



US008196185B2

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

(10) **Patent No.:** **US 8,196,185 B2**
(45) **Date of Patent:** **Jun. 5, 2012**

(54) **REMOTE HVAC CONTROL WITH A CUSTOMIZABLE OVERVIEW DISPLAY**

5,956,487 A 9/1999 Venkatraman et al.
5,975,737 A 11/1999 Crater et al.
5,982,362 A 11/1999 Crater et al.
6,061,603 A 5/2000 Papadopoulos et al.
6,067,477 A 5/2000 Wewalaarachchi et al.
6,112,246 A 8/2000 Horbal et al.
6,139,177 A 10/2000 Venkatraman et al.
6,157,943 A 12/2000 Meyer

(Continued)

(75) Inventors: **Levi H. Gaedelmann**, Edina, MN (US);
Kevin B. Moore, Chaska, MN (US);
Daniel J. Sullivan, St. Anthony, MN (US);
Geoffrey Ho, Minneapolis, MN (US)

(73) Assignee: **Honeywell International Inc.**,
Morristown, NJ (US)

FOREIGN PATENT DOCUMENTS

EP 0434926 8/1995

(Continued)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1172 days.

OTHER PUBLICATIONS

Lennox, "Network Control Panel (NCP)," User's Manual, 18 pages, Nov. 1999.

(Continued)

(21) Appl. No.: **11/845,770**

(22) Filed: **Aug. 27, 2007**

Prior Publication Data

US 2009/0057427 A1 Mar. 5, 2009

Int. Cl.

G06F 7/04 (2006.01)
G06F 1/00 (2006.01)
G06F 15/16 (2006.01)
G06F 15/177 (2006.01)
G06F 15/173 (2006.01)
G05D 23/00 (2006.01)

Primary Examiner — Aravind Moorthy

(74) *Attorney, Agent, or Firm* — Seager, Tufte & Wickhem LLC

(52) **U.S. Cl.** **726/4**; 713/324; 700/276; 709/200;
709/203; 709/222; 709/223; 709/224; 709/225;
709/229; 236/51

(58) **Field of Classification Search** 726/4; 713/324;
700/276; 709/200, 203, 222–225, 229; 236/51
See application file for complete search history.

ABSTRACT

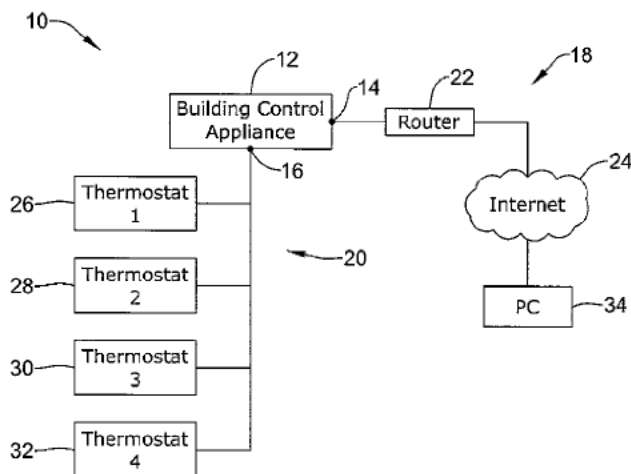
An HVAC control system that accommodates and/or facilitates control from a remote location. The HVAC control system may include a web-enabled building control appliance having a controller, a first port and a second port. The controller may implement a web server that is coupled to the first port for serving up one or more web pages on a first network and for receiving a number of responses. The controller may also be coupled to the second port so as to communicate with one or more communicating thermostats via a second network. The web server may be adapted to provide an overview or summary web-page via the first port that displays information regarding the one or more thermostats, where the information that is displayed may be customized for a particular user.

