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(54) **CONFIGURABLE SYSTEM FOR ALERTING CAREGIVERS**

(58) **Field of Classification Search** 340/573.1,
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See application file for complete search history.

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(56) **References Cited**

U.S. PATENT DOCUMENTS

2,330,356	A	9/1943	Belliveau
2,335,524	A	11/1943	Lomax
2,736,888	A	2/1956	McLain
2,896,021	A	7/1959	Philipps
3,098,220	A	7/1963	De Graaf
3,439,320	A	4/1969	Ward
3,478,344	A	11/1969	Schwitzgebel et al.
3,553,383	A	1/1971	Rochtus

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(Continued)

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FOREIGN PATENT DOCUMENTS

WO WO 02/091297 A1 11/2002

(Continued)

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(57) **ABSTRACT**

Related U.S. Application Data

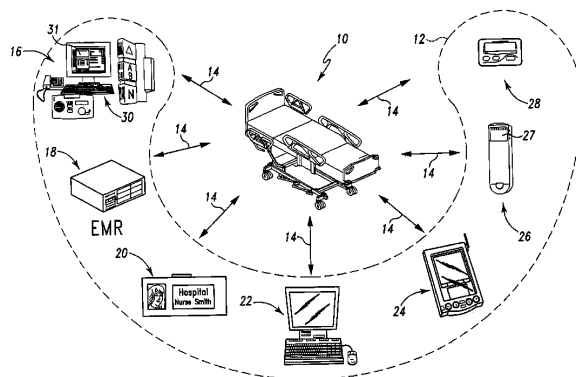
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A system that monitors various conditions of a plurality of hospital beds located in different rooms of a healthcare facility is provided. Alternatively or additionally, other types of equipment may be monitored by the system. Various configurations of network interface units that are coupleable to or integrated into a hospital bed are also disclosed. The system receives data from the hospital beds and/or other equipment and initiates a communication to a wireless communication device of at least one designated caregiver in response to the received data being indicative of an alarm condition.

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46 Claims, 23 Drawing Sheets



