

ALLNAMES:(Attabotics Inc)

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Sort: Relevance

Per page: 200

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1 / 1

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1. [WO/2016/172793](#) STORAGE AND RETRIEVAL SYSTEM

WO - 03.11.2016

Int.Class [B65G 1/04](#) Appl.No PCT/CA2016/050484 Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

Bins or other storage units contained within a three-dimensional grid structure are arranged in cells, each of which has multiple storage units surrounding a central void or space on different sides thereof. This void space is slightly larger than each storage unit, enabling the unit to be pulled into the void by mechanical means, and allowing access to the bins on all sides of the void. The storage units are stacked within the three-dimensional grid structure, which can be built or expanded to a predetermined footprint. The aligned voids of stacked cells create vertical shafts spanning between upper and lower tracks of the grid structure on which robotic retrieval vehicles can horizontally travel to and from any given shaft. The robotic retrieval vehicles can directly access any storage unit via the vertical shafts.

2. [20200216298](#) STORAGE UNITS AND ROBOTIC STORAGE/RETRIEVAL VEHICLES FOR A THREE-DIMENSIONAL STORAGE SYSTEM

US - 09.07.2020

Int.Class [B66F 9/06](#) Appl.No 16354539 Applicant Attabotics Inc. Inventor Scott Gravelle

In combination, a storage unit storable within a three-dimensional storage system and a storage/retrieval vehicle navigable through the three-dimensional storage system to storage locations therein at which the storage unit is selectively storable and retrievable. The storage/retrieval vehicle comprises a frame conveyable through the three-dimensional storage system, a platform atop the frame for receipt of the storage unit on the platform, and a loading/unloading mechanism operable to load and unload the storage unit to and from the platform at four different sides thereof. The storage unit and the storage/retrieval vehicle are configured to enable unloading of the storage unit from the platform in any one of four different directions at four different respective sides of the vehicle regardless of an original orientation in which the storage unit was previously loaded onto the platform and without reorienting the storage unit from the original orientation.

3. [20190375589](#) STORAGE AND RETRIEVAL SYSTEMS SHARING A COMMON ROBOTIC FLEET BETWEEN A STORAGE GRID AND EXTERNAL WORKSTATIONS

US - 12.12.2019

Int.Class [B65G 1/04](#) Appl.No 16374123 Applicant Attabotics Inc. Inventor Scott Gravelle

A storage system features a fleet of storage/retrieval vehicles and a gridded three-dimensional structure. The structure features a gridded two-dimensional track layout on which the one or more storage/retrieval vehicles are conveyable in two directions, and a plurality of storage columns residing above or below the gridded track layout in spaced distribution throughout the two-dimensional area of the track layout. Upright shafts reside above or below the gridded track layout and provide vehicle access to the storage columns. At least one working station resides outside the two-dimensional area of the track layout, and via one or more extension tracks, is served by the same vehicles that navigate the gridded structure.

4. [20190375590](#) STORAGE AND RETRIEVAL SYSTEMS PERFORMING INTERNAL SORTATION BY ORCHESTRATED NAVIGATION OF STORAGE GRID ROBOTS TO WORKSTATION INTAKE POINTS

US - 12.12.2019

Int.Class [B65G 1/137](#) Appl.No 16374143 Applicant Attabotics Inc. Inventor Scott Gravelle

Orchestrated delivery of retrieved storage units from a three-dimensional gridded storage structure to an entrance or intake point of a working station in a sequenced manner is performed entirely within the footprint of the gridded three-dimensional storage structure by the same fleet of robotic storage/retrieval vehicles operable to retrieve the storage units from storage locations within that gridded structure, thereby enabling omission of large sortation conveyors or other external sortation equipment.

5. [20200087066](#) STORAGE/RETRIEVAL VEHICLE WITH VARIABLE FOOTPRINT SIZE

US - 19.03.2020

Int.Class [B65G 1/04](#) Appl.No 16656231 Applicant Attabotics Inc. Inventor Scott Gravelle

Bins or other storage units contained within a three-dimensional grid structure are arranged in cells, each of which has multiple storage units surrounding a central void or space on different sides thereof. This void space is slightly larger than each storage unit, enabling the unit to be pulled into the void by mechanical means, and allowing access to the bins on all sides of the void. The storage units are stacked within the three-dimensional grid structure, which can be built or expanded to a predetermined footprint. The aligned voids of stacked cells create vertical shafts spanning between upper and lower tracks of the grid structure on which robotic retrieval vehicles can horizontally travel to and from any given shaft. The robotic retrieval vehicles can directly access any storage unit via the vertical shafts.

6. [20200087065](#) STORAGE AND RETRIEVAL SYSTEM WITH SHAFT-TRAVERSING TRACKS

US - 19.03.2020

Int.Class [B65G 1/04](#) Appl.No 16656207 Applicant Attabotics Inc. Inventor Scott Gravelle

Bins or other storage units contained within a three-dimensional grid structure are arranged in cells, each of which has multiple storage units surrounding a central void or space on different sides thereof. This void space is slightly larger than each storage unit, enabling the unit to be pulled into the void by mechanical means, and allowing access to the bins on all sides of the void. The storage units are stacked within the three-dimensional grid structure, which can be built or expanded to a predetermined footprint. The aligned voids of stacked cells create vertical shafts spanning between upper and lower tracks of



the grid structure on which robotic retrieval vehicles can horizontally travel to and from any given shaft. The robotic retrieval vehicles can directly access any storage unit via the vertical shafts.

7. [20190233209](#) STORAGE AND RETRIEVAL SYSTEM

US - 01.08.2019

Int.Class [B65G 1/04](#) Appl.No 16354104 Applicant Attabotics Inc. Inventor Scott Gravelle

Bins or other storage units contained within a three-dimensional grid structure are arranged in cells, each of which has multiple storage units surrounding a central void or space on different sides thereof. This void space is slightly larger than each storage unit, enabling the unit to be pulled into the void by mechanical means, and allowing access to the bins on all sides of the void. The storage units are stacked within the three-dimensional grid structure, which can be built or expanded to a predetermined footprint. The aligned voids of stacked cells create vertical shafts spanning between upper and lower tracks of the grid structure on which robotic retrieval vehicles can horizontally travel to and from any given shaft. The robotic retrieval vehicles can directly access any storage unit via the vertical shafts.

8. [20180148259](#) STORAGE AND RETRIEVAL SYSTEM

US - 31.05.2018

Int.Class [B65G 1/04](#) Appl.No 15568646 Applicant Attabotics Inc. Inventor Scott Gravelle

Bins or other storage units contained within a three-dimensional grid structure are arranged in cells, each of which has multiple storage units surrounding a central void or space on different sides thereof. This void space is slightly larger than each storage unit, enabling the unit to be pulled into the void by mechanical means, and allowing access to the bins on all sides of the void. The storage units are stacked within the three-dimensional grid structure, which can be built or expanded to a predetermined footprint. The aligned voids of stacked cells create vertical shafts spanning between upper and lower tracks of the grid structure on which robotic retrieval vehicles can horizontally travel to and from any given shaft. The robotic retrieval vehicles can directly access any storage unit via the vertical shafts.

9. [3931776](#) MULTI-NODAL SUPPLY CHAIN SYSTEM AND METHOD FOR SUPPLY CHAIN WORKFLOW EXECUTION USING TRANSPORTABLE AND CONTINUOUSLY TRACKABLE STORAGE BINS

EP - 05.01.2022

Int.Class [G06Q 10/08](#) Appl.No 20766321 Applicant ATTABOTICS INC Inventor GRAVELLE SCOTT

A multi-nodal supply chain system including multiple interconnected entities and a method for executing a supply chain workflow using transportable and continuously trackable, standardized storage bins is provided. The entities include a network of node facilities distributed throughout a geographical region, inter-nodal transport vehicles (INTVs), storage bins storable in indexed storage locations within the node facilities and the INTVs, and a computerized system. The computerized system stores bin identifiers of the storage bins and location identifiers of the indexed storage locations and dynamic storage locations of the storage bins. The computerized system also updates the location identifiers as the storage bins are transferred between the node facilities and the INTVs. The node facilities, the INTVs, and the storage bins, in communication with the computerized system, provide a complete traceability of one or more eaches of inventory items from their input into the supply chain system to fulfillment of orders.

10. [WO/2020/178692](#) MULTI-NODAL SUPPLY CHAIN SYSTEM AND METHOD FOR SUPPLY CHAIN WORKFLOW EXECUTION USING TRANSPORTABLE AND CONTINUOUSLY TRACKABLE STORAGE BINS

WO - 10.09.2020

Int.Class [G06Q 10/08](#) Appl.No PCT/IB2020/051721 Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

A multi-nodal supply chain system including multiple interconnected entities and a method for executing a supply chain workflow using transportable and continuously trackable, standardized storage bins is provided. The entities include a network of node facilities distributed throughout a geographical region, inter-nodal transport vehicles (INTVs), storage bins storable in indexed storage locations within the node facilities and the INTVs, and a computerized system. The computerized system stores bin identifiers of the storage bins and location identifiers of the indexed storage locations and dynamic storage locations of the storage bins. The computerized system also updates the location identifiers as the storage bins are transferred between the node facilities and the INTVs. The node facilities, the INTVs, and the storage bins, in communication with the computerized system, provide a complete traceability of one or more eaches of inventory items from their input into the supply chain system to fulfillment of orders.