References Cited

U.S. PATENT DOCUMENTS

4,918,615 A 4/1990 Suzuki et al.
5,790,977 A 8/1998 Ezekiel

18 Claims, 75 Drawing Sheets



U.S. PATENT DOCUMENTS

6,192,282	B1	2/2001	Smith et al.	
6,229,429	B1	5/2001	Horon	
6,259,074	B1	7/2001	Brunner et al.	
6,282,454	B1	8/2001	Papadopoulos et al.	
6,351,693	B1	2/2002	Monie et al.	
6,353,853	B1	3/2002	Gravlin	
6,369,695	B1	4/2002	Horon	
6,405,099	B1	6/2002	Nagai et al.	
6,437,692	B1	8/2002	Petite et al.	
6,484,061	B2	11/2002	Papadopoulos et al.	
6,487,457	B1	11/2002	Hull et al.	
6,580,950	B1	6/2003	Johnson et al.	
6,598,056	B1	7/2003	Hull et al.	
6,619,555	B2	9/2003	Rosen	
6,721,607	B2	4/2004	Brault	
6,741,915	B2	5/2004	Poth	
6,904,385	B1	6/2005	Budike, Jr.	
6,934,862	B2	8/2005	Sharood et al.	
6,993,417	B2	1/2006	Osann, Jr.	
7,110,843	B2	9/2006	Pagnano et al.	
7,183,899	B2	2/2007	Behnke	
7,187,986	B2	3/2007	Johnson et al.	
7,702,421	B2*	4/2010	Sullivan et al.	700/276
2002/0111698	A1	8/2002	Graziano et al.	
2002/0133636	A1	9/2002	Venkatraman et al.	
2003/0065407	A1*	4/2003	Johnson et al.	700/19
2003/0103075	A1	6/2003	Rosselot	
2004/0107114	A1*	6/2004	Curtis	705/1
2004/0143474	A1	7/2004	Haerberle et al.	
2004/0260411	A1	12/2004	Cannon	
2005/0040250	A1	2/2005	Wruck	
2005/0143863	A1	6/2005	Ruane et al.	
2006/0058900	A1	3/2006	Johanson et al.	
2006/0105760	A1	5/2006	Shamoon et al.	
2006/0283965	A1	12/2006	Mueller et al.	
2007/0058634	A1	3/2007	Gupta et al.	
2007/0097993	A1	5/2007	Bojajra et al.	
2007/0114295	A1*	5/2007	Jenkins	236/51
2007/0220907	A1	9/2007	Ehlers	
2008/0011864	A1	1/2008	Tessier et al.	

FOREIGN PATENT DOCUMENTS

WO	9621264	7/1996
----	---------	--------

OTHER PUBLICATIONS

<http://www2.sims.berkeley.edu/courses/is213/s06/projects/lightson;final.html>, "Lights on a Wireless Lighting Control System," 11 pages, printed Mar. 22, 2007.

<http://www.commercial.carrier.com/commercial/hvac/productdescription> . . . , "Carrier: 33CSCCNWEB-01 CCN Web Internet Connection to the Carrier Comfort Network," 1 page, printed Mar. 11, 2008.

<http://www.commercial.carrier.com/commercial/hvac/productdescription> . . . , "Carrier: i-Vu CCN," 1 page, printed Mar. 11, 2008.

<http://www.docs.hvacpartners.com/idc/groups/public/documents/techlit/gc-controls-ivuccn.rtf>, "Products," 5 pages, printed Jul. 3, 2007.

<http://www.lightstat.com/products/istat.asp>, Lightstat Incorporated, "Internet Programmable Communicating Thermostats," 1 page, printed Mar. 13, 2007.

<http://pueblo.lbl.gov/~olken> . . . , "Remote Building Monitoring and Operations Home Page," 5 pages, prior to Aug. 27, 2007.

Andover Controls, Network News, vol. 2, No. 2, 8 pages, 1997.

Andover Controls, World, 4 pages, Spring 1997.

CADGRAPHICS, "The CADGRAPHICS User's Guide," 198 pages, 2003.

Carrier Comfort Network CCN Web, Overview and Configuration Manual, 134 pages, Apr. 2006.

Carrier Comfort Network CCN Web, Product Data, 2 pages, Apr. 2006.

Carrier Comfort Network CCN Web, "Web Browser User Interface to the Carrier Comfort Network," 2 pages, 2002.

Carrier, Demo Screen Shots, 15 pages, prior to Aug. 27, 2007.

Carrier, i-Vu CCN, 7 pages, 2007.

Carrier, i-Vu CCN 4.0, Owner's Guide, 20 pages, Jul. 2007.

Carrier, "i-Vu Powerful and Intuitive Front End for Building Control," 2 pages, Aug. 2005.

Carrier, "i-Vu Web-Based Integrated Control System," 3 pages, 2005.

Circon, "i-Browse Web-Based Monitoring and Control for Facility Management," 2 pages, prior to Aug. 27, 2007.

