



US007066173B2

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

(10) **Patent No.:** **US 7,066,173 B2**
(45) **Date of Patent:** **Jun. 27, 2006**

(54) **MEDICAL VENTILATOR AND METHOD OF CONTROLLING SAME**

(75) Inventors: **Michael J. Banner**, Alachua, FL (US);
Paul B. Blanch, Alachua, FL (US);
Neil R. Euliano, Gainesville, FL (US);
Jose C. Principe, Gainesville, FL (US)

(73) Assignee: **University of Florida Research Foundation, Inc.**, Gainesville, FL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 323 days.

(21) Appl. No.: **10/407,160**

(22) Filed: **Apr. 4, 2003**

(65) **Prior Publication Data**

US 2004/0003813 A1 Jan. 8, 2004

Related U.S. Application Data

(63) Continuation of application No. 09/607,713, filed on Jun. 30, 2000, now abandoned.

(60) Provisional application No. 60/141,676, filed on Jun. 30, 1999.

(51) **Int. Cl.**
A61M 16/00 (2006.01)

(52) **U.S. Cl.** **128/204.23**; 128/204.21;
128/204.18; 128/924; 128/925

(58) **Field of Classification Search** 128/204.18,
128/204.21, 204.22, 204.23, 202.22, 205.23,
128/920, 923, 924, 925

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,595,226 A 7/1971 Newcombe
4,537,190 A 8/1985 Caillot et al.
4,565,194 A 1/1986 Weerda et al.

4,986,268 A 1/1991 Tehrani
4,990,894 A 2/1991 Loescher et al.
5,107,831 A 4/1992 Halpern et al.
5,161,525 A 11/1992 Kimm et al.
5,307,795 A 5/1994 Whitwam et al.
5,316,009 A 5/1994 Yamada
5,320,093 A * 6/1994 Raemer 128/203.12
5,331,995 A 7/1994 Westfall et al.
5,335,650 A 8/1994 Shaffer et al.
5,339,818 A 8/1994 Baker et al.
5,365,922 A 11/1994 Raemer
5,402,796 A 4/1995 Packer et al.
5,429,123 A 7/1995 Shaffer et al.
5,546,935 A 8/1996 Champeau
5,549,106 A 8/1996 Gruenke et al.
5,582,163 A 12/1996 Bonassa
5,584,291 A 12/1996 Vapola et al.
5,598,838 A 2/1997 Servidio et al.
5,678,539 A * 10/1997 Schubert et al. 128/204.21
5,692,497 A 12/1997 Schnitzer et al.
5,794,615 A 8/1998 Estes
5,884,622 A 3/1999 Younes

(Continued)

FOREIGN PATENT DOCUMENTS

DE 44 10 508 A1 9/1994

(Continued)

Primary Examiner—Mital Patel
(74) *Attorney, Agent, or Firm*—Saliwanchik, Lloyd & Saliwanchik

(57) **ABSTRACT**

Embodiments of the present invention described and shown in the specification and drawings include a system and method for monitoring the ventilation support provided by a ventilator and automatically supplying a breathing gas to a patient via a breathing circuit that is in fluid communication with the lungs of the patient.

10 Claims, 9 Drawing Sheets

