



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

(10) **Patent No.:** **US 6,847,892 B2**
(45) **Date of Patent:** **Jan. 25, 2005**

(54) **SYSTEM FOR LOCALIZING AND SENSING OBJECTS AND PROVIDING ALERTS**

(75) Inventors: **Peter Y. Zhou**, Riverside, CA (US); **Dexing Pang**, Riverside, CA (US); **Yiu-Cho Alan Tong**, Anaheim, CA (US); **Ning Lin**, Anaheim, CA (US); **David Ralph Addington**, Lake Elsinore, CA (US); **Rowena Lampa Albanna**, Riverside, CA (US); **Amro Albanna**, Riverside, CA (US); **Keith I. Bolton**, Parkland, FL (US)

(73) Assignee: **Digital Angel Corporation**, South St. Paul, MN (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.: **10/169,477**

(22) PCT Filed: **Oct. 29, 2001**

(86) PCT No.: **PCT/US01/48539**

§ 371 (c)(1),
(2), (4) Date: **Dec. 17, 2002**

(87) PCT Pub. No.: **WO02/44865**

PCT Pub. Date: **Jun. 6, 2002**

(65) **Prior Publication Data**

US 2003/0149526 A1 Aug. 7, 2003

(51) **Int. Cl.**⁷ **G08B 23/00**

(52) **U.S. Cl.** **701/213; 701/36; 340/426.1; 340/426.119; 342/357.07; 455/404.1**

(58) **Field of Search** **701/36, 213; 340/426.1, 340/426.12, 426.19, 989, 426, 425.5, 825.3; 342/357.07, 357, 450; 455/404.1, 521, 562.1, 277.1, 273**

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,163,447 A	8/1979	Orr	600/479
4,468,656 A	8/1984	Clifford et al.	340/539.11
4,531,526 A	7/1985	Genest	600/300
4,619,653 A	10/1986	Fischell	604/891.11
4,665,385 A	5/1987	Henderson	340/539.26
4,706,689 A	11/1987	Man	600/302
5,043,736 A	8/1991	Darnell et al.	342/357.1
5,119,102 A	6/1992	Barnard	342/357.09
5,153,584 A	10/1992	Engira	340/870.18
5,204,670 A	4/1993	Stinton	340/10.5
5,223,844 A	6/1993	Mansell et al.	

(List continued on next page.)

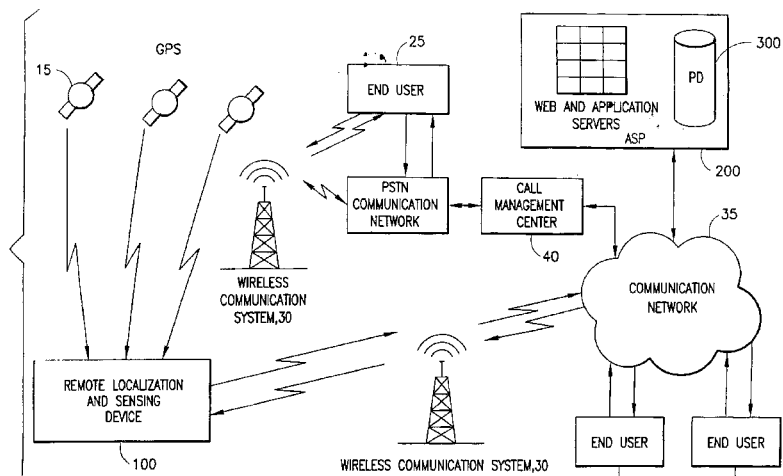
Primary Examiner—Thomas G. Black
Assistant Examiner—Tuan C To

(74) *Attorney, Agent, or Firm*—Stroock & Stroock & Lavan LLP

(57) **ABSTRACT**

The present invention generally relates to systems, methods and applications utilizing the convergence of any combination of the following three technologies: wireless positioning or localization technology, wireless communications technology and sensor technology. In particular, certain embodiments of the present invention relate to a remote device that includes a sensor for determining or measuring a desired parameter, a receiver for receiving position data from the Global Positioning System (GPS) satellite system, a processor for determining whether or not alert conditions are present and a wireless transceiver for transmitting the measured parameter data and the position data to a central station, such as an application service provider (ASP). The ASP, in turn, may communicate the measured data, position data and notification of any alerts to an end user via an alert device. The present invention also relates to various applications and systems utilizing the capabilities of such a device.