Echelon, "i.Lon SmartServer," 5 pages, 2007.

Echelon, "Energy Control Solutions with the i.Lon SmartServer," 4 pages, 2007.

Echelon, "i.Lon 100e3 Internet Server Models 72101R-300, 72101R-308, 72102R-300, 72103-R300 . . ." 5 pages, copyright 2002-2007.

Echelon, i.Lon 100e3 Internet Server New Features, 15 pages, Sep. 2006.

Honeywell News Release, "Honeywell's New Sysnet Facilities Integration System for Boiler Plant and Combustion Safety Processes," 4 pages, Dec. 15, 1995.

Honeywell, "Introduction of the S7350A Honeywell WebPAD Information Appliance," Home and Building Control Bulletin, 2 pages, Aug. 29, 2000; Picture of WebPad Device with touch screen, 1 Page; and screen shots of WebPad Device, 4 pages.

Honeywell, The RapidZone Solution, Excel 5000 Open System, Application Guide, 52 pages, Jan. 2004.

Honeywell, Excel 15B W7760B Building Manager Release 2.02.00, Installation Instructions, 28 pages, Dec. 2004.

i.Lon, SmartServer, 2 pages, prior to Aug. 27, 2007.

i.Lon 100e3 Internet Server, 1 page, prior to Aug. 27, 2007.

i-stat, Demo Screen Shots, Printed Mar. 13, 2007.

i-stat, The Internet Programmable Thermostat, 2 pages, prior to Aug. 27, 2007.

Johnson Controls, Network Integration Engine (NIE) 3 pages, Nov. 9, 2007.

Johnson Controls, Network Integration Engine (NIE), Product Bulletin, pp. 1-11, Jan. 30, 2008.

Narang, "WEBARC: Control and Monitoring of Building Systems Over the Web," 53 pages, May 1999.

Olken et al., "Object Lessons Learned from a Distributed System for Remote Building Monitoring and Operation," ACM SIGPLAN Notices, vol. 33, No. 10, pp. 284-295, Oct. 1998.

Proliphix, Inc., "Proliphix IP Devices: HTTP API," 28 pages, Jan. 23, 2006.

Proliphix, Inc., Remote Management User Guide, 12 pages, prior to Aug. 27, 2007.

So et al., "Building Automation on the Information Superhighway," ASHRAE (American Society of Heating Refrigerating, and Air Conditioning) Transactions, vol. 104, Part 2, pp. 176-191, 1998.

So et al., "Building Automation Systems on the Internet," Facilities vol. 15, No. 5/6, pp. 125-133, May/June 1997.

Talon, "Raptor Controller," 6 pages, Oct. 2003.

Talon, "Workstation Software," 4 pages, Nov. 2002.

"Energy User News," 4 pages, Mar. 1, 1997.

Andover Controls, "Facility Management Unleashed," 6 pages, 2002.

Facility Robotics Solutions Direct, "Who We Are and What We Do," 2 pages, Sep. 19, 1997.

Facility Robotics Solutions, "Where Can I go to Find Everything I Need to Put Together LonWorks-Based Automation Systems?," 5 pages, prior to Jun. 28, 2007.

Honeywell, "Excel Building Supervisor-Integrated R7044 and FS90 Ver. 2.0," Operator Manual, 70 pages, Apr. 1995.

Trane, "System Programming, Tracer Summit Version 14, BMTW-SVP01D-EN," 623 pages, 2002.