11. [112021010595](#) SISTEMA DE CADEIA DE SUPRIMENTO E MÉTODO PARA EXECUTAR UM FLUXO DE TRABALHO DA CADEIA DE SUPRIMENTO USANDO RECEPTÁCULOS DE ARMAZENAMENTO TRANSPORTÁVEIS E CONTINUAMENTE RASTREÁVEIS

BR - 21.09.2021

Int.Class [G06Q 10](#) Appl.No 112021010595 Applicant ATTABOTICS INC. Inventor BRADLEY DEAN SIMPSON

sistema de cadeia de suprimento e método para executar um fluxo de trabalho da cadeia de suprimento usando receptáculos de armazenamento transportáveis e continuamente rastreáveis. é provido um sistema de cadeia de suprimento multi-nodal incluindo múltiplas entidades interconectadas e um método para executar um fluxo de trabalho de cadeia de suprimento usando receptáculos de armazenamento padronizados transportáveis e continuamente rastreáveis. as entidades incluem uma rede de instalações de nós distribuída por uma região geográfica, veículos de transporte inter-nodal (intvs), receptáculos de armazenamento armazenáveis em locais de armazenamento indexados dentro das instalações de nó e dos intvs e um sistema computadorizado. o sistema computadorizado armazena identificadores de receptáculo dos receptáculos de armazenamento e identificadores de local dos locais de armazenamento indexados e locais de armazenamento dinâmicos dos receptáculos de armazenamento. o sistema computadorizado também atualiza os identificadores de local conforme os receptáculos de armazenamento são transferidos entre as instalações de nó e os intvs. as instalações de nó, os intvs e os receptáculos de armazenamento, em comunicação com o sistema computadorizado, proveem uma rastreabilidade completa de um ou mais de itens unitários dos itens de inventário a partir de sua entrada no sistema de cadeia de suprimento até o atendimento de pedidos.

12. [20200279217](#) MULTI-NODAL SUPPLY CHAIN SYSTEM AND METHOD FOR SUPPLY CHAIN WORKFLOW EXECUTION USING TRANSPORTABLE AND CONTINUOUSLY TRACKABLE STORAGE BINS

US - 03.09.2020

Int.Class [G06Q 10/08](#) Appl.No 16805810 Applicant Attabotics Inc Inventor Scott Gravelle

A multi-nodal supply chain system including multiple interconnected entities and a method for executing a supply chain workflow using transportable and continuously trackable, standardized storage bins is provided. The entities include a network of node facilities distributed throughout a geographical region, inter-nodal transport vehicles (INTVs), storage bins storable in indexed storage locations within the node facilities and the INTVs, and a computerized system. The computerized system stores bin identifiers of the storage bins and location identifiers of the indexed storage locations and dynamic storage locations of the storage bins. The computerized system also updates the location identifiers as the storage bins are transferred between the node facilities and the INTVs. The node facilities, the INTVs, and the storage bins, in communication with the computerized system, provide a complete traceability of one or more eaches of inventory items from their input into the supply chain system to fulfillment of orders.

13. [PI 2021004976](#) MULTI-NODAL SUPPLY CHAIN SYSTEM AND METHOD FOR SUPPLY CHAIN WORKFLOW EXECUTION USING TRANSPORTABLE AND CONTINUOUSLY TRACKABLE STORAGE BINS MY - 01.09.2020

Int.Class [G1Q 10/08](#) Appl.No PI 2021004976 Applicant ATTABOTICS INC Inventor SIMPSON, Bradley Dean

A multi-nodal supply chain system including multiple interconnected entities and a method for executing a supply chain workflow using transportable and continuously trackable, standardized storage bins is provided. The entities include a network of node facilities distributed throughout a geographical region, inter-nodal transport vehicles (INTVs), storage bins storable in indexed storage locations within the node facilities and the INTVs, and a computerized system. The computerized system stores bin identifiers of the storage bins and location identifiers of the indexed storage locations and dynamic storage locations of the storage bins. The computerized system also updates the location identifiers as the storage bins are transferred between the node facilities and the INTVs. The node facilities, the INTVs, and the storage bins, in communication with the computerized system, provide a complete traceability of one or more eaches of inventory items from their input into the supply chain system to fulfillment of orders. Fig 2A.

14. [11202109481R](#) MULTI-NODAL SUPPLY CHAIN SYSTEM AND METHOD FOR SUPPLY CHAIN WORKFLOW EXECUTION USING TRANSPORTABLE AND CONTINUOUSLY TRACKABLE STORAGE BINS SG - 29.09.2021

Int.Class [G06Q 10/08](#) Appl.No 11202109481R Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

A multi-nodal supply chain system including multiple interconnected entities and a method for executing a supply chain workflow using transportable and continuously trackable, standardized storage bins is provided. The entities include a network of node facilities distributed throughout a geographical region, inter-nodal transport vehicles (INTVs), storage bins storable in indexed storage locations within the node facilities and the INTVs, and a computerized system. The computerized system stores bin identifiers of the storage bins and location identifiers of the indexed storage locations and dynamic storage locations of the storage bins. The computerized system also updates the location identifiers as the storage bins are transferred between the node facilities and the INTVs. The node facilities, the INTVs, and the storage bins, in communication with the computerized system, provide a complete traceability of one or more eaches of inventory items from their input into the supply chain system to fulfillment of orders.

15. [2020231623](#) MULTI-NODAL SUPPLY CHAIN SYSTEM AND METHOD FOR SUPPLY CHAIN WORKFLOW EXECUTION USING TRANSPORTABLE AND CONTINUOUSLY TRACKABLE STORAGE BINS AU - 10.09.2020

Int.Class [G06Q 10/08](#) Appl.No 2020231623 Applicant Attabotics Inc. Inventor GRAVELLE, Scott

A multi-nodal supply chain system including multiple interconnected entities and a method for executing a supply chain workflow using transportable and continuously trackable, standardized storage bins is provided. The entities include a network of node facilities distributed throughout a geographical region, inter-nodal transport vehicles (INTVs), storage bins storable in indexed storage locations within the node facilities and the INTVs, and a computerized system. The computerized system stores bin identifiers of the storage bins and location identifiers of the indexed storage locations and dynamic storage locations of the storage bins. The computerized system also updates the location identifiers as the storage bins are transferred between the node facilities and the INTVs. The node facilities, the INTVs, and the storage bins, in communication with the computerized system, provide a complete traceability of one or more eaches of inventory items from their input into the supply chain system to fulfillment of orders.

16. [3119942](#) MULTI-NODAL SUPPLY CHAIN SYSTEM AND METHOD FOR SUPPLY CHAIN WORKFLOW EXECUTION USING TRANSPORTABLE AND CONTINUOUSLY TRACKABLE STORAGE BINS CA - 10.09.2020

Int.Class [G06Q 10/08](#) Appl.No 3119942 Applicant ATTABOTICS INC. Inventor LANGEN, DOUGLAS

A multi-nodal supply chain system including multiple interconnected entities and a method for executing a supply chain workflow using transportable and continuously trackable, standardized storage bins is provided. The entities include a network of node facilities distributed throughout a geographical region, inter-nodal transport vehicles (INTVs), storage bins storable in indexed storage locations within the node facilities and the INTVs, and a computerized system. The computerized system stores bin identifiers of the storage bins and location identifiers of the indexed storage locations and dynamic storage locations of the storage bins. The computerized system also updates the location identifiers as the storage bins are transferred between the node facilities and the INTVs. The node facilities, the INTVs, and the storage bins, in communication with the computerized system, provide a complete traceability of one or more eaches of inventory items from their input into the supply chain system to fulfillment of orders.