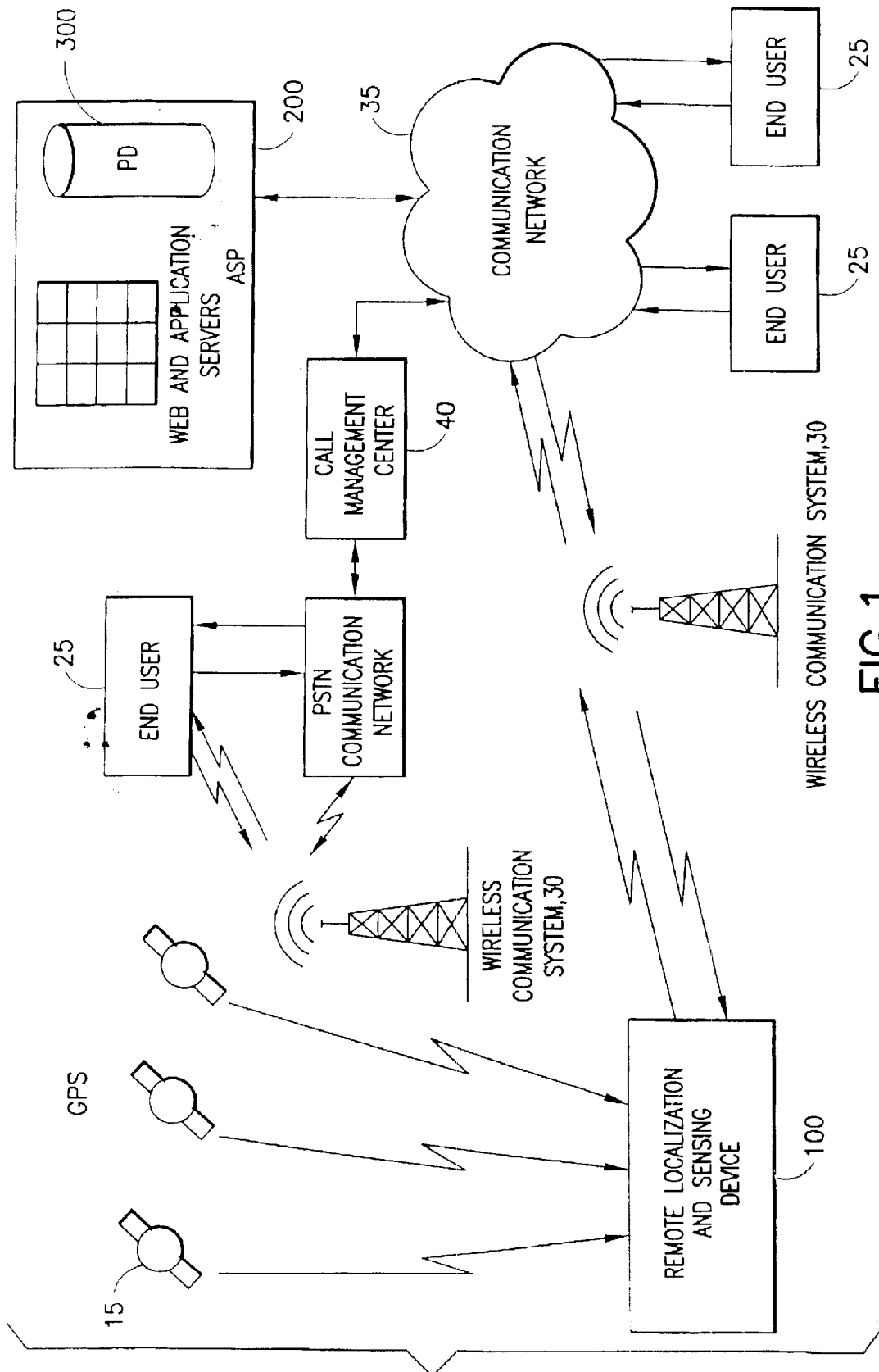
1 Claim, 57 Drawing Sheets



U.S. PATENT DOCUMENTS

5,235,633 A	8/1993	Dennison et al.	455/456.3	5,982,281 A	11/1999	Layson, Jr.	340/539.13
5,299,132 A	3/1994	Wortham	455/457	6,026,304 A	2/2000	Hilsenrath et al.	455/456.2
5,379,224 A	1/1995	Brown et al.	701/215	6,028,514 A	2/2000	Lemelson, deceased et al.	340/539.13
5,389,934 A	2/1995	Kass	342/357.07	6,031,454 A	2/2000	Lovejoy et al.	340/539.24
5,416,468 A	5/1995	Baumann	340/573.1	6,034,622 A	3/2000	Levine	340/573.4
5,418,537 A	5/1995	Bird	342/352.04	6,046,687 A	4/2000	Janky	455/404.1
5,461,365 A	10/1995	Schlager et al.	340/573.4	6,057,779 A	5/2000	Bates	340/5.21
5,462,051 A	10/1995	Oka et al.	600/300	6,067,007 A *	5/2000	Gioia	340/426
5,481,245 A	1/1996	Moldavsky	340/540	6,069,570 A	5/2000	Herring	340/572.1
5,491,636 A *	2/1996	Robertson et al.	342/357	6,072,396 A	6/2000	Gaukel	340/573.1
5,519,403 A	5/1996	Bickley et al.	342/352	6,078,804 A	6/2000	Alperovich et al. ...	340/539.11
5,519,760 A	5/1996	Borkowski et al.	455/404.2	6,084,512 A	7/2000	Elberty et al.	701/213
5,552,772 A	9/1996	Janky et al.	340/573.4	6,121,881 A	9/2000	Bieback et al.	342/457.07
5,557,254 A	9/1996	Johnson et al.		6,127,925 A	10/2000	Bonsignore et al. ...	342/357.08
5,565,858 A	10/1996	Guthrie	380/10.33	6,131,067 A	10/2000	Gierd et al.	701/208
5,587,715 A	12/1996	Lewis		6,140,956 A	10/2000	Hillman et al.	342/357.07
5,594,425 A	1/1997	Ladner et al.	340/825.49	6,140,957 A	10/2000	Wilson et al.	342/357.08
5,624,376 A	4/1997	Ball et al.	600/25	6,148,261 A	11/2000	Obradovich et al.	701/208
5,626,630 A	5/1997	Markowitz et al.	607/60	6,154,676 A	11/2000	Levine	607/58
5,629,678 A	5/1997	Gargano et al.	340/573.4	6,157,841 A	12/2000	Bolduc et al.	455/456.5
5,630,206 A	5/1997	Urban et al.	455/456.1	6,160,478 A	12/2000	Jacobsen et al.	340/539.12
5,650,770 A	7/1997	Schlager et al.	340/573.1	6,160,481 A	12/2000	Taylor, Jr.	340/573.4
