴: **E 21 B 19/16**

⑳ Date of filing: **20.06.85**

③① Priority: **29.06.84 US 626186**

④③ Date of publication of application:
02.01.86 Bulletin 86/1

⑧⑧ Date of deferred publication of search report: **10.12.86**

⑧④ Designated Contracting States:
DE FR GB

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⑤④ **Wrench and wrench assembly.**

⑤⑦ A wrench assembly for making and breaking connections between tubular members, such as a drill string and a top drive sub. The wrench assembly consists of a lower wrench (33) and an upper wrench (31). The lower wrench (33) has a curved gate arm (41) and a curved latch arm (43) pivotable between an open position and a closed position. The gate arm (41) has a plurality of teeth on its outer surface, and the latch arm (43) has a plurality of teeth on its inner surface, for locking engagement with the teeth on the gate arm (41). The lower wrench (33) also has a clamping cylinder (61) and a die block (59) for forcing the tubular member against the gate arm (41). The upper wrench (31), mounted above the lower wrench (33), has a semicircular plate (65). At least one spline (67) is mounted on the interior surface of the semicircular plate (59) for engagement with at least one spline on the top drive sub. A fluid cylinder (71) is provided for applying torque to the wrenches to rotate one of the wrenches with respect to the other wrenches.

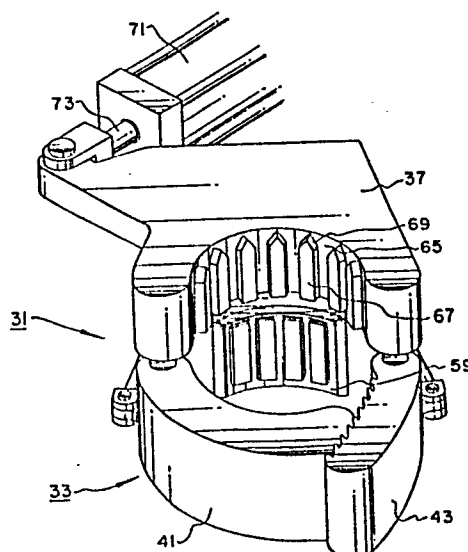


Fig. 4



European Patent
Office

EUROPEAN SEARCH REPORT

01 66675

Application number

EP 85 63 0095

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. 4)
A	<u>US-A- 2 495 834</u> (COLQUITT) * Column 1, line 54 - column 2, line 7 * ---	1	E 21 B 19/16
A	<u>US-A- 4 200 010</u> (HEWITT) * Column 5, lines 33-49, 57-63 * ---	1	
A	<u>US-A- 3 799 009</u> (GUIER) * Column 3, lines 9-39; Figures 2-4 * ---	1	
A	<u>US-A- 2 649 283</u> (LUNDEEN) * Column 7, line 67 - column 8, line 2 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			E 21 B
For documents cited in the search report, see also the following information:			
Place of search		Date of completion of the search	Examiner
The Hague		25-04-1986	SOGNO
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.

X 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 1,2: Wrench with arms having latching teeth
- 2) Claims 3-5: Wrench assembly with a semi-circular plate adapted to engage at least one spline on a top drive sub.

- ☐ 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: 1, 2