

US007503104B2

(12) United States Patent

Rinner et al.

(10) Patent No.: US 7,503,104 B2 (45) Date of Patent: Mar. 17, 2009

(54)	METHOD OF MAKING RATCHET SCREWDRIVER				
(75)	Inventors:	James A. Rinner, Racine, WI (US); Hua Gao, Fox Point, WI (US)			
(73)	Assignee:	Teleflex Medical Incorporated, Limerick, PA (US)			
(*)	Notice:	Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.			
(21)	Appl. No.: 11/646,371				
(22)	Filed:	Dec. 28, 2006			
(65)		Prior Publication Data			
	US 2007/0	101831 A1 May 10, 2007			
Related U.S. Application Data					
(62)	Division of application No. 11/036,577, filed on Jan. 18, 2005, now Pat. No. 7,181,997.				
(51)	Int. Cl. B23P 11/0 B25B 13/0	0 (2006.01) 0 (2006.01)			
• •	U.S. Cl. 29/434 ; 81/584				
(58)	Field of Classification Search				
	81/58.4, 63.1, 60, 58; 192/43.2, 43 See application file for complete search history.				
(56)		References Cited			

U.S. PATENT DOCUMENTS

1/1901 Furbish 81/29

666,512 A

814,528 A	3/1906	Furbish
1,704,062 A	3/1929	Starkey 81/58.4
2,300,392 A	11/1942	Austin
2,664,126 A	12/1953	Mansfield et al.
2,845,158 A	7/1958	Morgan
3,115,913 A	12/1963	Yess
3,554,251 A	1/1971	McLogan 145/75
3,908,487 A	9/1975	Plaw 81/59.1
4,488,460 A	12/1984	Ballone et al 81/60
4,621,718 A	11/1986	DeCarolis 192/43
5,576,501 A	11/1996	Huang
5,609,078 A	3/1997	Yang 81/63.1
5,848,680 A *	12/1998	Rinner 192/43.1
6,047,801 A *	4/2000	Liao 192/43.2
6,047,802 A	4/2000	Huang
6,244,139 B1	6/2001	Huang
2005/0204869 A1	9/2005	Shu 81/58.4

FOREIGN PATENT DOCUMENTS

FR	705087	6/1931
WO	WO 99/28091	6/1999

^{*} cited by examiner

Primary Examiner—John C Hong (74) Attorney, Agent, or Firm—Baker & Hostetler LLP

(57) ABSTRACT

A ratchet screwdriver and method of making same wherein there is a handle and there are a ratchet gear and pawls inside the handle. An adjuster is inside the handle and is movable by a tool extending into the handle for positioning the adjuster relative to the gear and thereby eliminating play between the gear and the handle. Ball bearings are interposed between the handle and the gear and the bearings rotatably support the gear and transmit the anti-play forces that act on the gear.

4 Claims, 4 Drawing Sheets