US 7,319,386 B2

Page 2

U.S. PATENT DOCUMENTS					
3,599,199 A	8/1971	Bunting	5,434,775 A	7/1995	Sims et al.
3,599,200 A	8/1971	Bunting	5,446,678 A	8/1995	Saltzstein et al.
3,696,384 A	10/1972	Lester	5,455,560 A	10/1995	Owen
3,739,329 A	6/1973	Lester	5,458,123 A	10/1995	Unger
3,767,859 A	10/1973	Doering et al.	5,461,390 A	10/1995	Hoshen
3,805,265 A	4/1974	Lester	5,475,367 A	12/1995	Prevost
3,913,153 A	10/1975	Adams et al.	5,534,851 A	7/1996	Russek
3,973,200 A	8/1976	Akerberg	5,537,459 A *	7/1996	Price et al. 455/435.1
4,067,005 A	1/1978	Levy et al.	5,548,637 A	8/1996	Heller et al.
4,150,284 A	4/1979	Trenkler et al.	5,549,113 A	8/1996	Halleck et al.
4,151,407 A	4/1979	McBride et al.	5,561,412 A	10/1996	Novak et al.
4,183,015 A	1/1980	Drew et al.	5,568,119 A	10/1996	Schipper et al.
4,216,462 A	8/1980	McGrath et al.	5,576,452 A *	11/1996	Dever et al. 556/130
4,225,953 A	9/1980	Simon et al.	5,576,952 A	11/1996	Stutman et al.
4,228,426 A	10/1980	Roberts	5,579,001 A	11/1996	Dempsey et al.
4,237,344 A *	12/1980	Moore 379/38	5,588,005 A	12/1996	Ali et al.
4,264,982 A	4/1981	Sakarya	5,594,786 A	1/1997	Chaco et al.
4,275,385 A	6/1981	White	5,621,388 A	4/1997	Sherburne et al.
4,279,433 A	7/1981	Petaja	5,635,907 A	6/1997	Bernard et al.
4,298,863 A	11/1981	Natitus et al.	5,636,245 A	6/1997	Ernst et al.
4,331,953 A	5/1982	Blevins et al.	5,640,953 A	6/1997	Bishop et al.
4,356,475 A	10/1982	Neumann et al.	5,650,769 A	7/1997	Campana, Jr.
4,418,334 A	11/1983	Burnett	5,650,770 A	7/1997	Schlager et al.
4,455,548 A	6/1984	Burnett	5,664,270 A	9/1997	Bell et al.
4,489,387 A	12/1984	Lamb et al.	5,682,139 A	10/1997	Pradeep et al.
4,495,495 A	1/1985	Ormanns et al.	5,686,888 A	11/1997	Welles, II
4,495,496 A	1/1985	Miller, III	5,686,902 A	11/1997	Reis et al.
4,539,560 A	9/1985	Fleck et al.	5,687,734 A	11/1997	Dempsey et al.
4,577,185 A	3/1986	Andersen	5,689,229 A *	11/1997	Chaco et al. 340/286.07
4,578,671 A	3/1986	Flowers	5,691,980 A	11/1997	Welles, II et al.
4,593,273 A	6/1986	Narcisse	5,699,038 A	12/1997	Ulrich et al.
4,598,275 A	7/1986	Ross et al.	5,705,980 A	1/1998	Shapiro
4,601,064 A	7/1986	Shiple	5,708,421 A	1/1998	Boyd
4,649,385 A	3/1987	Aires et al.	5,713,856 A	2/1998	Eggers et al.
4,680,790 A	7/1987	Packard et al.	5,719,761 A	2/1998	Gatti et al.
4,709,330 A	11/1987	Yokoi et al.	5,731,757 A	3/1998	Layson, Jr.
4,740,788 A	4/1988	Konneker	5,742,237 A	4/1998	Bledsoe
4,752,951 A	6/1988	Konneker	5,751,246 A	5/1998	Hertel
4,792,798 A	12/1988	Wilowski	5,752,917 A	5/1998	Fuchs
4,795,905 A	1/1989	Zierhut	5,760,704 A	6/1998	Barton et al.
4,814,751 A	3/1989	Hawkins et al.	5,767,791 A	6/1998	Stoop et al.
4,833,452 A	5/1989	Currier	5,781,442 A	7/1998	Engleson et al.
4,833,467 A	5/1989	Kobayashi et al.	5,793,290 A	8/1998	Eagleson et al.
4,837,568 A	6/1989	Snaper	5,808,564 A	9/1998	Simms et al.
4,853,692 A	8/1989	Wolk et al.	5,812,056 A	9/1998	Law
4,899,135 A	2/1990	Chahariiran	5,822,418 A	10/1998	Yacenda et al.
4,947,152 A	8/1990	Hodges	5,822,544 A	10/1998	Chaco et al.
4,955,000 A	9/1990	Nastrom	5,838,223 A	11/1998	Gallant et al.
4,967,195 A	10/1990	Shiple	5,844,488 A	12/1998	Musicik
4,990,892 A	2/1991	Guest et al.	5,867,821 A	2/1999	Ballantyne et al.
4,998,095 A	3/1991	Shields	5,877,675 A	3/1999	Rebstock et al.
4,998,939 A	3/1991	Pothast et al.	5,933,488 A	8/1999	Marcus et al.
5,006,830 A	4/1991	Merritt	5,936,539 A	8/1999	Fuchs
5,027,314 A	6/1991	Linwood et al.	5,942,986 A	8/1999	Shabot et al.
5,041,086 A	8/1991	Koenig et al.	5,944,659 A	8/1999	Flach et al.
5,062,151 A	10/1991	Shiple	5,963,137 A	10/1999	Waters, Sr.
5,065,154 A	11/1991	Kaiser	5,974,389 A	10/1999	Clark et al.
5,086,290 A	2/1992	Murray et al.	5,991,728 A	11/1999	DeBusk et al.
5,103,108 A	4/1992	Crimmins	5,995,937 A	11/1999	DeBusk et al.
5,124,991 A	6/1992	Allen	6,014,633 A	1/2000	DeBusk et al.
5,137,033 A	8/1992	Norton	6,057,758 A	5/2000	Dempsey et al.
5,153,584 A	10/1992	Engira	6,057,782 A	5/2000	Koenig
5,266,944 A	11/1993	Carroll et al.	6,067,019 A	5/2000	Scott
5,291,399 A	3/1994	Chaco	6,076,166 A	6/2000	Moshfeghi et al.
5,319,355 A	6/1994	Russek	6,085,493 A	7/2000	DeBusk et al.
5,319,363 A *	6/1994	Welch et al. 340/825.36	6,088,362 A	7/2000	Turnbull et al.
5,357,254 A	10/1994	Kah, Jr.	6,093,146 A	7/2000	Filangeri
5,375,604 A	12/1994	Kelly et al.	6,097,308 A	8/2000	Albert et al.
5,396,224 A	3/1995	Dukes et al.	6,125,350 A *	9/2000	Dirbas 705/2
5,396,227 A	3/1995	Carroll et al.	6,133,837 A	10/2000	Riley
5,416,695 A	5/1995	Stutman et al.	6,147,592 A	11/2000	Ulrich et al.
			6,183,417 B1	2/2001	Geheb et al.
			6,208,250 B1	3/2001	Dixon et al.

