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(54) **CHAIR**

(75) Inventors: **Kenneth L. Kramer**, Greensburg, IN (US); **Marshall S. Dahneke**, Batesville, IN (US); **Reed N. Wilcox**, Ridgefield, CT (US); **David T. Schwanemann**, Cincinnati, OH (US); **John P. Biondo**, Greensburg, IN (US); **Francis C. Ganance**, Cincinnati, OH (US); **Scott A. Schultz**, Batesville, IN (US); **Russell L. Hardy**, Batesville, IN (US); **Troy D. Acton**, St. Paul, IN (US)

(73) Assignee: **Hill-Rom Services, Inc.**, Wilmington, DE (US)

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,587,068 A	2/1952	Sanders
2,682,913 A	7/1954	Scheide
2,869,614 A	1/1959	Wamsley
3,138,402 A *	6/1964	Heyl, Jr. et al. 297/69
3,147,039 A	9/1964	Smith et al.
3,284,126 A	11/1966	Piazza
3,379,450 A	4/1968	Jones et al.
3,589,769 A	6/1971	Bressler

(Continued)

FOREIGN PATENT DOCUMENTS

WO WO9317649 9/1993

OTHER PUBLICATIONS

Equalizer M1 Tilt System, Burke, Inc., date unknown, four pages.

(Continued)

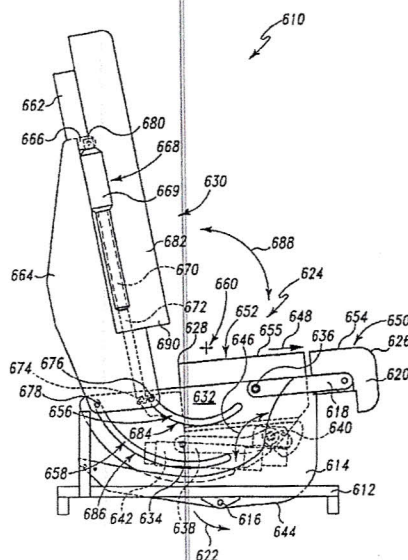
Primary Examiner—Sarah McPartlin

(74) *Attorney, Agent, or Firm*—Barnes & Thornburg LLP

(57) **ABSTRACT**

A chair with articulable support sections and an integrated lift system may have support sections mechanically linked such that a single actuation control device may articulate multiple sections. The chair includes configurable accessories directed to the comfort of an occupant of the chair. The support sections may include air cells to adjust firmness of support section surfaces.

