



US006398727B1

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

(10) **Patent No.:** **US 6,398,727 B1**
(45) **Date of Patent:** **Jun. 4, 2002**

(54) **METHOD AND APPARATUS FOR PROVIDING PATIENT CARE**

(75) Inventors: **Tuan Bui**, Green Oaks, IL (US); **Thomas Cooper**, Friendswood, TX (US); **Clint Deckert**, Poway, CA (US); **Doron Levitas**, Chicago, IL (US); **Emil S. Macha**, Sugar Land, TX (US); **Shan Padda**, Chicago, IL (US); **Arthur Schulze**, Wharton, TX (US)

(73) Assignee: **Baxter International Inc.**, Dearfield, IL (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.: **09/219,664**

(22) Filed: **Dec. 23, 1998**

(51) **Int. Cl.**⁷ **A61B 5/00**

(52) **U.S. Cl.** **600/300; 128/904**

(58) **Field of Search** 600/300, 301; 128/903, 904

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,739,943 A	6/1973	Wilhelmson et al.	222/59
3,858,574 A	1/1975	Page	128/205 T
3,910,257 A	10/1975	Fletcher et al.	128/2.1 A
4,173,971 A	11/1979	Karz	128/702
4,413,314 A	11/1983	Slater et al.	364/188
4,449,538 A	5/1984	Corbitt et al.	128/760
4,531,527 A	7/1985	Reinhold, Jr. et al.	128/696
4,561,443 A	12/1985	Hogrefe et al.	128/419 PG
4,586,260 A	5/1986	Baxter et al.	33/125 C
4,624,661 A	11/1986	Arimond	604/151
4,676,776 A	6/1987	Howson	604/31
4,696,671 A	9/1987	Epstein et al.	604/67
4,731,051 A	3/1988	Fischell	606/67
4,756,706 A	7/1988	Kerns et al.	604/66

(List continued on next page.)

OTHER PUBLICATIONS

A.H. McMorris, J.L. Kelleway, B. Tapadia and E. L. Dohmann, "Are Process Control Rooms Obsolete?", taken from Control Engineering, pp. 42-47, Jul., 1971.

Abbott Laboratories, The Blue Line System, LIFECARE, copyright, 1990.

L. C. Sheppard, "Computer Based Clinical Systems: Automation and Integration", taken from 39th ACEMB, Sep. 13-16, 1986; pp. 73-75.

"BLOCK Medical: Growing With Home Infusion Therapy," taken from INVIVO, The Business and Medicine Report, Apr. 1991; pp. 7-9.

(List continued on next page.)

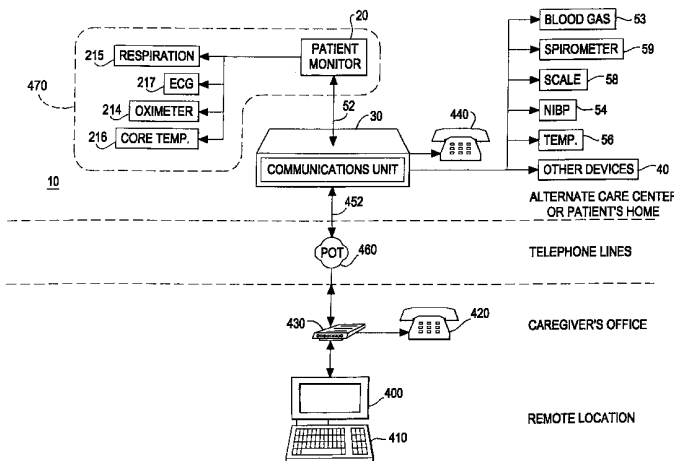
Primary Examiner—Robert L. Nasser

(74) *Attorney, Agent, or Firm*—Wallenstein & Wagner, LTD

(57) **ABSTRACT**

A patient management system includes a programmable patient monitor for monitoring and recording a plurality of physiological conditions of a patient, a plurality of physiological condition sensors and a communications unit. The plurality of patient monitoring sensors are electrically coupled to the programmable patient monitor. Each sensor detects a particular physiological condition of the patient, such as core temperature, ECG electrodes for providing an electrocardiogram and blood oximetry sensors. The patient monitor is small and compact and easily worn by the patient during his normal at home activities. To provide communication with a caregiver via a remote controller at the caregiver's location, a communications unit is disposed in the facility. The communications unit may be selectively coupled to the programmable patient monitor for receiving, storing and transmitting to the remote controller patient physiological condition data and for transmitting instructions from the remote controller to the programmable patient monitor. When the patient connects the patient monitor to the communications unit, the patient can communicate with the caregiver at the remote location.