5,652,570 A	7/1997	Lepkofker	340/573.4	6,166,627 A *	12/2000	Reeley	340/426
5,686,888 A	11/1997	Welles, II et al.	340/539.13	6,166,642 A	12/2000	Farshid	340/573.1
5,712,619 A	1/1998	Simkin	340/539.13	6,167,276 A	12/2000	Pite	455/456.3
5,714,931 A	2/1998	Petite et al.	340/539.17	6,169,484 B1	1/2001	Schuchman et al.	340/573.1
5,724,025 A	3/1998	Tavori	340/573.1	6,172,640 B1	1/2001	Durst et al.	342/357.07
5,729,199 A	3/1998	Cooper et al.	340/541	6,175,308 B1	1/2001	Tallman et al.	340/539.11
5,742,233 A	4/1998	Hoffman et al.	340/573.1	6,198,394 B1	3/2001	Jacobsen et al.	340/573.01
5,742,509 A	4/1998	Goldberg et al.	701/211	6,198,930 B1	3/2001	Schipper	340/573.1
5,748,147 A	5/1998	Bickley et al.	342/457	6,199,550 B1	3/2001	Wiesmann et al.	455/440
5,751,246 A	5/1998	Hertel	342/357.07	6,208,290 B1	3/2001	Krasner	342/357.05
5,767,788 A	6/1998	Ness	340/828.49	6,211,781 B1	4/2001	McDonald	340/505
5,771,001 A	6/1998	Cobb	340/573.1	6,219,556 B1	4/2001	Lee	455/456.4
5,772,586 A	6/1998	Heinonen et al.	600/300	6,225,901 B1	5/2001	Kail, IV	340/534.11
5,791,294 A	8/1998	Manning	119/721	6,236,358 B1	5/2001	Durst et al.	342/352.09
5,835,012 A	11/1998	Wilk	340/539.26	6,253,129 B1	6/2001	Jenkins et al.	
5,838,237 A	11/1998	Revell et al.	340/573.1	6,263,280 B1	7/2001	Stingone, Jr.	
5,874,897 A	2/1999	Klempau et al.	340/573.1	6,300,903 B1	10/2001	Richards et al.	342/450
5,892,454 A	4/1999	Schipper et al.	340/825.37	6,313,791 B1	11/2001	Klanke	342/357.17
5,905,450 A	5/1999	Kim et al.	340/967	6,421,001 B1	7/2002	Durst et al.	342/357.07
5,917,405 A *	6/1999	Joao	340/426	6,433,677 B1 *	8/2002	Flick	340/426
5,917,425 A	6/1999	Crimmins et al.	340/825.49	6,587,040 B2 *	7/2003	Seto	340/426.1
5,939,982 A	8/1999	Gagnon et al.	340/539.17	6,697,810 B2 *	2/2004	Kumar et al.	707/10
5,963,130 A	10/1999	Schlager et al.	340/540	6,703,930 B2 *	3/2004	Skinner	340/539.11
5,971,931 A	10/1999	Raff	600/485	2001/0026240 A1 *	10/2001	Neher	342/357.07
5,977,913 A	11/1999	Christ	342/465				