17. [112021010604](#) GERENCIAMENTO DE INVENTÁRIO DE VÁRIAS ENTIDADES USANDO LOTE DE ARMAZENAMENTO E REASSOCIAÇÃO DE INVENTÁRIO BR - 24.08.2021

Int.Class [G06Q 10](#) Appl.No 112021010604 Applicant ATTABOTICS INC. Inventor BRADLEY DEAN SIMPSON

gerenciamento de inventário de várias entidades usando lote de armazenamento e reassociação de inventário.é fornecido um sistema de gerenciamento de inventário de várias entidades, incluindo lotes de armazenamento reatribuíveis e um método para gerenciar o inventário de produtos de entidades diferentes, por exemplo, fornecedores, em uma ou mais instalações, incluindo uma ou mais estruturas de armazenamento servidas por manipuladores robóticos. cada lote de armazenamento armazena um ou mais de cada um dos produtos. um sistema de gerenciamento de inventário computadorizado (cims) armazena registros digitais, incluindo identificadores de entidades, catálogos de produtos contendo identificadores de produtos oferecidos por cada entidade aos clientes e identificadores de lote exclusivos atribuídos aos lotes de armazenamento. o cims executa uma transferência digital de propriedade de inventário de uma entidade com estoque para uma entidade em necessidade, por exemplo, com base em uma deficiência de inventário, uma ausência completa de inventário da entidade em necessidade, pedidos para o inventário de produto sendo recebido etc. junto com uma troca de inventário por meio dos lotes de armazenamento, o cims executa o comércio entre as entidades e implementa a reserva de inventário.

18. [20210398059](#) MULTI-ENTITY INVENTORY MANAGEMENT USING STORAGE BIN AND INVENTORY REASSIGNMENT US - 23.12.2021

Int.Class [G06Q 10/08](#) Appl.No 16954199 Applicant ATTABOTICS INC Inventor SCOTT GRAVELLE

A multi-entity inventory management system including reassignable storage bins and a method for managing product inventory of different entities, for example, vendors, at one or more facilities including one or more storage structures served by robotic handlers, are provided. Each storage bin stores one or more caches of the products. A computerized inventory management system (CIMS) stores digital records including entity identifiers, product catalogues containing product identifiers of the products offered by each entity to customers, and unique bin identifiers assigned to the storage bins. The CIMS executes a digital transfer of ownership of inventory from a stocked entity to a needful entity, for example, based on an inventory shortfall, a complete absence of inventory of the needful entity, orders for the product inventory being received, etc. Along with an inventory swap through the storage bins, the CIMS executes commerce between the entities and implements inventory reservation.

19. [11202110050R](#) MULTI-ENTITY INVENTORY MANAGEMENT USING STORAGE BIN AND INVENTORY REASSIGNMENT SG - 28.10.2021

Int.Class [G06Q 10/08](#) Appl.No 11202110050R Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

20. [202147046974](#) MULTI-ENTITY INVENTORY MANAGEMENT USING STORAGE BIN AND INVENTORY REASSIGNMENT IN - 29.10.2021Int.Class [G06Q/](#) Appl.No 202147046974 Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

A multi-entity inventory management system including reassignable storage bins and a method for managing product inventory of different entities, for example, vendors, at one or more facilities including one or more storage structures served by robotic handlers, are provided. Each storage bin stores one or more eaches of the products. A computerized inventory management system (CIMS) stores digital records including entity identifiers, product catalogues containing product identifiers of the products offered by each entity to customers, and unique bin identifiers assigned to the storage bins. The CIMS executes a digital transfer of ownership of inventory from a stocked entity to a needful entity, for example, based on an inventory shortfall, a complete absence of inventory of the needful entity, orders for the product inventory being received, etc. Along with an inventory swap through the storage bins, the CIMS executes commerce between the entities and implements inventory reservation.

21. [PI2021004979](#) MULTI-ENTITY INVENTORY MANAGEMENT USING STORAGE BIN AND INVENTORY REASSIGNMENT MY - 14.09.2020Int.Class [G1Q 10/08](#) Appl.No PI 2021004979 Applicant ATTABOTICS INC Inventor SIMPSON, Bradley Dean

A multi-entity inventory management system including reassignable storage bins and a method for managing product inventory of different entities, for example, vendors, at one or more facilities including one or more storage structures served by robotic handlers, are provided. Each storage bin stores one or more eaches of the products. A computerized inventory management system (CIMS) stores digital records including entity identifiers, product catalogues containing product identifiers of the products offered by each entity to customers, and unique bin identifiers assigned to the storage bins. The CIMS executes a digital transfer of ownership of inventory from a stocked entity to a needful entity, for example, based on an inventory shortfall, a complete absence of inventory of the needful entity, orders for the product inventory being received, etc. Along with an inventory swap through the storage bins, the CIMS executes commerce between the entities and implements inventory reservation. [FIG. 4C]

22. [2020234099](#) MULTI-ENTITY INVENTORY MANAGEMENT USING STORAGE BIN AND INVENTORY REASSIGNMENT AU - 17.09.2020Int.Class [G06Q 10/08](#) Appl.No 2020234099 Applicant Attabotics Inc. Inventor GRAVELLE, Scott

A multi-entity inventory management system including reassignable storage bins and a method for managing product inventory of different entities, for example, vendors, at one or more facilities including one or more storage structures served by robotic handlers, are provided. Each storage bin stores one or more eaches of the products. A computerized inventory management system (CIMS) stores digital records including entity identifiers, product catalogues containing product identifiers of the products offered by each entity to customers, and unique bin identifiers assigned to the storage bins. The CIMS executes a digital transfer of ownership of inventory from a stocked entity to a needful entity, for example, based on an inventory shortfall, a complete absence of inventory of the needful entity, orders for the product inventory being received, etc. Along with an inventory swap through the storage bins, the CIMS executes commerce between the entities and implements inventory reservation.

23. [3119943](#) MULTI-ENTITY INVENTORY MANAGEMENT USING STORAGE BIN AND INVENTORY REASSIGNMENT CA - 17.09.2020Int.Class [G06Q 10/08](#) Appl.No 3119943 Applicant ATTABOTICS INC. Inventor GRAVELLE, SCOTT

A multi-entity inventory management system including reassignable storage bins and a method for managing product inventory of different entities, for example, vendors, at one or more facilities including one or more storage structures served by robotic handlers, are provided. Each storage bin stores one or more eaches of the products. A computerized inventory management system (CIMS) stores digital records including entity identifiers, product catalogues containing product identifiers of the products offered by each entity to customers, and unique bin identifiers assigned to the storage bins. The CIMS executes a digital transfer of ownership of inventory from a stocked entity to a needful entity, for example, based on an inventory shortfall, a complete absence of inventory of the needful entity, orders for the product inventory being received, etc. Along with an inventory swap through the storage bins, the CIMS executes commerce between the entities and implements inventory reservation.

24. [WO/2020/183427](#) MULTI-ENTITY INVENTORY MANAGEMENT USING STORAGE BIN AND INVENTORY REASSIGNMENT WO - 17.09.2020Int.Class [G06Q 10/08](#) Appl.No PCT/IB2020/052287 Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

A multi-entity inventory management system including reassignable storage bins and a method for managing product inventory of different entities, for example, vendors, at one or more facilities including one or more storage structures served by robotic handlers, are provided. Each storage bin stores one or more eaches of the products. A computerized inventory management system (CIMS) stores digital records including entity identifiers, product catalogues containing product identifiers of the products offered by each entity to customers, and unique bin identifiers assigned to the storage bins. The CIMS executes a digital transfer of ownership of inventory from a stocked entity to a needful entity, for example, based on an inventory shortfall, a complete absence of inventory of the needful entity, orders for the product inventory being received, etc. Along with an inventory swap through the storage bins, the CIMS executes commerce between the entities and implements inventory reservation.

25. [3938984](#) MULTI-ENTITY INVENTORY MANAGEMENT USING STORAGE BIN AND INVENTORY REASSIGNMENT EP - 19.01.2022Int.Class [G06Q 10/08](#) Appl.No 20769613 Applicant ATTABOTICS INC Inventor GRAVELLE SCOTT

A multi-entity inventory management system including reassignable storage bins and a method for managing product inventory of different entities, for example, vendors, at one or more facilities including one or more storage structures served by robotic handlers, are provided. Each storage bin stores one or more eaches of the products. A computerized inventory management system (CIMS) stores digital records including entity identifiers, product catalogues containing product identifiers of the products offered by each entity to customers, and unique bin identifiers assigned to the storage bins. The CIMS executes a digital transfer of ownership of inventory from a stocked entity to a needful entity, for example, based on an inventory shortfall, a complete absence of inventory of the needful entity, orders for the product inventory being received, etc. Along with an inventory swap through the storage bins, the CIMS executes commerce between the entities and implements inventory reservation.

26. [3983177](#) MANUFACTURING SYSTEM WITH AN INTERCONNECTED STORAGE STRUCTURE AND MANUFACTURING CELLS SHARING A COMMON ROBOTIC FLEET EP - 20.04.2022Int.Class [B25H 3/00](#) Appl.No 20821967 Applicant ATTABOTICS INC Inventor GRAVELLE SCOTT

A manufacturing system including an automated storage and retrieval system (ASRS) structure with a three-dimensional array of storage locations distributed throughout a two- dimensional footprint of the ASRS structure at multiple storage levels; workpieces stored within the storage locations of the

ASRS structure; robotic storage/retrieval vehicles [RSRVs] navigable within the ASRS structure in three dimensions to access the storage locations, and multiple manufacturing cells positioned outside the ASRS structure, is provided. The manufacturing system includes a track structure attached to the ASRS structure and defining one or more travel paths traversable by the RSRVs from the ASRS structure. The same fleet of RSRVs that is navigable within the ASRS structure is operable to deliver the workpieces to the manufacturing cells. One or more of the manufacturing cells are positioned along the track structure, thereby receiving convenient access to the workpieces along with associated toolpieces and workpiece supports for manufacturing goods.

