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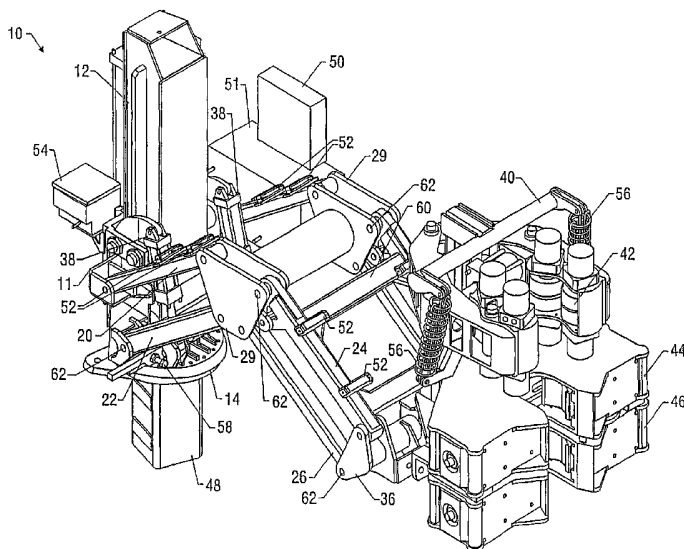
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[Continued on next page]

(54) Title: AUTOMATED ARM FOR POSITIONING OF DRILLING TOOLS SUCH AS AN IRON ROUGHNECK



(57) Abstract: The invention relates to an apparatus for moving an Iron Roughneck into position to allow making-up or breaking-out of threaded joints in a drill string. The apparatus may also be used to move other drilling equipment into position on the centerline of the well or at mouse holes. A self-balanced, dual synchronized parallelogram arm is utilized to accomplish the movement of the devices. Hydraulic or pneumatic cylinders are used for extension and retraction of the arm rather than to support the tool. The arm may hold the tool in any position without cylinder assistance. The linkage in the synchronized parallelogram may be accomplished by gears, links, slots, or rollers.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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INTERNATIONAL SEARCH REPORT

International application No.

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<p>A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : E21B 19/16 US CL : 414/22.51; 175/220; 166/77.51 According to International Patent Classification (IPC) or to both national classification and IPC</p>																	
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) U.S. : 414/22.51, 22.63, 745.1; 175/220, 85, 162; 166/77.51, 85.1; 408/234, 236, 237</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Please See Continuation Sheet</p>																	
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category *</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>US 4,274,778 A (PUTNAM et al) 23 June 1981 (23.06.1981), Figures 1 and 20, columns 4-10.</td> <td>1-12, 15-27, 30-39, 42-59</td> </tr> <tr> <td>Y</td> <td>US 4,548,544 A (VAN APPLIEDORN) 22 October 1985 (22.10.1985), whole document.</td> <td>15-27, 30-39, 42-59</td> </tr> <tr> <td>Y</td> <td>US 4,234,150 A (MEE et al) 18 November 1980 (18.11.1980), Figure 5.</td> <td>12, 15, 27, 30, 39, 42, 51</td> </tr> <tr> <td>Y</td> <td>WO 00/66875 A1 (BOYADJIEFF et al) 9 November 2000 (09.11.2000), whole document.</td> <td>54</td> </tr> </tbody> </table>			Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	US 4,274,778 A (PUTNAM et al) 23 June 1981 (23.06.1981), Figures 1 and 20, columns 4-10.	1-12, 15-27, 30-39, 42-59	Y	US 4,548,544 A (VAN APPLIEDORN) 22 October 1985 (22.10.1985), whole document.	15-27, 30-39, 42-59	Y	US 4,234,150 A (MEE et al) 18 November 1980 (18.11.1980), Figure 5.	12, 15, 27, 30, 39, 42, 51	Y	WO 00/66875 A1 (BOYADJIEFF et al) 9 November 2000 (09.11.2000), whole document.	54
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<p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.</p>																	
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"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</td> </tr> <tr> <td>"E" earlier application or patent published on or after the international filing date</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"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)</td> <td>"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</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance	"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	"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"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)	"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	"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	"P" document published prior to the international filing date but later than the priority date claimed						
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<p>Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230</p>		<p>Authorized officer David J. Bagnell <i>[Signature]</i> Telephone No. (571) 272-5150</p>															

INTERNATIONAL SEARCH REPORT

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Continuation of B. FIELDS SEARCHED Item 3:
EPO, JPO, Derwent

Terms: arm, drilling, iron roughneck, floor