* cited by examiner



WIRELESS COMMUNICATION SYSTEM, 30

FIG. 1

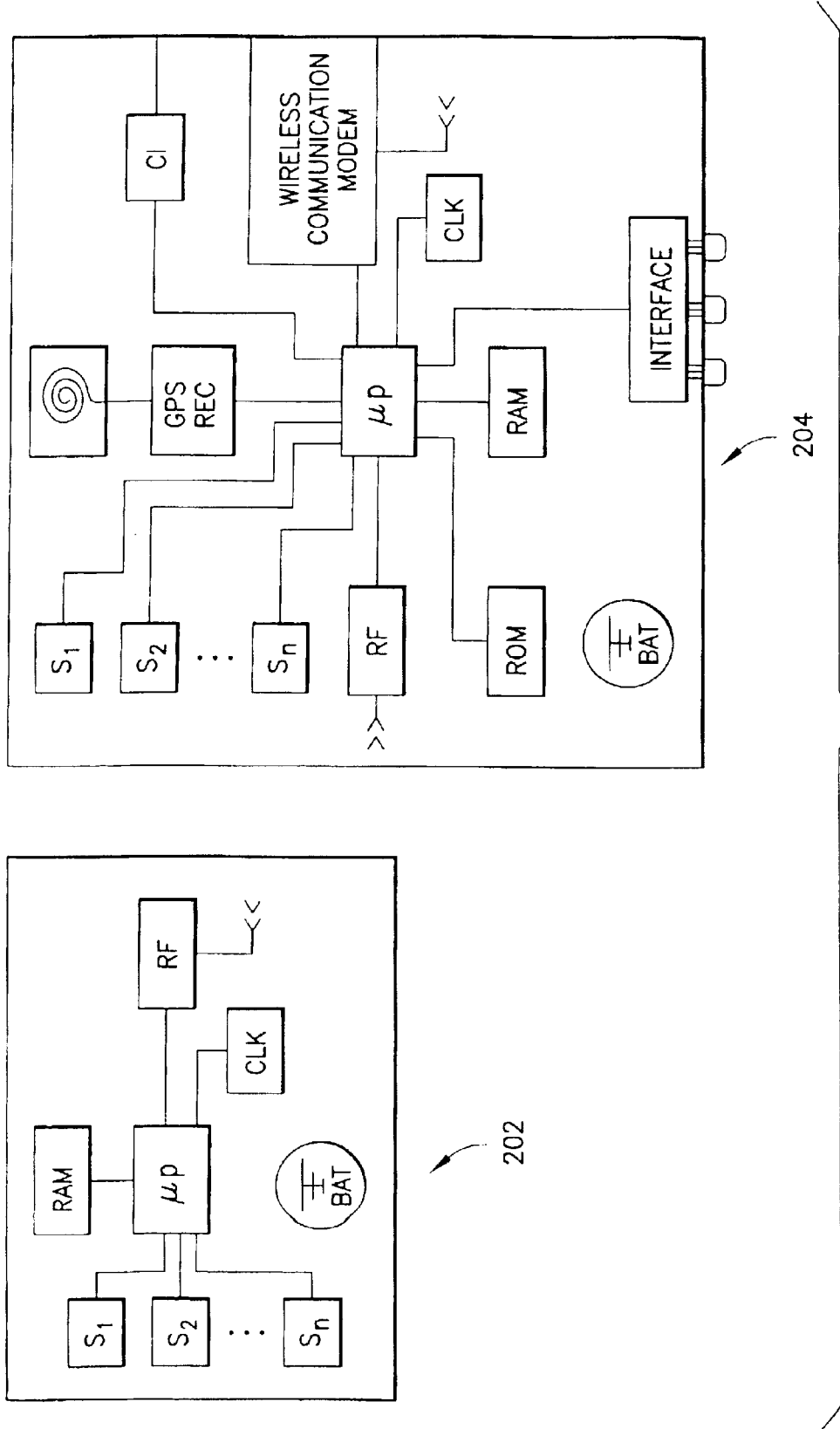