* cited by examiner

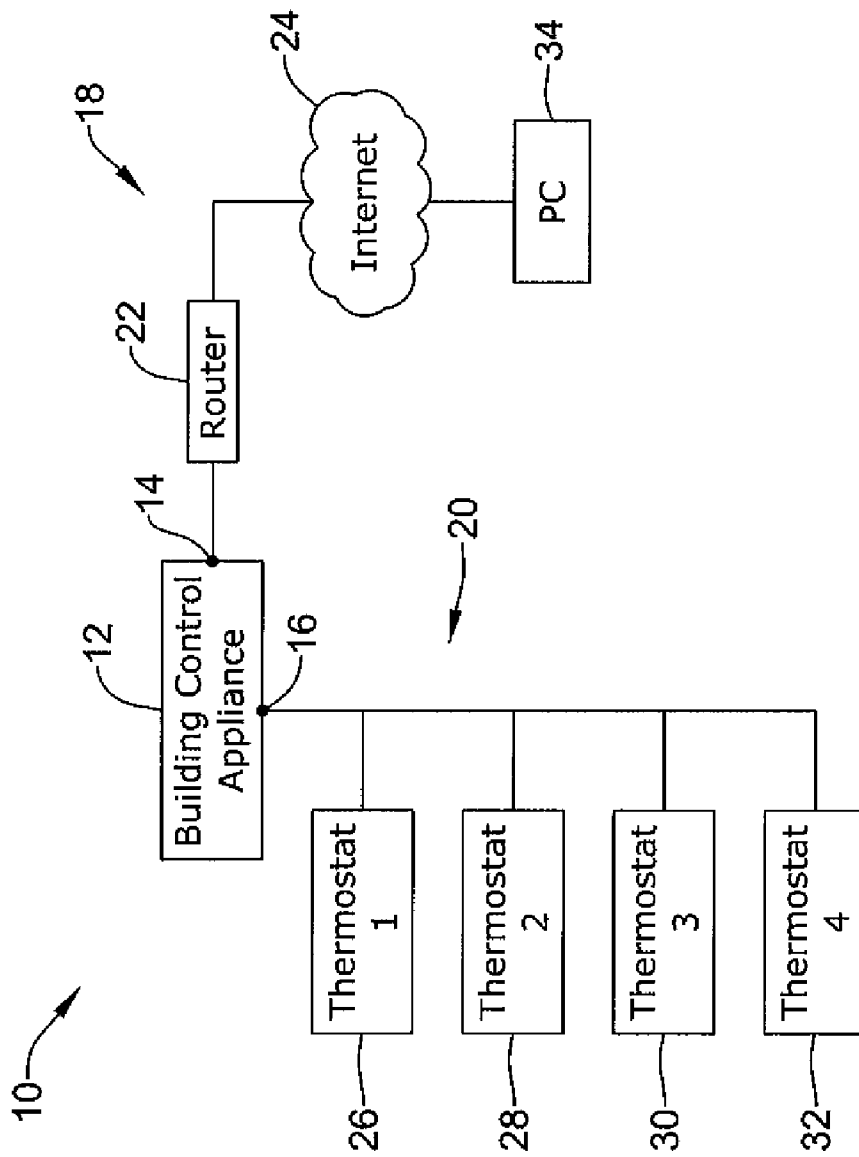


Figure 1

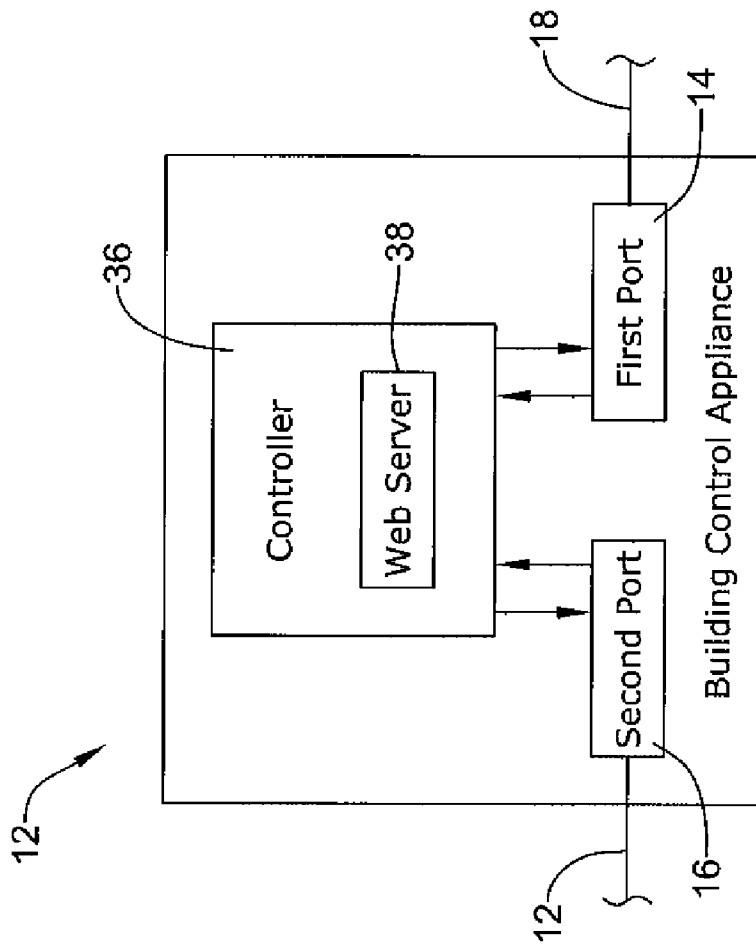