87 Claims, 68 Drawing Sheets



U.S. PATENT DOCUMENTS

4,797,840 A	1/1989	Fraden	364/557
4,803,625 A	2/1989	Fu et al.	364/413.03
4,810,243 A	3/1989	Howson	604/31
4,828,545 A	5/1989	Epstein et al.	604/66
4,850,972 A	7/1989	Schulman et al.	604/151
4,865,584 A	9/1989	Epstein et al.	604/67
4,901,221 A	2/1990	Kodosky et al.	364/200
4,925,444 A	5/1990	Orkin et al.	604/80
4,933,843 A	6/1990	Scheller et al.	364/413.01
4,942,514 A	7/1990	Miyagaki et al.	364/190
4,952,928 A	8/1990	Carroll et al.	340/825.54
4,995,268 A	2/1991	Ash et al.	73/861.05
5,038,800 A	8/1991	Oba	128/904
5,078,683 A	1/1992	Sancoff et al.	604/67
5,100,380 A	3/1992	Epstein et al.	604/67
5,109,849 A	5/1992	Goodman et al.	128/633
5,115,133 A	5/1992	Knudson	250/341
5,116,312 A	5/1992	Blankenship et al.	604/66
5,137,023 A	8/1992	Mendelson et al.	128/633
5,152,296 A	10/1992	Simons	128/670
5,153,827 A	10/1992	Coutré et al.	364/413.02
5,155,693 A	10/1992	Altmayer et al.	364/550
5,165,874 A	11/1992	Sancoff et al.	417/474
5,167,235 A	12/1992	Seacord et al.	128/664
5,191,891 A	3/1993	Righter	128/710
5,207,642 A	5/1993	Orkin et al.	604/65
5,213,099 A	5/1993	Tripp, Jr.	128/633
5,226,425 A	7/1993	Righter	128/710
5,230,623 A	7/1993	Guthrie et al.	433/72
5,256,157 A	10/1993	Samiotes et al.	604/246
5,291,190 A	3/1994	Scarola et al.	340/825.06
5,295,062 A	3/1994	Fukushima	364/188
5,297,554 A	3/1994	Glynn et al.	128/665
5,317,506 A	5/1994	Coutré et al.	364/413.02
5,338,157 A	8/1994	Blomquist	417/2
5,361,758 A	11/1994	Hall et al.	128/633
5,368,562 A	11/1994	Blomquist et al.	604/65
5,376,070 A	12/1994	Purvis et al.	604/31
5,378,231 A	1/1995	Johnson et al.	604/67
5,395,321 A	3/1995	Kawahara et al.	604/67
5,395,329 A	3/1995	Fleitschhacker et al.	604/95
5,400,246 A	3/1995	Wilson et al.	364/146
5,412,400 A	5/1995	Takahara et al.	345/119
5,429,602 A	7/1995	Hauser	604/65
5,469,855 A	11/1995	Pompei et al.	128/664
5,482,446 A	1/1996	Williamson et al.	417/474
5,485,408 A	1/1996	Blomquist	364/578
5,509,422 A	4/1996	Fukami	128/670
5,522,396 A	6/1996	Langer et al.	128/696
5,544,651 A	8/1996	Wilk	128/633
5,558,638 A	9/1996	Evers et al.	604/66
5,573,506 A	11/1996	Vasko	604/65
5,582,593 A	12/1996	Hultman	604/65

5,643,212 A 7/1997 Coutré et al. 604/131

OTHER PUBLICATIONS

“IEEE-488 and VXibus Control, Data Acquisition, and Analysis . . . the Most Choices,” select pages taken from National Instruments, Application Software Products and Application Software Overview, (1991) 17 pages.

“LabVIEW®2 User Manual; Chapter 2, The Front Panel,” taken from National Instruments Corporation, Jan., 1990; pp. 1–36.

J. C. Crone, Jaromir Belic and Roger W. Jelliffe, M.D., “A Programmable Infusion Pump Controller,” taken from 30th Annual Conference On Engineering In Medicine And Biology, Nov. 5–9, 1977; pp. A–35827 through A–35837.

Selective portions of Chapter 9 of Mayhew, “Principles and Guidelines In Software User Interface Design,” Prentice Hall PTR, Englewood Cliffs, New Jersey, 1992.