US 7,319,386 B2

Page 3

6,241,668 B1	6/2001	Herzog	6,726,634 B2	4/2004	Freeman
6,259,355 B1	7/2001	Chaco et al.	6,727,818 B1	4/2004	Wildman et al.
6,264,614 B1	7/2001	Albert et al.	6,731,311 B2	5/2004	Bufe et al.
6,279,183 B1	8/2001	Kummer et al.	6,731,989 B2	5/2004	Engleson et al.
6,287,253 B1	9/2001	Ortega et al.	6,740,033 B1	5/2004	Olejniczak et al.
6,302,844 B1	10/2001	Walker et al.	6,749,566 B2	6/2004	Russ
6,314,556 B1	11/2001	DeBusk et al.	6,751,630 B1	6/2004	Franks et al.
6,320,510 B2	11/2001	Menkedick et al.	6,754,545 B2	6/2004	Haeuser et al.
6,344,794 B1	2/2002	Ulrich et al.	6,754,883 B2	6/2004	DeBusk et al.
6,348,777 B1	2/2002	Brown et al.	6,759,959 B2	7/2004	Wildman
6,362,725 B1	3/2002	Ulrich et al.	6,763,541 B2	7/2004	Mahoney et al.
6,364,834 B1	4/2002	Reuss et al.	6,771,172 B1	8/2004	Robinson et al.
6,398,727 B1	6/2002	Bui et al.	6,773,396 B2	8/2004	Flach et al.
6,406,426 B1	6/2002	Reuss et al.	6,778,225 B2	8/2004	David
6,407,335 B1	6/2002	Franklin-Lees et al.	6,781,517 B2	8/2004	Moster et al.
6,412,980 B1	7/2002	Lounsberry et al.	6,784,797 B2	8/2004	Smith et al.
6,416,471 B1	7/2002	Kumar et al.	6,791,460 B2	9/2004	Dixon et al.
6,421,649 B1	7/2002	Rattner	6,792,396 B2	9/2004	Inda et al.
6,439,769 B1	8/2002	Polkus et al.	6,801,227 B2	10/2004	Bocioneck et al.
6,441,742 B1	8/2002	Lovely et al.	6,807,543 B2	10/2004	Muthya
6,442,290 B1	8/2002	Ellis et al.	6,825,763 B2	11/2004	Ulrich et al.
6,445,299 B1	9/2002	Rojas, Jr.	6,826,578 B2	11/2004	Brackett et al.
6,450,956 B1	9/2002	Rappaport et al.	6,828,992 B1	12/2004	Freeman et al.
6,462,656 B2	10/2002	Ulrich et al.	6,829,796 B2	12/2004	Salvatini et al.
6,486,792 B1	11/2002	Moster et al.	6,830,549 B2	12/2004	Bui et al.
6,493,568 B1	12/2002	Bell et al.	6,832,199 B1	12/2004	Kucek et al.
6,494,831 B1	12/2002	Koritzinsky	6,840,117 B2	1/2005	Hubbard, Jr.
6,510,344 B1	1/2003	Halpern	6,847,814 B1	1/2005	Vogeleisen
6,516,324 B1	2/2003	Jones et al.	6,868,256 B2	3/2005	Dooley et al.
6,526,310 B1	2/2003	Carter et al.	6,871,211 B2	3/2005	Labounty et al.
6,529,164 B1	3/2003	Carter	6,873,884 B2	3/2005	Brackett et al.
6,533,453 B1	3/2003	Heidsieck et al.	6,876,303 B2 *	4/2005	Reeder et al. 340/573.1
6,535,576 B2	3/2003	Vafi et al.	6,876,985 B2	4/2005	Kawanaka
6,539,393 B1	3/2003	Kabala	6,885,288 B2	4/2005	Pincus
6,544,173 B2	4/2003	West et al.	6,891,909 B2	5/2005	Hurley et al.
6,544,174 B2	4/2003	West et al.	6,904,161 B1	6/2005	Becker et al.
6,551,243 B2	4/2003	Bocioneck et al.	6,909,995 B2	6/2005	Shiraishi
