



US007104275B2

(12) **United States Patent**
Dille

(10) **Patent No.:** **US 7,104,275 B2**

(45) **Date of Patent:** **Sep. 12, 2006**

- (54) **PINCH VALVE**

5,379,790 A	1/1995	Bruce et al.	
5,810,324 A	9/1998	Eriksson et al.	
5,816,445 A *	10/1998	Gardos et al.	222/1
6,036,166 A	3/2000	Olson	
6,120,001 A *	9/2000	Donahue	251/4
6,279,869 B1	8/2001	Olewicz	
6,340,096 B1 *	1/2002	Zerfas	222/1
6,536,738 B1 *	3/2003	Inoue et al.	251/5
2001/0019117 A1	9/2001	Schoeb	
- (75) Inventor: **Joseph C Dille**, Telford, MO (US)
- (73) Assignee: **Emerson Electric Co.**, St. Louis, MO (US)
- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 232 days.

(21) Appl. No.: **10/605,385**

(Continued)

(22) Filed: **Sep. 26, 2003**

FOREIGN PATENT DOCUMENTS

(65) **Prior Publication Data**
US 2004/0112436 A1 Jun. 17, 2004

GB 1321199 A 6/1973

Related U.S. Application Data

OTHER PUBLICATIONS

(63) Continuation-in-part of application No. PCT/US03/09381, filed on Mar. 28, 2003.

International search report for Application No. PCT/US2004/031702, Dec. 17, 2004.

(60) Provisional application No. 60/369,493, filed on Apr. 1, 2002.

(Continued)

(51) **Int. Cl.**
G05D 7/06 (2006.01)
F16K 7/06 (2006.01)

Primary Examiner—Ramesh Krishnamurthy
(74) *Attorney, Agent, or Firm*—Locke Liddell & Sapp LLP

(52) **U.S. Cl.** **137/487.5**; 137/486; 251/7; 251/48; 251/337

(57) **ABSTRACT**

(58) **Field of Classification Search** 137/486, 137/487.5; 251/4, 5, 6, 7, 8, 48, 227, 337
See application file for complete search history.

A control valve includes an elastomeric flow tube, a plunger having first and second ends, and a pinch member connected to the first end of the plunger. The pinch member is situated adjacent the flow tube. A reference surface is positioned generally opposite the pinch member such that the elastomeric tube is squeezable between the pinch member and the reference surface to control fluid flow through the flow tube. A first guide spring is situated between the pinch member and the first end of the plunger, and a second guide spring is situated adjacent the second end of the plunger. A damper may be connected to the plunger. Further, a pressure containing member may be situated about at least a portion of the flow tube.

(56) **References Cited**
U.S. PATENT DOCUMENTS

- 2,588,212 A * 3/1952 Custer 251/5
- 2,674,435 A 4/1954 Angell
- 3,511,469 A * 5/1970 Bell 251/7
- 4,259,985 A 4/1981 Bergmann
- 4,548,382 A 10/1985 Otting
- 4,895,341 A * 1/1990 Brown et al. 251/8
- 5,078,361 A * 1/1992 Nordman 251/7
- 5,190,071 A * 3/1993 Sule 137/595

25 Claims, 8 Drawing Sheets