Electronic’s Article of February, 1990, by Jack Shandle, entitled “Who Will Dominate the Desktop in the ’90s,” pp. 48–50.

Chapter 5 entitled “Direct Manipulation” from Shneiderman “Designing the User Interface: Strategies for Effective Human–Computer Interaction,” Addison–Wesley Publishing Company, Second Edition, ©1992, reprinted with corrections 1993.

Literature of Baxter’s Multiplex™ Series 100 Fluid Management System, 2 pp., no date listed.

Literature of Baxter “Introducing MultiPlex™ Series 100 Fluid Management System,” copyright 1988.

Literature describing Baxter’s FLO–GARD® 6201 Volumetric Infusion Pump, copyright 1992.

Literature of I–Flow Corporation advertising its Virus 4000 Infusion System.

One–page article by Jerry Hirsch entitled “Portable IV Frees Patients,” printed in The Orange County Register, D section, Nov. 21, 1991.

Bedder, et al., “Cost Analysis of Two Implantable Narcotic Delivery Systems,” Journal of Pain and Symptom Management, vol. 6, No. 6, Aug., 1991, pp. 368–373.

Peter Lord, Hossein Allami, Mark Davis, Raul Dias, Patrice Heck, and Robert Fischell, pp. 66–71 from book chapter entitled “MiniMed Technologies Programmable Implantable Infusion System,” describing clinical trials from Nov., 1986.

“IMED®STATUS™ Infusion Management System,” 6 page brochure, IMED Corporation, San Diego, CA, no date listed.

James D. Foley and Andries Van Dam “Fundamentals of Interactive Computer Graphics,” selected pages from Chapters 1 and 2, Addison–Wesley Publishing Company, ©1982, reprinted with corrections 1983.