6,553,106 B1	4/2003	Gould et al.	6,912,549 B2	6/2005	Rotter et al.
6,554,174 B1	4/2003	Aceves	6,915,170 B2	7/2005	Engleson et al.
6,556,630 B1	4/2003	Brinsfield et al.	6,925,367 B2	8/2005	Fontius
6,560,274 B1	5/2003	Leitgeb et al.	6,930,878 B2	8/2005	Brackett et al.
6,572,556 B2	6/2003	Stoycos et al.	6,958,706 B2 *	10/2005	Chaco et al. 340/870.11
6,575,901 B2	6/2003	Stoycos et al.	7,068,143 B2	6/2006	Doering et al.
6,581,204 B2	6/2003	DeBusk et al.	7,092,376 B2 *	8/2006	Schuman 370/349
6,584,182 B2	6/2003	Brodnick	7,138,902 B2 *	11/2006	Menard 340/5.53
6,584,454 B1	6/2003	Hummel, Jr. et al.	2001/0050610 A1	12/2001	Gelston
6,585,645 B2	7/2003	Hutchinson	2001/0051765 A1	12/2001	Walker et al.
6,589,170 B1	7/2003	Flach et al.	2002/0014951 A1	2/2002	Kramer et al.
6,593,528 B2	7/2003	Franklin-Lees et al.	2002/0044043 A1	4/2002	Chaco et al.
6,594,146 B2	7/2003	Frangesch et al.	2002/0044059 A1	4/2002	Reeder et al.
6,594,519 B2	7/2003	Stoycos et al.	2002/0067273 A1	6/2002	Jaques et al.
6,600,421 B2	7/2003	Freeman	2002/0070867 A1	6/2002	Conway et al.
6,603,494 B1	8/2003	Banks et al.	2002/0080037 A1	6/2002	Dixon et al.
6,609,115 B1	8/2003	Mehring et al.	2002/0103674 A1	8/2002	Reeder et al.
6,616,606 B1	9/2003	Petersen et al.	2002/0151990 A1	10/2002	Ulrich et al.
6,622,088 B2	9/2003	Hood	2002/0173991 A1	11/2002	Avitall
6,640,246 B1	10/2003	Gary, Jr. et al.	2002/0186136 A1	12/2002	Schuman
6,643,238 B2	11/2003	Nakajima	2002/0196141 A1	12/2002	Boone et al.
6,650,346 B1	11/2003	Jaeger et al.	2003/0010345 A1	1/2003	Koblasz et al.
6,659,947 B1	12/2003	Carter et al.	2003/0028449 A1	2/2003	Heinen et al.
6,665,385 B2	12/2003	Rogers et al.	2003/0030569 A1	2/2003	Ulrich et al.
6,665,820 B1	12/2003	Frowein et al.	2003/0052787 A1	3/2003	Zerhusen et al.
6,669,630 B1	12/2003	Joliat et al.	2003/0074222 A1	4/2003	Rosow et al.
6,671,547 B2	12/2003	Lyster et al.	2003/0146835 A1	8/2003	Carter
6,671,563 B1	12/2003	Engelson et al.	2003/0149598 A1	8/2003	Santoso et al.
6,685,633 B2	2/2004	Albert et al.	2003/0176798 A1	9/2003	Simon
6,689,091 B2	2/2004	Bui et al.	2003/0206116 A1	11/2003	Weiner et al.
6,694,367 B1	2/2004	Miesbauer et al.	2004/0183681 A1	9/2004	Smith
6,694,509 B1	2/2004	Stoval et al.	2004/0183684 A1	9/2004	Callaway
6,697,765 B2	2/2004	Kuth			
6,707,476 B1	3/2004	Hochstedler			
6,714,913 B2	3/2004	Brandt et al.			
6,721,818 B1	4/2004	Nakamura			

US 7,319,386 B2

Page 4

2004/0186358 A1 9/2004 Chernow et al.
2004/0193449 A1 9/2004 Wildman et al.
2005/0035862 A1 2/2005 Wildman et al.
2005/0242946 A1 11/2005 Hubbard, Jr. et al.