27. [202247001229](#) MANUFACTURING SYSTEM WITH AN INTERCONNECTED STORAGE STRUCTURE AND MANUFACTURING CELLS SHARING A COMMON ROBOTIC FLEET

IN - 25.02.2022

Int.Class [B65G/](#) Appl.No 202247001229 Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

A manufacturing system including an automated storage and retrieval system [ASRS] structure with a three-dimensional array of storage locations distributed throughout a two- dimensional footprint of the ASRS structure at multiple storage levels; workpieces stored within the storage locations of the ASRS structure; robotic storage/retrieval vehicles [RSRVs] navigable within the ASRS structure in three dimensions to access the storage locations, and multiple manufacturing cells positioned outside the ASRS structure, is provided. The manufacturing system includes a track structure attached to the ASRS structure and defining one or more travel paths traversable by the RSRVs from the ASRS structure. The same fleet of RSRVs that is navigable within the ASRS structure is operable to deliver the workpieces to the manufacturing cells. One or more of the manufacturing cells are positioned along the track structure, thereby receiving convenient access to the workpieces along with associated toolpieces and workpiece supports for manufacturing goods.

28. [WO/2020/250166](#) MANUFACTURING SYSTEM WITH AN INTERCONNECTED STORAGE STRUCTURE AND MANUFACTURING CELLS SHARING A COMMON ROBOTIC FLEET

WO - 17.12.2020

Int.Class [B25H 3/00](#) Appl.No PCT/IB2020/055479 Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

A manufacturing system including an automated storage and retrieval system [ASRS] structure with a three-dimensional array of storage locations distributed throughout a two- dimensional footprint of the ASRS structure at multiple storage levels; workpieces stored within the storage locations of the ASRS structure; robotic storage/retrieval vehicles [RSRVs] navigable within the ASRS structure in three dimensions to access the storage locations, and multiple manufacturing cells positioned outside the ASRS structure, is provided. The manufacturing system includes a track structure attached to the ASRS structure and defining one or more travel paths traversable by the RSRVs from the ASRS structure. The same fleet of RSRVs that is navigable within the ASRS structure is operable to deliver the workpieces to the manufacturing cells. One or more of the manufacturing cells are positioned along the track structure, thereby receiving convenient access to the workpieces along with associated toolpieces and workpiece supports for manufacturing goods.

29. [2020291822](#) MANUFACTURING SYSTEM WITH AN INTERCONNECTED STORAGE STRUCTURE AND MANUFACTURING CELLS SHARING A COMMON ROBOTIC FLEET

AU - 17.12.2020

Int.Class [B25H 3/00](#) Appl.No 2020291822 Applicant Attabotics Inc. Inventor GRAVELLE, Scott

A manufacturing system including an automated storage and retrieval system [ASRS] structure with a three-dimensional array of storage locations distributed throughout a two- dimensional footprint of the ASRS structure at multiple storage levels; workpieces stored within the storage locations of the ASRS structure; robotic storage/retrieval vehicles [RSRVs] navigable within the ASRS structure in three dimensions to access the storage locations, and multiple manufacturing cells positioned outside the ASRS structure, is provided. The manufacturing system includes a track structure attached to the ASRS structure and defining one or more travel paths traversable by the RSRVs from the ASRS structure. The same fleet of RSRVs that is navigable within the ASRS structure is operable to deliver the workpieces to the manufacturing cells. One or more of the manufacturing cells are positioned along the track structure, thereby receiving convenient access to the workpieces along with associated toolpieces and workpiece supports for manufacturing goods.

30. [3119896](#) MANUFACTURING SYSTEM WITH AN INTERCONNECTED STORAGE STRUCTURE AND MANUFACTURING CELLS SHARING A COMMON ROBOTIC FLEET

CA - 17.12.2020

Int.Class [B25H 3/00](#) Appl.No 3119896 Applicant ATTABOTICS INC Inventor

A manufacturing system including an automated storage and retrieval system [ASRS] structure with a three-dimensional array of storage locations distributed throughout a two- dimensional footprint of the ASRS structure at multiple storage levels; workpieces stored within the storage locations of the ASRS structure; robotic storage/retrieval vehicles [RSRVs] navigable within the ASRS structure in three dimensions to access the storage locations, and multiple manufacturing cells positioned outside the ASRS structure, is provided. The manufacturing system includes a track structure attached to the ASRS structure and defining one or more travel paths traversable by the RSRVs from the ASRS structure. The same fleet of RSRVs that is navigable within the ASRS structure is operable to deliver the workpieces to the manufacturing cells. One or more of the manufacturing cells are positioned along the track structure, thereby receiving convenient access to the workpieces along with associated toolpieces and workpiece supports for manufacturing goods.

31. [11202110440T](#) MANUFACTURING SYSTEM WITH AN INTERCONNECTED STORAGE STRUCTURE AND MANUFACTURING CELLS SHARING A COMMON ROBOTIC FLEET

SG - 28.10.2021

Int.Class [B25H 3/00](#) Appl.No 11202110440T Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

32. [112021010618](#) SISTEMA DE FABRICAÇÃO E MÉTODO PARA EXECUTAR UM FLUXO DE TRABALHO EM UM SISTEMA DE FABRICAÇÃO

BR - 18.01.2022

Int.Class [B25H 3](#) Appl.No 112021010618 Applicant ATTABOTICS INC. Inventor SCOTT GRAVELLE

sistema de fabricação e método para executar um fluxo de trabalho em um sistema de fabricação. um sistema de fabricação incluindo uma estrutura de sistema automatizado de recuperação e armazenamento [asrs] com uma matriz tridimensional de locais de armazenamento distribuídos ao longo de uma área de ocupação bidimensional da estrutura do asrs em vários níveis de armazenamento; peças de trabalho armazenadas nos locais de armazenamento da estrutura do asrs; são providos veículos robóticos de armazenamento/recuperação [rsrvs] navegáveis dentro da estrutura do asrs em três dimensões para acessar os locais de armazenamento e múltiplas células de fabricação posicionadas fora da estrutura do asrs. o sistema de fabricação inclui uma estrutura de trilhos anexada à estrutura do asrs e definindo um ou mais cursos de deslocamento que podem ser percorridos pelos rsrvs a partir da estrutura do asrs. a mesma frota de rsrvs que é navegável dentro da estrutura do asrs é operável para entregar as peças de trabalho às células de fabricação. uma ou mais das células de fabricação são posicionadas ao longo da estrutura de trilho, recebendo desse modo acesso conveniente às peças de trabalho juntamente com peças de ferramentas associadas e suportes das peças de trabalho para mercadorias de fabricação.

33. [PI2021004982](#) MANUFACTURING SYSTEM WITH AN INTERCONNECTED STORAGE STRUCTURE AND

MY - 11.12.2020

MANUFACTURING CELLS SHARING A COMMON ROBOTIC FLEET

Int.Class [B65G 1/02](#) Appl.No PI 2021004982 Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

A manufacturing system including an automated storage and retrieval system (ASRS) structure with a three-dimensional array of storage locations distributed throughout a two-dimensional footprint of the ASRS structure at multiple storage levels; workpieces stored within the storage locations of the ASRS structure; robotic storage/retrieval vehicles (RSRVs) navigable within the ASRS structure in three dimensions to access the storage locations, and multiple manufacturing cells positioned outside the ASRS structure, is provided. The manufacturing system includes a track structure attached to the ASRS structure and defining one or more travel paths traversable by the RSRVs from the ASRS structure. The same fleet of RSRVs that is navigable within the ASRS structure is operable to deliver the workpieces to the manufacturing cells. One or more of the manufacturing cells are positioned along the track structure, thereby receiving convenient access to the workpieces along with associated toolpieces and workpiece supports for manufacturing goods. [FIG. 1]

34. [3102647](#) IMPROVED STORAGE UNITS AND ROBOTIC STORAGE/RETRIEVAL VEHICLES FOR A THREE-DIMENSIONAL STORAGE SYSTEM CA - 12.12.2019

Int.Class [B65G 1/02](#) Appl.No 3102647 Applicant ATTABOTICS INC. Inventor GRAVELLE, SCOTT

In combination, a storage unit storable within a three-dimensional storage system and a storage/retrieval vehicle navigable through the three-dimensional storage system to storage locations therein at which the storage unit is selectively storable and retrievable. The storage/retrieval vehicle comprises a frame conveyable through the three-dimensional storage system, a platform atop the frame for receipt of the storage unit on the platform, and a loading/unloading mechanism operable to load and unload the storage unit to and from the platform at four different sides thereof. The storage unit and the storage/retrieval vehicle are configured to enable unloading of the storage unit from the platform in any one of four different directions at four different respective sides of the vehicle regardless of an original orientation in which the storage unit was previously loaded onto the platform and without reorienting the storage unit from the original orientation.