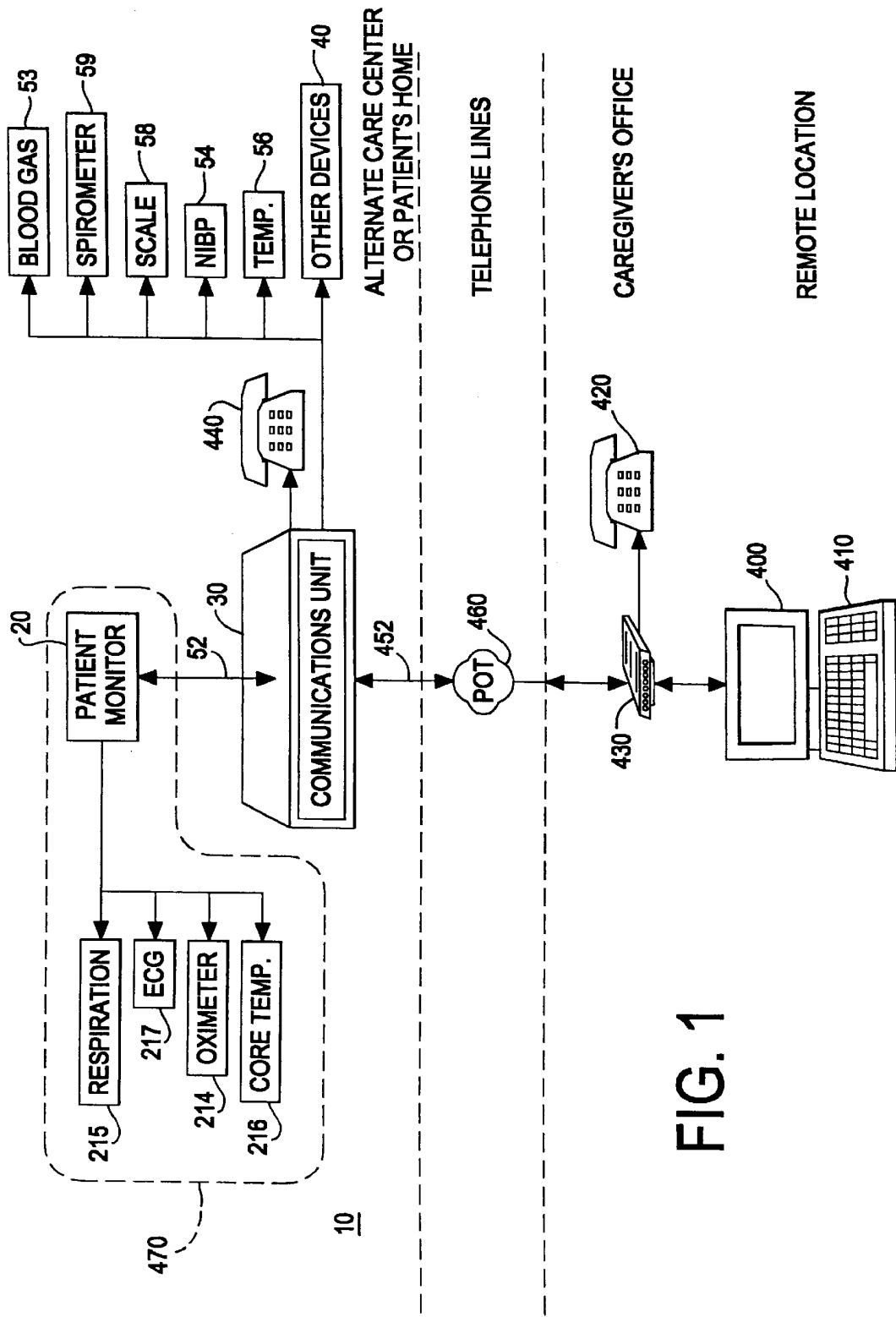


FIG. 1

FIG. 2

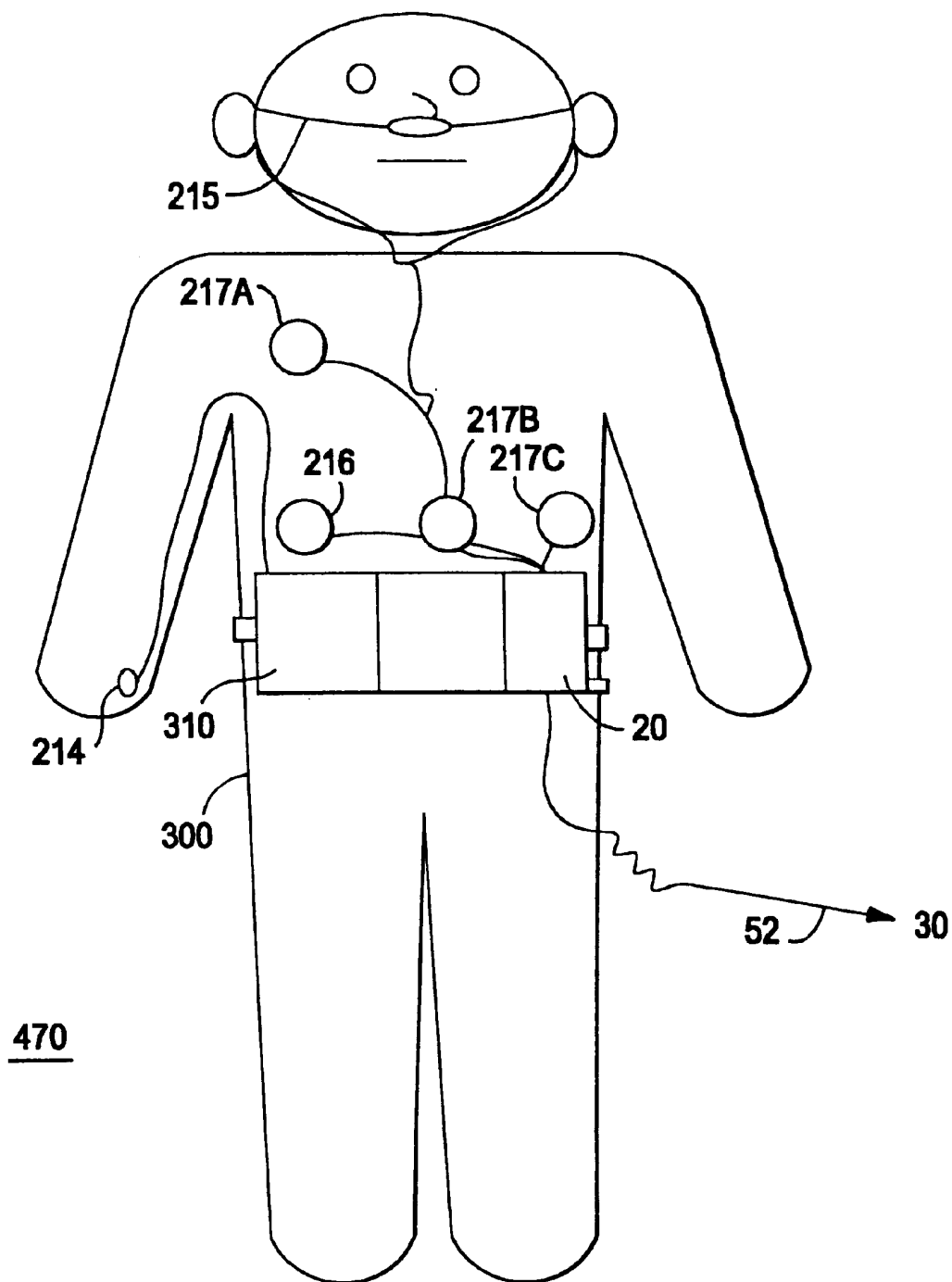