Figure 2

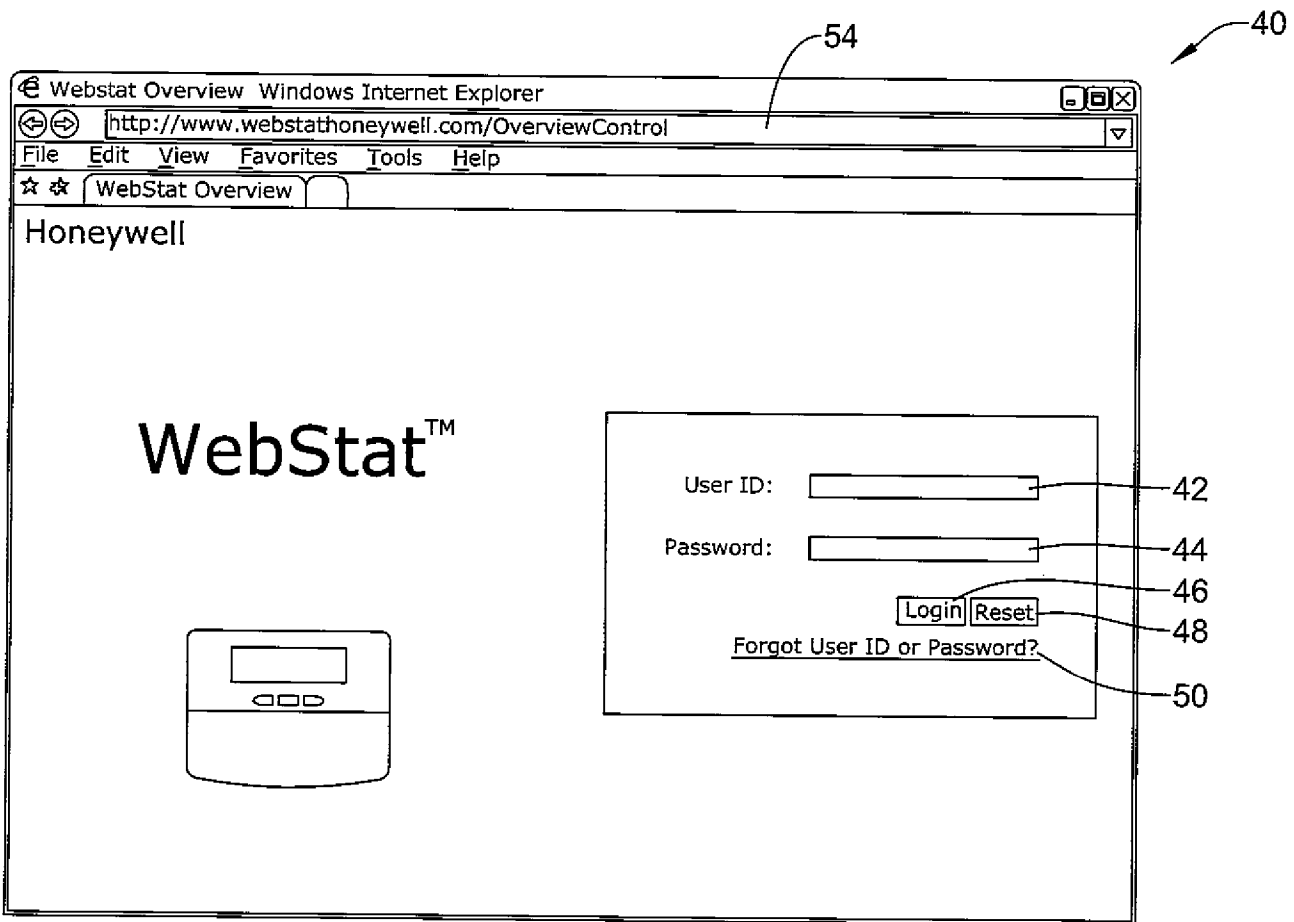


Figure 3A

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.