FIG.2a

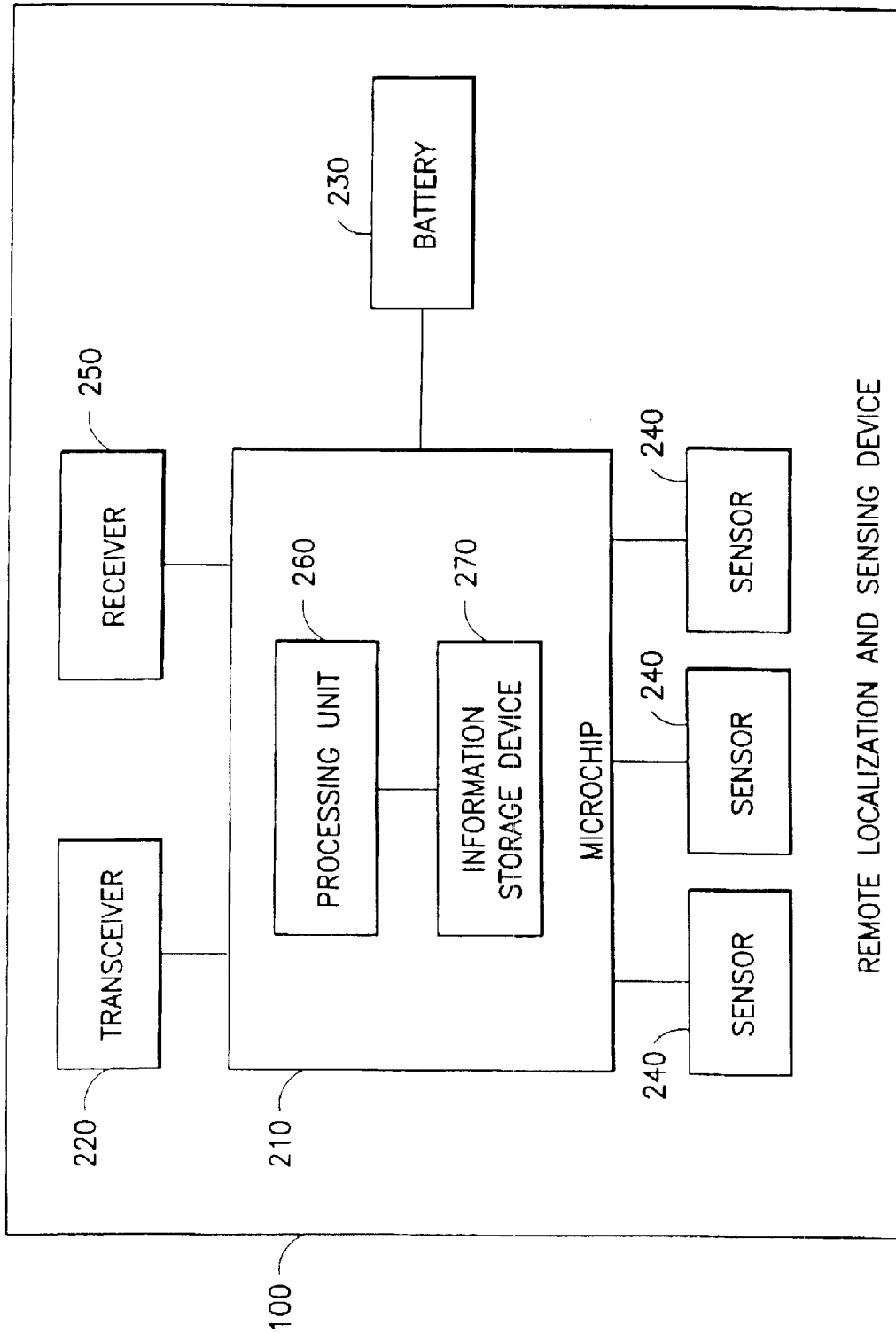


FIG.2b

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.