35. [2019280477](#) IMPROVED STORAGE UNITS AND ROBOTIC STORAGE/RETRIEVAL VEHICLES FOR A THREE-DIMENSIONAL STORAGE SYSTEM AU - 12.12.2019

Int.Class [B65G 1/02](#) Appl.No 2019280477 Applicant Attabotics Inc. Inventor DHALIWAL, Sundeeep

In combination, a storage unit storable within a three-dimensional storage system and a storage/retrieval vehicle navigable through the three-dimensional storage system to storage locations therein at which the storage unit is selectively storable and retrievable. The storage/retrieval vehicle comprises a frame conveyable through the three-dimensional storage system, a platform atop the frame for receipt of the storage unit on the platform, and a loading/unloading mechanism operable to load and unload the storage unit to and from the platform at four different sides thereof. The storage unit and the storage/retrieval vehicle are configured to enable unloading of the storage unit from the platform in any one of four different directions at four different respective sides of the vehicle regardless of an original orientation in which the storage unit was previously loaded onto the platform and without reorienting the storage unit from the original orientation.

36. [202147000978](#) IMPROVED STORAGE UNITS AND ROBOTIC STORAGE/RETRIEVAL VEHICLES FOR A THREE-DIMENSIONAL STORAGE SYSTEM IN - 15.01.2021

Int.Class [B65G 1/02](#) Appl.No 202147000978 Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

In combination, a storage unit storable within a three-dimensional storage system and a storage/retrieval vehicle navigable through the three-dimensional storage system to storage locations therein at which the storage unit is selectively storable and retrievable. The storage/retrieval vehicle comprises a frame conveyable through the three-dimensional storage system, a platform atop the frame for receipt of the storage unit on the platform, and a loading/unloading mechanism operable to load and unload the storage unit to and from the platform at four different sides thereof. The storage unit and the storage/retrieval vehicle are configured to enable unloading of the storage unit from the platform in any one of four different directions at four different respective sides of the vehicle regardless of an original orientation in which the storage unit was previously loaded onto the platform and without reorienting the storage unit from the original orientation.

37. [11202012135P](#) IMPROVED STORAGE UNITS AND ROBOTIC STORAGE/RETRIEVAL VEHICLES FOR A THREE-DIMENSIONAL STORAGE SYSTEM SG - 28.01.2021

Int.Class [B65G 1/02](#) Appl.No 11202012135P Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

In combination, a storage unit storable within a three-dimensional storage system and a storage/retrieval vehicle navigable through the three-dimensional storage system to storage locations therein at which the storage unit is selectively storable and retrievable. The storage/retrieval vehicle comprises a frame conveyable through the three-dimensional storage system, a platform atop the frame for receipt of the storage unit on the platform, and a loading/unloading mechanism operable to load and unload the storage unit to and from the platform at four different sides thereof. The storage unit and the storage/retrieval vehicle are configured to enable unloading of the storage unit from the platform in any one of four different directions at four different respective sides of the vehicle regardless of an original orientation in which the storage unit was previously loaded onto the platform and without reorienting the storage unit from the original orientation.

38. [112020024755](#) UNIDADES DE ARMAZENAMENTO APRIMORADAS E VEÍCULOS DE ARMAZENAMENTO/RECUPERAÇÃO ROBÓTICOS PARA UM SISTEMA DE ARMAZENAMENTO TRIDIMENSIONAL BR - 23.03.2021

Int.Class [B65G 1](#) Appl.No 112020024755 Applicant ATTABOTICS INC. Inventor JOHN EARL

em combinação, uma unidade de armazenamento armazenável dentro de um sistema de armazenamento tridimensional e um veículo de armazenamento/recuperação navegável através do sistema de armazenamento tridimensional para locais de armazenamento nele nos quais a unidade de armazenamento é seletivamente armazenável e recuperável. o veículo de armazenamento/recuperação compreende um quadro transportável através do sistema de armazenamento tridimensional, uma plataforma no topo do quadro para o recebimento da unidade de armazenamento na plataforma e um mecanismo de descarregamento/descarregamento operável para carregar e descarregar a unidade de armazenamento e para e a partir da plataforma em quatro lados diferentes desta. a unidade de armazenamento e o veículo de armazenamento/recuperação são configurados para permitir o descarregamento da unidade de armazenamento da plataforma em qualquer uma das quatro direções diferentes em quatro lados respectivos do veículo, independentemente de uma orientação original na qual a unidade de armazenamento foi carregada anteriormente na plataforma e sem reorientar a unidade de armazenamento da orientação original.

39. [PI 2020006427](#) IMPROVED STORAGE UNITS AND ROBOTIC STORAGE/RETRIEVAL VEHICLES FOR A THREE-DIMENSIONAL STORAGE SYSTEM MY - 08.12.2019

Int.Class [B6G 1/02](#) Appl.No PI 2020006427 Applicant ATTABOTICS INC. Inventor EARL, John

In combination, a storage unit storable within a three-dimensional storage system and a storage/retrieval vehicle navigable through the three-dimensional storage system to storage locations therein at which the storage unit is selectively storable and retrievable. The storage/retrieval vehicle comprises a frame conveyable through the three-dimensional storage system, a platform atop the frame for receipt of the storage unit on the platform, and a loading/unloading mechanism operable to load and unload the storage unit to and from the platform at four different sides thereof. The storage unit and the storage/retrieval vehicle are configured to enable unloading of the storage unit from the platform in any one of four different directions at four different respective sides of the vehicle regardless of an original orientation in which the storage unit was previously loaded onto the platform and without reorienting the storage unit from the original orientation. Figure 9C

40. [WO/2019/232652](#) IMPROVED STORAGE UNITS AND ROBOTIC STORAGE/RETRIEVAL VEHICLES FOR A THREE-DIMENSIONAL STORAGE SYSTEM WO - 12.12.2019

Int.Class [B65G 1/02](#) Appl.No PCT/CA2019/050816 Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

In combination, a storage unit storable within a three-dimensional storage system and a storage/retrieval vehicle navigable through the three-dimensional storage system to storage locations therein at which the storage unit is selectively storable and retrievable. The storage/retrieval vehicle comprises a frame conveyable through the three-dimensional storage system, a platform atop the frame for receipt of the storage unit on the platform, and a loading/unloading mechanism operable to load and unload the storage unit to and from the platform at four different sides thereof. The storage unit and the storage/retrieval vehicle are configured to enable unloading of the storage unit from the platform in any one of four different directions at four different respective sides of the vehicle regardless of an original orientation in which the storage unit was previously loaded onto the platform and without reorienting the storage unit from the original orientation.

41. [3802370](#) IMPROVED STORAGE UNITS AND ROBOTIC STORAGE/RETRIEVAL VEHICLES FOR A THREE-DIMENSIONAL STORAGE SYSTEM EP - 14.04.2021

Int.Class [B65G 1/02](#) Appl.No 19815192 Applicant ATTABOTICS INC Inventor GRAVELLE SCOTT

In combination, a storage unit storable within a three-dimensional storage system and a storage/retrieval vehicle navigable through the three-dimensional storage system to storage locations therein at which the storage unit is selectively storable and retrievable. The storage/retrieval vehicle comprises a frame conveyable through the three-dimensional storage system, a platform atop the frame for receipt of the storage unit on the platform, and a loading/unloading mechanism operable to load and unload the storage unit to and from the platform at four different sides thereof. The storage unit and the storage/retrieval vehicle are configured to enable unloading of the storage unit from the platform in any one of four different directions at four different respective sides of the vehicle regardless of an original orientation in which the storage unit was previously loaded onto the platform and without reorienting the storage unit from the original orientation.

42. [2019280476](#) IMPROVED STORAGE AND RETRIEVAL SYSTEMS AU - 12.12.2019

Int.Class [B65G 1/02](#) Appl.No 2019280476 Applicant Attabotics Inc. Inventor GRAVELLE, Scott

An improved storage and retrieval system employing a gridded three-dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

43. [112020024745](#) SISTEMAS DE ARMAZENAMENTO E RECUPERAÇÃO MELHORADOS BR - 23.03.2021

Int.Class [B25J 5](#) Appl.No 112020024745 Applicant ATTABOTICS INC. Inventor DARIN ROUSSEAU

um sistema de estocagem e recuperação aprimorado que emprega uma estrutura de estocagem tridimensional gradeada apresenta estações de trabalho atendidas pela mesma frota de veículos robóticos que atende a estrutura de estocagem, estações de trabalho de deslocamento usando os mesmos veículos robóticos para transportar unidades de estocagem através da estação de trabalho sem transferência para qualquer outro transportador ou manipulador, classificação interna usando navegação orquestrada dos veículos robóticos para pontos de entrada da estação de trabalho, sensores nos veículos robóticos para confirmar o carregamento adequado e alinhamento das unidades de estocagem sobre os mesmos, mecanismos de elevação para elevar os veículos robóticos em eixos da grade de um trilho inferior do mesmo, o uso de marcadores e escâneres para alinhar os veículos robóticos com os eixos da grade e cortinas de luz da estação de trabalho para segurança das mãos, contagem de coleta e detecção de protrusão do conteúdo do recipiente.