22 Claims, 39 Drawing Sheets



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U.S. PATENT DOCUMENTS

3,640,566 A	2/1972	Hodge	
3,807,795 A	4/1974	Weant et al.	
3,851,917 A	12/1974	Horstmann et al.	
3,865,457 A	2/1975	Carter	
3,964,786 A	6/1976	Mashuda	
4,067,249 A	1/1978	Deucher	
4,076,304 A	2/1978	Deucher	
4,101,143 A	7/1978	Sieber	
4,119,342 A	10/1978	Jones	
4,120,530 A	10/1978	Imbro	
4,231,614 A	11/1980	Shaffer	
4,249,774 A *	2/1981	Andreasson	297/311
4,285,541 A	8/1981	Onishi	
4,519,649 A	5/1985	Tanaka et al.	
4,569,556 A	2/1986	Pillot	
4,572,573 A *	2/1986	Yoshikawa et al.	297/75
4,598,944 A	7/1986	Meyer et al.	
4,675,926 A	6/1987	Lindblom et al.	
4,717,169 A	1/1988	Shaffer	
4,768,797 A	9/1988	Friedrich	
4,771,489 A	9/1988	Chen et al.	
4,787,104 A	11/1988	Grantham	
4,809,804 A	3/1989	Houston et al.	
4,858,260 A	8/1989	Failor et al.	
4,862,529 A	9/1989	Peck	
4,862,530 A	9/1989	Chen	
4,929,022 A	5/1990	Geraci	
4,945,582 A	8/1990	Hayton et al.	
4,949,408 A	8/1990	Trkla	
4,949,410 A	8/1990	Failor et al.	
4,974,905 A	12/1990	Davis	
4,979,726 A	12/1990	Geraci	
4,986,260 A *	1/1991	Iams et al.	601/43
4,987,896 A	1/1991	Nakamatsu	
4,993,777 A	2/1991	LaPointe	
5,023,967 A	6/1991	Ferrand	
5,096,008 A	3/1992	Mankowski	
5,108,202 A	4/1992	Smith	
5,155,873 A	10/1992	Bridges	
5,193,633 A	3/1993	Ezenwa	
5,199,113 A	4/1993	Glasow et al.	
5,230,113 A	7/1993	Foster et al.	
5,261,725 A *	11/1993	Rudolph	297/361.1
5,269,227 A	12/1993	Warren et al.	
5,297,021 A	3/1994	Koerlin et al.	
5,333,887 A	8/1994	Luther	
5,342,114 A	8/1994	Burke et al.	
5,346,280 A	9/1994	Deumite	
5,348,375 A *	9/1994	Steininger	297/362.11
5,366,036 A	11/1994	Perry	
5,398,357 A	3/1995	Foster	
5,402,544 A	4/1995	Crawford et al.	
5,411,044 A	5/1995	Andolfi	
5,454,126 A	10/1995	Foster et al.	
5,479,666 A	1/1996	Foster et al.	
5,513,867 A	5/1996	Bloswick et al.	
5,537,701 A	7/1996	Elliott	
5,556,121 A	9/1996	Pillot	
5,584,082 A	12/1996	Crawford et al.	
5,609,348 A	3/1997	Galumbeck	
5,651,149 A	7/1997	Garman	
5,690,185 A	11/1997	Sengel	
5,715,548 A	2/1998	Weismiller et al.	
5,772,226 A *	6/1998	Bobichon	280/250.1
5,774,914 A	7/1998	Johnson et al.	
5,790,997 A	8/1998	Ruehl	
5,868,461 A	2/1999	Brotherston	
5,870,784 A	2/1999	Elliott	
5,890,765 A	4/1999	LaPointe et al.	
5,984,338 A	11/1999	Meyer	
5,984,411 A *	11/1999	Galumbeck	297/344.15
5,992,934 A *	11/1999	Gehrig et al.	297/316
6,000,578 A	12/1999	Boissay	
6,089,593 A	7/2000	Hanson et al.	
6,101,647 A	8/2000	Stroud et al.	
6,135,559 A	10/2000	Kowalski	
6,154,899 A	12/2000	Brooke et al.	
6,163,903 A	12/2000	Weismiller et al.	
6,175,982 B1	1/2001	Cushwa	
6,176,508 B1	1/2001	Malassigne et al.	
6,213,554 B1 *	4/2001	Marcoux et al.	297/330
6,231,067 B1	5/2001	Johnson et al.	
6,250,717 B1	6/2001	Porcheron	
6,272,702 B1	8/2001	Uchida et al.	
6,332,512 B1	12/2001	Muranaka	
6,336,235 B1	1/2002	Ruehl	
6,382,725 B1 *	5/2002	Carroll	297/330
6,398,357 B1	6/2002	Holloway et al.	
6,409,265 B1	6/2002	Koerlin et al.	
6,425,634 B1	7/2002	Romero	
6,428,103 B1	8/2002	Hong	
6,454,285 B1	9/2002	Koenig	
6,460,930 B2	10/2002	Thornton	
6,499,163 B1	12/2002	Stensby	
6,533,304 B2	3/2003	Lizama-Troncoso et al.	
6,557,940 B2 *	5/2003	Hayashi et al.	297/330
6,584,629 B2	7/2003	Tsuji et al.	
6,601,869 B2	8/2003	Porcheron	
6,604,471 B1	8/2003	Tarver, Jr.	
6,604,750 B2	8/2003	Malassigne et al.	
6,623,022 B2	9/2003	Malassigne et al.	
6,715,836 B1 *	4/2004	Chen et al.	297/411.39
6,752,459 B2	6/2004	Deisig	
6,799,770 B2	10/2004	Patrick et al.	
6,839,918 B1	1/2005	Jensen	
6,851,751 B1	2/2005	Romero et al.	
2002/0174487 A1	11/2002	Kramer et al.	
2004/0212177 A1	10/2004	Kuiken	
2005/0046255 A1	3/2005	Bressler et al.	
2005/0088024 A1	4/2005	Rozaieski et al.	

OTHER PUBLICATIONS

Quantum Rehab, Moving at the Speed of Life, a Division of Pride Mobility Products Corp., Mar. 9, 2004, two pages.
Solutions for Easier Living, Uplift Technologies, Inc., date unknown, four pages.
Oto Bodycare, Oto Super Relax SPR-1200, date unknown, four pages.
Scooter Link Medical Equipment Superstore, Med-Lift-Reliance 5555 Full Sleeper Lift Chair, Sep. 14, 2004, one page.
Use and Care Guide for Your New American Massage Adjustable Recliner, American Massage Products, Inc., Sep. 1996, eight pages.
The First Intelligent Massage Chair to Give You Arm and Foot Massage, Osim Global Health Care, date unknown, one page.
Precision Massage Technology, The OSIM iSymphonic, date unknown, one page.
Intelligent Temperature Controllers, date unknown, one page.
Panasonic Ideas for Life, Momi Momi Real Pro, date unknown, twelve pages.
Amano All Products 2004, Medical and Welfare Instruments and Machinery, date unknown, two pages.
Otto Bock Seating and Positioning Products, Otto Bock Health Care, date unknown, twelve pages.
Senator, date unknown, one page.
Written Opinion and International Search Report for PCT/US05/29229, mailed Jun. 20, 2008, ten pages.
International Search Report for International Application No. PCT/US05/28992, dated Feb. 23, 2007.

* cited by examiner