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(54) Title: AUTOMATED STORAGE AND RETRIEVAL SYSTEM AND CONTROL SYSTEM THEREOF

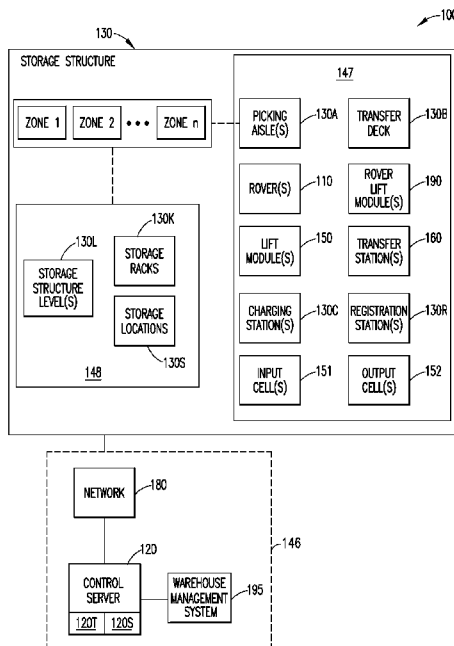


FIG. 1

(57) Abstract: An automated storage and retrieval system includes a storage space with storage locations defined therein, an automated transport system connected to the storage space and configured to transport store units for storage in the storage locations and retrieval from the storage locations, and a control system disposed for managing throughput performance of the automated storage and retrieval system, the control system being operably coupled to the automated transport system and having more than one separate and distinct control sections each configured for managing throughput performance with respect to a common group of the storage locations, wherein at least one of the control sections manages aspects of throughput performance of the common group independent of another of the control sections.

**INTERNATIONAL SEARCH REPORT**

International application No.  
PCT/US 14/32368

<p><b>A. CLASSIFICATION OF SUBJECT MATTER</b>                  IPC(8) - G06F 17/30 (2015.01)                  CPC - G06F 17/30864                  According to International Patent Classification (IPC) or to both national classification and IPC</p>																	
<p><b>B. FIELDS SEARCHED</b></p> <p>Minimum documentation searched (classification system followed by classification symbols)                  IPC(8): G06F 17/30 (2015.01); CPC: G06F 17/30864</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched                  USPC: 707/705, 707/999.01; CPC: G06F 17/30864 or G06F 17/30867 or G06F 17/30067 or G06Q 30/02 or G06F 17/30011                  IPC(8): G06F 17/30 (2015.01)</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)                  PatBase, ProQuest Dialog, Google Web, Google Patents (Search terms: automate, robot, warehouse, lift, elevator, vertical, throughput, performance, efficiency, storage, location, bay, shelf, facility, balance, control, manage, tier, level, collision, non-deterministic, stochastic, dead reckoning, vehicle, navigate, metric, measure, determine, etc.)</p>																	
<p><b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">Category*</th> <th style="width:70%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width:20%;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X --- Y</td> <td>US 2007/0276535 A1 (Haag) 29 November 2007 (29.11.2007), para. [0050]-[0051], [0053]-[0056], [0060], [0082], [0090], and [0094]-[0105], and Fig. 1.</td> <td>1-2, 11-12, 22, 25-27 ----- 3-10, 13-21, 23-24, 28-29</td> </tr> <tr> <td>Y</td> <td>US 2011/0301757 A1 (Jones et al.) 08 December 2011 (08.12.2011), para. [0032], [0034], [0038]-[0039], [0046], [0049], [0051], and [0111], and Fig. 2, and claims 31 and 37.</td> <td>3-10, 13-21, 23-24, 28-29</td> </tr> <tr> <td>Y</td> <td>US 2012/0029802 A1 (Barry et al.) 02 February 2012 (02.02.2012), para. [0012]-[0013], and [0016]-[0028].</td> <td>17-21</td> </tr> <tr> <td>A</td> <td>US 7,317,987 B2 (Nahla) 08 January 2008 (08.01.2008) (entire document).</td> <td>1-29</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X --- Y	US 2007/0276535 A1 (Haag) 29 November 2007 (29.11.2007), para. [0050]-[0051], [0053]-[0056], [0060], [0082], [0090], and [0094]-[0105], and Fig. 1.	1-2, 11-12, 22, 25-27 ----- 3-10, 13-21, 23-24, 28-29	Y	US 2011/0301757 A1 (Jones et al.) 08 December 2011 (08.12.2011), para. [0032], [0034], [0038]-[0039], [0046], [0049], [0051], and [0111], and Fig. 2, and claims 31 and 37.	3-10, 13-21, 23-24, 28-29	Y	US 2012/0029802 A1 (Barry et al.) 02 February 2012 (02.02.2012), para. [0012]-[0013], and [0016]-[0028].	17-21	A	US 7,317,987 B2 (Nahla) 08 January 2008 (08.01.2008) (entire document).	1-29
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<p>Date of the actual completion of the international search 25 February 2015 (25.02.2015)</p>		<p>Date of mailing of the international search report <b>16 MAR 2015</b></p>															
<p>Name and mailing address of the ISA/US                  Mail Stop PCT, Attn: ISA/US, Commissioner for Patents                  P.O. Box 1450, Alexandria, Virginia 22313-1450                  Facsimile No. 571-273-3201</p>		<p>Authorized officer:                  Lee W. Young                  PCT Helpdesk: 571-272-4300                  PCT OSP: 571-272-7774</p>															