44. [3802374](#) IMPROVED STORAGE AND RETRIEVAL SYSTEMS EP - 14.04.2021

Int.Class [B65G 1/04](#) Appl.No 19814226 Applicant ATTABOTICS INC Inventor GRAVELLE SCOTT

An improved storage and retrieval system employing a gridded three-dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

45. [3102631](#) STORAGE AND RETRIEVAL SYSTEMS SHARING A COMMON ROBOTIC FLEET BETWEEN A STORAGE GRID AND EXTERNAL WORKSTATIONS CA - 12.12.2019

Int.Class [B65G 1/04](#) Appl.No 3102631 Applicant ATTABOTICS INC. Inventor GRAVELLE, SCOTT

An improved storage and retrieval system employing a gridded three-dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

46. [2019280272](#) IMPROVED STORAGE AND RETRIEVAL SYSTEMS

AU - 12.12.2019

Int.Class [B65G 1/04](#) Appl.No 2019280272 Applicant ATTABOTICS Inc. Inventor GRAVELLE, Scott

An improved storage and retrieval system employing a gridded three- dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

47. [112020024747](#) SISTEMAS DE ARMAZENAMENTO E RECUPERAÇÃO APRIMORADOS

BR - 23.03.2021

Int.Class [B65G 1](#) Appl.No 112020024747 Applicant ATTABOTICS INC. Inventor DARIN ROUSSEAU

um sistema de armazenamento e recuperação aprimorado que emprega uma estrutura de armazenamento tridimensional gradeada apresenta estações de trabalho servidas pela mesma frota de veículos robóticos que serve a estrutura de armazenamento, estações de trabalho de deslocamento completo usando os mesmos veículos robóticos para levar unidades de armazenamento através da estação de trabalho sem transferência para qualquer outro transportador ou manipulador, organização interna usando navegação orquestrada dos veículos robóticos para pontos de entrada de estação de trabalho, sensores sobre os veículos robóticos para confirmar o carregamento e alinhamento devidos de unidades de armazenamento nestes, mecanismos de elevação para levantar os veículos robóticos em eixos da grade a partir de um trilho inferior deste, o uso de marcadores e escâneres para alinhar os veículos robóticos com os eixos de grade e cortinas de luz de estação de trabalho para segurança das mãos, contagem de escolha e detecção de protrusão do conteúdo do recipiente.

48. [11202012131V](#) IMPROVED STORAGE AND RETRIEVAL SYSTEMS

SG - 28.01.2021

Int.Class [B65G 1/04](#) Appl.No 11202012131V Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

An improved storage and retrieval system employing a gridded three- dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

49. [11202012134R](#) IMPROVED STORAGE AND RETRIEVAL SYSTEMS

SG - 28.01.2021

Int.Class [B65G 1/02](#) Appl.No 11202012134R Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

An improved storage and retrieval system employing a gridded three- dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

50. [3102674](#) STORAGE AND RETRIEVAL SYSTEM FOR MANAGING LOADING, ALIGNMENT, AND TRAVEL OF STORAGE UNITS AND ROBOTIC VEHICLES

CA - 12.12.2019

Int.Class [B65G 1/02](#) Appl.No 3102674 Applicant ATTABOTICS INC. Inventor GRAVELLE, SCOTT

An improved storage and retrieval system employing a gridded three- dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

51. [WO/2021/108899](#) AUTOMATED STORAGE AND RETRIEVAL SYSTEM REDUCING BIN MOVES BY SELECTING MULTI-STOCK BINS CONTAINING HIGHEST NUMBER OF SKUS ON WORKSTATION STOCK WAITLIST

WO - 10.06.2021

Int.Class [B65G 1/02](#) Appl.No PCT/CA2020/051641 Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

An automated storage and retrieval system stores multi-stock bins each holding different stock-keeping units (SKUs). Records dynamically track which SKUs are in each bin. A controller tracks a stock waitlist indicating quantities of SKUs still required to be delivered to a workstation in order to fulfil current orders assigned to the workstation. When a robot is available, the controller selects a multi-stock bin that has a highest number of unique ones of the required SKUs indicated on the stock waitlist and commands the robot to fetch and deliver the selected bin to the workstation. For new orders, the controller may determine if direct assignment can be done to a workstation without additional bins being scheduled. For other pending orders, the controller may assume each pending order is assigned to the workstation and then pick the order that would require a lowest number of bins to be delivered to the workstation.

52. [3799591](#) IMPROVED STORAGE AND RETRIEVAL SYSTEMS

EP - 07.04.2021

Int.Class [B65G 1/02](#) Appl.No 19814476 Applicant ATTABOTICS INC Inventor GRAVELLE SCOTT

An improved storage and retrieval system employing a gridded three- dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

53. [202147000974](#) IMPROVED STORAGE AND RETRIEVAL SYSTEMS

IN - 15.01.2021

Int.Class [B65G 1/02](#) Appl.No 202147000974 Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

An improved storage and retrieval system employing a gridded three- dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

54. [202147000966](#) IMPROVED STORAGE AND RETRIEVAL SYSTEMS

IN - 15.01.2021

Int.Class [B65G 1/04](#) Appl.No 202147000966 Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

An improved storage and retrieval system employing a gridded three- dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

55. [PI 2020006432](#) STORAGE AND RETRIEVAL SYSTEMS SHARING A COMMON ROBOTIC FLEET BETWEEN A STORAGE GRID AND EXTERNAL WORKSTATIONS

MY - 08.12.2019

Int.Class [BIG 1/04](#) Appl.No PI 2020006432 Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

A storage system features a fleet of storage/retrieval vehicles and a gridded three-dimensional structure. The structure features a gridded two-dimensional track layout on which the one or more storage/retrieval vehicles are conveyable in two directions, and a plurality of storage columns residing above or below the gridded track layout in spaced distribution throughout the two-dimensional area of the track layout. Upright shafts reside above or below the gridded track layout and provide vehicle access to the storage columns. At least one working station resides outside the two-dimensional area of the track layout, and via one or more extension tracks, is served by the same vehicles that navigate the gridded structure. Figure 5

56. [PI 2020006429](#) STORAGE AND RETRIEVAL SYSTEMS PERFORMING INTERNAL SORTATION BY ORCHESTRATED NAVIGATION OF STORAGE GRID ROBOTS TO WORKSTATION INTAKE POINTS

MY - 08.12.2019

Int.Class [BIG 1/02](#) Appl.No PI 2020006429 Applicant ATTABOTICS INC. Inventor HOPE, Winston

Orchestrated delivery of retrieved storage units from a three-dimensional gridded storage structure to an entrance or intake point of a working station in a sequenced manner is performed entirely within the footprint of the gridded three-dimensional storage structure by the same fleet of robotic storage/retrieval vehicles operable to retrieve the storage units from storage locations within that gridded structure, thereby enabling omission of large sortation conveyors or other external sortation equipment.

57. [20210354922](#) STORAGE AND RETRIEVAL SYSTEM FOR MANAGING LOADING, ALIGNMENT, AND TRAVEL OF STORAGE UNITS AND ROBOTIC VEHICLES

US - 18.11.2021

Int.Class [B65G 1/137](#) Appl.No 16973260 Applicant ATTABOTICS INC Inventor SCOTT GRAVELLE

A storage and retrieval system employing a gridded three-dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the gridded three-dimensional storage structure from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

58. [3149682](#) AUTOMATED STORAGE AND RETRIEVAL SYSTEM REDUCING BIN MOVES BY SELECTING MULTI-STOCK BINS CONTAINING HIGHEST NUMBER OF SKUS ON WORKSTATION STOCK WAITLIST

CA - 10.06.2021

Int.Class [B65G 1/02](#) Appl.No 3149682 Applicant ATTABOTICS INC. Inventor GRAVELLE, SCOTT

An automated storage and retrieval system stores multi-stock bins each holding different stock-keeping units (SKUs). Records dynamically track which SKUs are in each bin. A controller tracks a stock waitlist indicating quantities of SKUs still required to be delivered to a workstation in order to fulfil current orders assigned to the workstation. When a robot is available, the controller selects a multi-stock bin that has a highest number of unique ones of the required SKUs indicated on the stock waitlist and commands the robot to fetch and deliver the selected bin to the workstation. For new orders, the controller may determine if direct assignment can be done to a workstation without additional bins being scheduled. For other pending orders, the controller may assume each pending order is assigned to the workstation and then pick the order that would require a lowest number of bins to be delivered to the workstation.