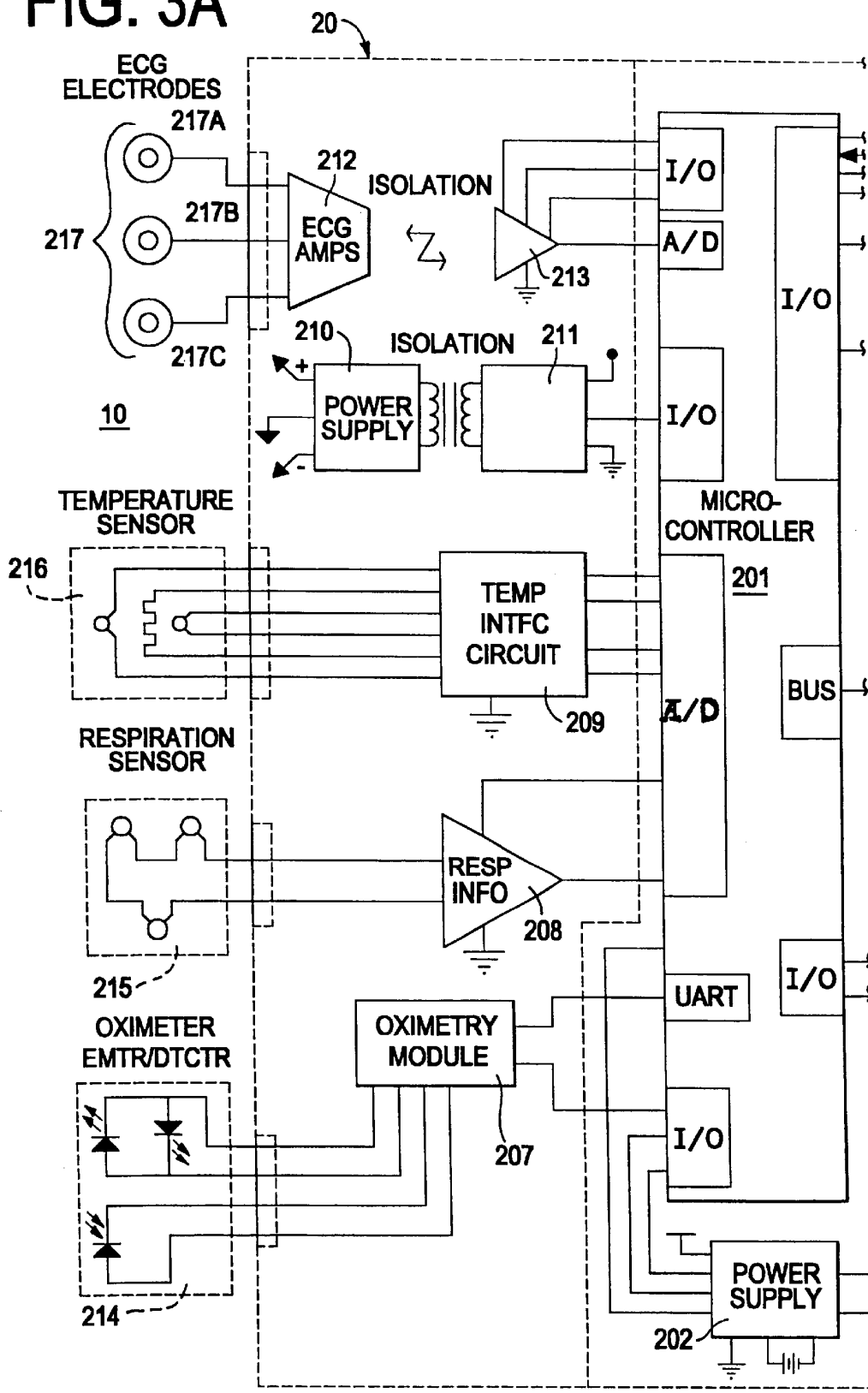


FIG. 3A



Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.