



US007438210B2

(12) **United States Patent**  
Gale et al.

(10) **Patent No.:** US 7,438,210 B2  
(45) **Date of Patent:** Oct. 21, 2008

(54) **ULTRASONIC WELDER HAVING MOTOR DRIVE ASSEMBLY INTEGRATED WITH TRANSDUCER HOUSING**

(75) Inventors: **Timothy S. Gale**, Rochester Hills, MI (US); **Kirk A. Brunssen**, Waterford, MI (US); **Clifford B. Madden**, Almont, MI (US); **Matthew E. Ballough**, Clarkston, MI (US)

(73) Assignee: **T.A. Systems Inc.**, Rochester Hills, MI (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 364 days.

(21) Appl. No.: 11/480,172

(22) Filed: Jun. 30, 2006

(65) **Prior Publication Data**

US 2008/0000944 A1 Jan. 3, 2008

(51) **Int. Cl.**

**B23K 1/06** (2006.01)  
**B32B 37/00** (2006.01)

(52) **U.S. Cl.** ..... 228/1.1; 156/580.1

(58) **Field of Classification Search** ... 228/110.1-111.5, 228/1.1; 156/64, 173.1, 358, 580.1  
See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,085,719 A	2/1992	Eck	
5,110,381 A *	5/1992	Heckard et al.	156/64
5,273,799 A	12/1993	Yu et al.	
5,286,319 A *	2/1994	Gawne et al.	156/73.1
5,286,586 A	2/1994	Foley et al.	
5,431,749 A *	7/1995	Messner	156/358
5,552,005 A	9/1996	Mammino et al.	
5,580,413 A	12/1996	Assink et al.	

5,597,440 A *	1/1997	Pecha	156/351
5,603,150 A	2/1997	Assink et al.	
5,800,672 A *	9/1998	Boyce et al.	156/580.1
5,868,300 A	2/1999	Babayan	
5,871,784 A	2/1999	Assink et al.	
5,948,189 A *	9/1999	Parish et al.	156/64
5,985,064 A *	11/1999	Sato	156/64
6,093,277 A	7/2000	Assink et al.	
6,168,063 B1 *	1/2001	Sato et al.	228/1.1
6,375,770 B1 *	4/2002	Meltzer et al.	156/73.4
6,450,393 B1	9/2002	Doumanidis et al.	
6,491,785 B1 *	12/2002	Sato et al.	156/379.6
6,508,641 B1	1/2003	Kubik	
6,682,620 B2 *	1/2004	Gartland et al.	156/73.4
6,743,331 B2 *	6/2004	Takahashi et al.	156/580.2
7,017,791 B2 *	3/2006	Higashiyama	228/1.1
7,351,298 B2 *	4/2008	Hatano	156/73.1
2005/0230025 A1	10/2005	Bates et al.	

\* cited by examiner

*Primary Examiner*—Jennifer McNeil  
*Assistant Examiner*—Carlos Gamino  
(74) *Attorney, Agent, or Firm*—Brooks Kushman P.C.

(57) **ABSTRACT**

An ultrasonic welder includes a housing having an ultrasonic transducer, a horn mounted to one end of the housing, a motor having a shaft, and a mounting assembly having a fastener such as a threaded screw. One screw end is coupled to the motor shaft to rotate as the motor shaft is being driven. The other screw end extends into a threaded screw receiver running within the housing. Upon rotating in one direction, the screw engages more threads of the screw receiver such that the housing with the horn move upward. Upon rotating in the other direction, the screw engages less threads of the screw receiver such that the housing with the horn moves downward. A linear transducer extends from the mounting assembly into the housing to monitor the horn position. A pair of guide shafts extend from the mounting assembly into the housing to stabilize the horn positioning.

**18 Claims, 5 Drawing Sheets**