59. [WO/2019/232613](#) IMPROVED STORAGE AND RETRIEVAL SYSTEMS

WO - 12.12.2019

Int.Class [B65G 1/04](#) Appl.No PCT/CA2019/050404 Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

An improved storage and retrieval system employing a gridded three- dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

60. [WO/2019/232651](#) IMPROVED STORAGE AND RETRIEVAL SYSTEMS

WO - 12.12.2019

Int.Class [B65G 1/02](#) Appl.No PCT/CA2019/050815 Applicant ATTABOTICS INC. Inventor GRAVELLE, Scott

An improved storage and retrieval system employing a gridded three-dimensional storage structure features workstations served by the same robotic vehicle fleet that serves the storage structure, travel-through workstations using the same robotic vehicles to carry storage units through the workstation without hand-off to any other conveyor or handler, internal sortation using orchestrated navigation of the robotic vehicles to workstation intake points, sensors on the robotic vehicles to confirm proper loading and alignment of storage units thereon, lifting mechanisms for raising the robotic vehicles into shafts of the grid from a lower track thereof, use of markers and scanners to align the robotic vehicles with the grid shafts, and workstation light curtains for hand safety, pick-counting and container content protrusion detection.

61. [202247017686](#) MULTI-ZONE AUTOMATED STORAGE AND RETRIEVAL SYSTEM

IN - 10.06.2022

Int.Class [B65G/](#) Appl.No 202247017686 Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

A multi-zone automated storage and retrieval system (ASRS) and a method for controlling operation of robotic storage/retrieval vehicles (RSRVs) therein are provided. The multi-zone ASRS includes first and second storage zones isolated by at least one barrier and including first and second groups of storage locations respectively for accommodating storage units therein. The multi-zone ASRS includes one or more portals opening through the barrier(s) between the storage zones, and at least one track layout. The track layout(s) includes first and second track areas occupying the first and second storage zones respectively, and one or more connective track segments interconnecting the first and second track areas through the portal(s). The RSRVs deposit and retrieve the storage units to and from the storage locations and travel on the first and second track areas via the connective track segment(s) to respectively access the first and second groups of storage locations therefrom.

62. [2020339816](#) MULTI-ZONE AUTOMATED STORAGE AND RETRIEVAL SYSTEM

AU - 03.02.2022

Int.Class [B65G 1/02](#) Appl.No 2020339816 Applicant Attabotics Inc Inventor DHALIWAL, Sundeep

A multi-zone automated storage and retrieval system (ASRS) and a method for controlling operation of robotic storage/retrieval vehicles (RSRVs) therein are provided. The multi-zone ASRS includes first and second storage zones isolated by at least one barrier and including first and second groups of storage locations respectively for accommodating storage units therein. The multi-zone ASRS includes one or more portals opening through the barrier(s) between the storage zones, and at least one track layout. The track layout(s) includes first and second track areas occupying the first and second storage zones respectively, and one or more connective track segments interconnecting the first and second track areas through the portal(s). The RSRVs deposit and retrieve the storage units to and from the storage locations and travel on the first and second track areas via the connective track segment(s) to respectively access the first and second groups of storage locations therefrom.

63. [11202200375V](#) MULTI-ZONE AUTOMATED STORAGE AND RETRIEVAL SYSTEM

SG - 25.02.2022

Int.Class [B65G 1/02](#) Appl.No 11202200375V Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

A multi-zone automated storage and retrieval system (ASRS) and a method for controlling operation of robotic storage/retrieval vehicles (RSRVs) therein are provided. The multi-zone ASRS includes first and second storage zones isolated by at least one barrier and including first and second groups of storage locations respectively for accommodating storage units therein. The multi-zone ASRS includes one or more portals opening through the barrier(s) between the storage zones, and at least one track layout. The track layout(s) includes first and second track areas occupying the first and second storage zones respectively, and one or more connective track segments interconnecting the first and second track areas through the portal(s). The RSRVs deposit and retrieve the storage units to and from the storage locations and travel on the first and second track areas via the connective track segment(s) to respectively access the first and second groups of storage locations therefrom.

64. [3147325](#) MULTI-ZONE AUTOMATED STORAGE AND RETRIEVAL SYSTEM

CA - 04.03.2021

Int.Class [B65G 1/02](#) Appl.No 3147325 Applicant ATTABOTICS INC. Inventor GRAVELLE, SCOTT

A multi-zone automated storage and retrieval system (ASRS) and a method for controlling operation of robotic storage/retrieval vehicles (RSRVs) therein are provided. The multi-zone ASRS includes first and second storage zones isolated by at least one barrier and including first and second groups of storage locations respectively for accommodating storage units therein. The multi-zone ASRS includes one or more portals opening through the barrier(s) between the storage zones, and at least one track layout. The track layout(s) includes first and second track areas occupying the first and second storage zones respectively, and one or more connective track segments interconnecting the first and second track areas through the portal(s). The RSRVs deposit and retrieve the storage units to and from the storage locations and travel on the first and second track areas via the connective track segment(s) to respectively access the first and second groups of storage locations therefrom.

65. [PI2022000511](#) MULTI-ZONE AUTOMATED STORAGE AND RETRIEVAL SYSTEM

MY - 26.02.2021

Int.Class [BIG 1/02](#) Appl.No PI 2022000511 Applicant ATTABOTICS INC. Inventor ROUSSEAU, Darin

A multi-zone automated storage and retrieval system (ASRS) and a method for controlling operation of robotic storage/retrieval vehicles (RSRVs) therein are provided. The multi-zone ASRS includes first and second storage zones isolated by at least one barrier and including first and second groups of storage locations respectively for accommodating storage units therein. The multi-zone ASRS includes one or more portals opening through the barrier(s) between the storage zones, and at least one track layout. The track layout(s) includes first and second track areas occupying the first and second storage zones respectively, and one or more connective track segments interconnecting the first and second track areas through the portal(s). The RSRVs deposit and retrieve the storage units to and from the storage locations and travel on the first and second track areas via the connective track segment(s) to respectively access the first and second groups of storage locations therefrom. [FIG. 1]

66. [PI2021004981](#) SPACE-EFFICIENT ORDER FULFILLMENT SYSTEM FOR WORKFLOW BETWEEN SERVICE AREAS

MY - 10.11.2020

Int.Class [B60P 1/38](#) Appl.No PI 2021004981 Applicant ATTABOTICS INC Inventor DHALIWAL, Sundeep

An order fulfillment system including an automated storage and retrieval system (ASRS) structure, robotic vehicles, storage bins, and different service areas in a continuous arrangement positioned adjacent to an outer perimeter of the ASRS structure at one or more service levels of the ASRS structure, is provided. The robotic vehicles are navigable within the ASRS structure at the service level(s) positioned above and/or below storage levels of the ASRS structure. The robotic vehicles carry the storage bins within the ASRS structure during transfer of the storage bins to and from storage locations of the ASRS structure. Each service area includes one or more workstations of a type configured for one or more tasks different from one or more workstations at another service area. Each service area receives a drop-off of the storage bins at and/or a travel of the storage bins through each service area by the robotic vehicles. [FIG. 3]

67. [202147055222](#) SPACE-EFFICIENT ORDER FULFILLMENT SYSTEM FOR WORKFLOW BETWEEN SERVICE AREAS

IN - 10.12.2021

Int.Class [B65G/](#) Appl.No 202147055222 Applicant ATTABOTICS INC Inventor GRAVELLE, Scott



An order fulfillment system including an automated storage and retrieval system (ASRS) structure, robotic vehicles, storage bins, and different service areas in a continuous arrangement positioned adjacent to an outer perimeter of the ASRS structure at one or more service levels of the ASRS structure, is provided. The robotic vehicles are navigable within the ASRS structure at the service level(s) positioned above and/or below storage levels of the ASRS structure. The robotic vehicles carry the storage bins within the ASRS structure during transfer of the storage bins to and from storage locations of the ASRS structure. Each service area includes one or more workstations of a type configured for one or more tasks different from one or more workstations at another service area. Each service area receives a drop-off of the storage bins at and/or a travel of the storage bins through each service area by the robotic vehicles.