FOREIGN PATENT DOCUMENTS

WO WO 2004/036390 A2 4/2004

* cited by examiner

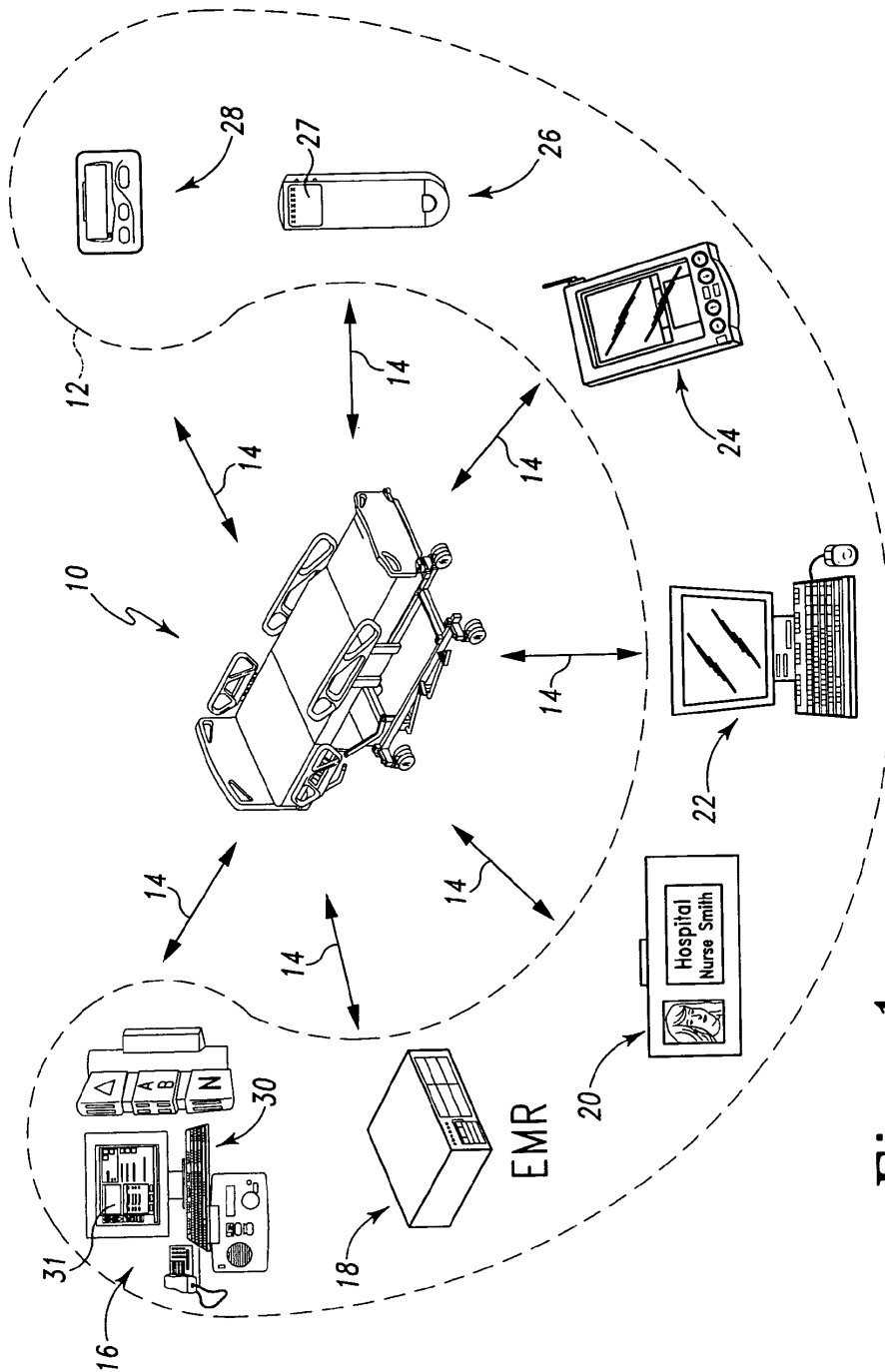


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