

12 **EUROPEAN PATENT APPLICATION**

21 Application number: **81302286.0**

51 Int. Cl.³: **B 21 D 39/06**

22 Date of filing: **22.05.81**

30 Priority: **27.05.80 PC /US80/006 42**

71 Applicant: **CATERPILLAR TRACTOR CO., 100 Northeast Adams Street, Peoria Illinois 61629 (US)**

43 Date of publication of application: **02.12.81**
Bulletin 81/48

72 Inventor: **Horton, Edward R., 1607 Country Oaks Ct., Dunlap Illinois 61525 (US)**
Inventor: **Hughes, John L., 1114 W. Inverrees, Peoria Illinois 61615 (US)**

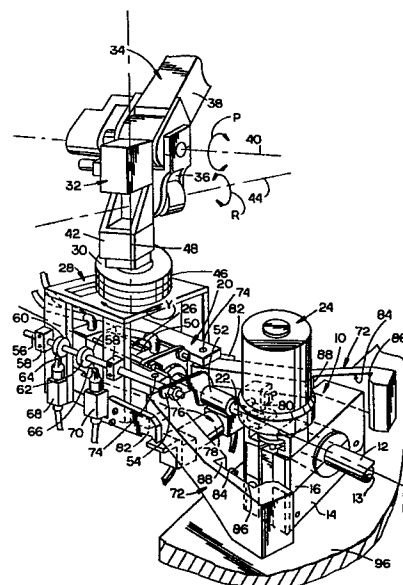
84 Designated Contracting States: **BE FR GB**

88 Date of deferred publication of search report: **09.06.82 Bulletin 82/23**

74 Representative: **Jackson, Peter Arthur et al, GILL JENNINGS & EVERY 53 to 64, Chancery Lane, London WC2A 1HN (GB)**

54 **Method and apparatus for connecting a tube to a flange.**

57 A method and apparatus for connecting a tube (12) to a flange (120) is disclosed including placing the tube between first and second portions (14, 16) of a holding apparatus (10), closing the portions and gripping the tube securely between the portions by operation of a first powered actuator (24), positioning a force-transmitting apparatus (20) including a punch (22) into axial alignment with the tube and the flange, and forcing the punch axially into the tube and expanding the tube radially outwardly into interlocking engagement with the flange by operation of a second powered actuator (26) of the force-transmitting apparatus. The portions (14, 16) are preferably pivotally closed to securely grip the tube, and the force-transmitting apparatus (20) is preferably an integrated part of a computer controlled industrial robot (32).





European Patent
Office

EUROPEAN SEARCH REPORT

0040971

EP 81 30 2286

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	US - A - 2 871 734 (FUCHS) * The whole document *	1-10	B 21 D 39/06 39/04
	--		
X	FR - A - 1 524 420 (WERNER) * Pages 8-10; figures *	1,2,9	
	--		
X	US - A - 1 716 429 (DAVIES) * The whole document *	1-5,9	
	--		TECHNICAL FIELDS SEARCHED (Int.Cl. ³)
X	US - A - 3 503 244 (JOSLIN) * The whole document *	9,10	B 21 D
	--		
A	US - A - 3 119 435 (GREENMAN)	1	
A	US - A - 3 504 515 (REARDON)	1	
A	US - A - 3 699 625 (SPENCER)	1	
A	US - A - 3 967 840 (CATERPILLAR)	1	
A	US - A - 2 622 652 (CONROY)	1	
A	US - A - 3 660 884 (IMPERIAL- EASTMAN)	1	CATEGORY OF CITED DOCUMENTS
A	GB - A - 546 306 (ROE & COMP.)	1	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
A	GB - A - 2 019 760 (GEORGE FISCHER CASTING)	1	
A	FR - A - 2 304 016 (CATERPILLAR)	1	
D	& US - A - 3 982 778 -----		&: member of the same patent family, corresponding document
The present search report has been drawn up for all claims			
Place of search The Hague	Date of completion of the search 10-03-1982	Examiner PEETERS L.	