68. [112022000170](#) SISTEMA DE ARMAZENAMENTO E RECUPERAÇÃO AUTOMATIZADO DE MÚLTIPLAS ZONAS E MÉTODO IMPLEMENTADO POR COMPUTADOR BR - 15.03.2022

Int.Class [B65G 1](#) Appl.No 112022000170 Applicant ATTABOTICS INC. Inventor DARIN ROUSSEAU

sistema de armazenamento e recuperação automatizado de múltiplas zonas e método implementado por computador. um sistema de armazenamento e recuperação automatizado de várias zonas (asrs) e um método para controlar a operação de veículos de armazenamento/recuperação robóticos (rsrvs) nele são providos. o asrs de múltiplas zonas inclui primeira e segunda zonas de armazenamento isoladas por pelo menos uma barreira e incluindo primeiro e segundo grupos de locais de armazenamento, respectivamente, para acomodar unidades de armazenamento nelas. o asrs de múltiplas zonas inclui um ou mais portais abrindo através da(s) barreira(s) entre as zonas de armazenamento e pelo menos uma disposição de trilho. a(s) disposição(ões) de trilho(s) inclui(em) primeira e segunda áreas de trilho ocupando a primeira e a segunda zonas de armazenamento, respectivamente, e um ou mais segmentos de trilho conectivo interconectando a primeira e a segunda áreas de trilho através do(s) portal(is). os rsrvs depositam e recuperam as unidades de armazenamento para e a partir dos locais de armazenamento e se deslocam na primeira e segunda áreas de trilho por meio do(s) segmento(s) de trilho conectivo para acessar, respectivamente, o primeiro e o segundo grupos de locais de armazenamento a partir destes.

69. [3119904](#) SPACE-EFFICIENT ORDER FULFILLMENT SYSTEM FOR WORKFLOW BETWEEN SERVICE AREAS CA - 19.11.2020

Int.Class [B65G 1/04](#) Appl.No 3119904 Applicant ATTABOTICS INC Inventor

An order fulfillment system including an automated storage and retrieval system (ASRS) structure, robotic vehicles, storage bins, and different service areas in a continuous arrangement positioned adjacent to an outer perimeter of the ASRS structure at one or more service levels of the ASRS structure, is provided. The robotic vehicles are navigable within the ASRS structure at the service level(s) positioned above and/or below storage levels of the ASRS structure. The robotic vehicles carry the storage bins within the ASRS structure during transfer of the storage bins to and from storage locations of the ASRS structure. Each service area includes one or more workstations of a type configured for one or more tasks different from one or more workstations at another service area. Each service area receives a drop-off of the storage bins at and/or a travel of the storage bins through each service area by the robotic vehicles.

70. [11202110064V](#) SPACE-EFFICIENT ORDER FULFILLMENT SYSTEM FOR WORKFLOW BETWEEN SERVICE AREAS SG - 29.11.2021

Int.Class [B65G 1/04](#) Appl.No 11202110064V Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

An order fulfillment system including an automated storage and retrieval system (ASRS) structure, robotic vehicles, storage bins, and different service areas in a continuous arrangement positioned adjacent to an outer perimeter of the ASRS structure at one or more service levels of the ASRS structure, is provided. The robotic vehicles are navigable within the ASRS structure at the service level(s) positioned above and/or below storage levels of the ASRS structure. The robotic vehicles carry the storage bins within the ASRS structure during transfer of the storage bins to and from storage locations of the ASRS structure. Each service area includes one or more workstations of a type configured for one or more tasks different from one or more workstations at another service area. Each service area receives a drop-off of the storage bins at and/or a travel of the storage bins through each service area by the robotic vehicles.

71. [112021010612](#) SISTEMA E MÉTODO DE ATENDIMENTO DE PEDIDOS E VEÍCULO ROBÓTICO PARA USO EM TAL SISTEMA PARA REALOCAR UM ARTIGO ENTRE UMA PLURALIDADE DE LOCAIS BR - 24.08.2021

Int.Class [B25J 5](#) Appl.No 112021010612 Applicant ATTABOTICS INC. Inventor DOUGLAS LANGEN

sistema e método de atendimento de pedidos e veículo robótico para uso em tal sistema para realocar um artigo entre uma pluralidade de locais. um sistema de atendimento de pedidos incluindo uma estrutura de sistema automatizado de armazenamento e recuperação (asrs), veículos robóticos, receptáculos de armazenamento e diferentes áreas de serviço em um arranjo contínuo posicionado adjacente a um perímetro externo da estrutura do asrs em um ou mais níveis de serviço da estrutura do asrs é fornecido. os veículos robóticos são navegáveis dentro da estrutura do asrs no(s) nível(is) de serviço posicionado s acima e/ou abaixo dos níveis de armazenamento da estrutura do asrs . os veículos robóticos carregam os receptáculos de armazenamento dentro da estrutura do asrs durante a transferência dos receptáculos de armazenamento para e a partir dos locais de armazenamento da estrutura do asrs . cada área de serviço inclui uma ou mais estações de trabalho de um tipo configurado para uma ou mais tarefas diferentes de uma ou mais estações de trabalho em outra área de serviço. cada área de serviço recebe um despacho dos receptáculos de armazenamento e/ou um deslocamento dos receptáculos de armazenamento através de cada área de serviço pelos veículos robóticos.

72. [3966134](#) SPACE-EFFICIENT ORDER FULFILLMENT SYSTEM FOR WORKFLOW BETWEEN SERVICE AREAS EP - 16.03.2022

Int.Class [B65G 1/04](#) Appl.No 20805222 Applicant ATTABOTICS INC Inventor GRAVELLE SCOTT

An order fulfillment system including an automated storage and retrieval system (ASRS) structure, robotic vehicles, storage bins, and different service areas in a continuous arrangement positioned adjacent to an outer perimeter of the ASRS structure at one or more service levels of the ASRS structure, is provided. The robotic vehicles are navigable within the ASRS structure at the service level(s) positioned above and/or below storage levels of the ASRS structure. The robotic vehicles carry the storage bins within the ASRS structure during transfer of the storage bins to and from storage locations of the ASRS structure. Each service area includes one or more workstations of a type configured for one or more tasks different from one or more workstations at another service area. Each service area receives a drop-off of the storage bins at and/or a travel of the storage bins through each service area by the robotic vehicles.

73. [WO/2020/229973](#) SPACE-EFFICIENT ORDER FULFILLMENT SYSTEM FOR WORKFLOW BETWEEN SERVICE AREAS WO - 19.11.2020

Int.Class [B65G 1/04](#) Appl.No PCT/IB2020/054380 Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

An order fulfillment system including an automated storage and retrieval system (ASRS) structure, robotic vehicles, storage bins, and different service areas in a continuous arrangement positioned adjacent to an outer perimeter of the ASRS structure at one or more service levels of the ASRS structure, is provided. The robotic vehicles are navigable within the ASRS structure at the service level(s) positioned above and/or below storage levels of the ASRS structure. The robotic vehicles carry the storage bins within the ASRS structure during transfer of the storage bins to and from storage locations of the ASRS structure. Each service area includes one or more workstations of a type configured for one or more tasks different from one or more workstations at another service area. Each service area receives a drop-off of the storage bins at and/or a travel of the storage bins through each service area by the robotic vehicles.

74. [4021826](#) MULTI-ZONE AUTOMATED STORAGE AND RETRIEVAL SYSTEM

EP - 06.07.2022

Int.Class [B65G 1/02](#) Appl.No 20858587 Applicant ATTABOTICS INC Inventor GRAVELLE SCOTT

A multi-zone automated storage and retrieval system (ASRS) and a method for controlling operation of robotic storage/retrieval vehicles (RSRVs) therein are provided. The multi-zone ASRS includes first and second storage zones isolated by at least one barrier and including first and second groups of storage locations respectively for accommodating storage units therein. The multi-zone ASRS includes one or more portals opening through the barrier(s) between the storage zones, and at least one track layout. The track layout(s) includes first and second track areas occupying the first and second storage zones respectively, and one or more connective track segments interconnecting the first and second track areas through the portal(s). The RSRVs deposit and retrieve the storage units to and from the storage locations and travel on the first and second track areas via the connective track segment(s) to respectively access the first and second groups of storage locations therefrom.

75. [WO/2021/038437](#) MULTI-ZONE AUTOMATED STORAGE AND RETRIEVAL SYSTEM

WO - 04.03.2021

Int.Class [B65G 1/02](#) Appl.No PCT/IB2020/057931 Applicant ATTABOTICS INC Inventor GRAVELLE, Scott

A multi-zone automated storage and retrieval system (ASRS) and a method for controlling operation of robotic storage/retrieval vehicles (RSRVs) therein are provided. The multi-zone ASRS includes first and second storage zones isolated by at least one barrier and including first and second groups of storage locations respectively for accommodating storage units therein. The multi-zone ASRS includes one or more portals opening through the barrier(s) between the storage zones, and at least one track layout. The track layout(s) includes first and second track areas occupying the first and second storage zones respectively, and one or more connective track segments interconnecting the first and second track areas through the portal(s). The RSRVs deposit and retrieve the storage units to and from the storage locations and travel on the first and second track areas via the connective track segment(s) to respectively access the first and second groups of storage locations therefrom.

76. [2020275488](#) SPACE-EFFICIENT ORDER FULFILLMENT SYSTEM FOR WORKFLOW BETWEEN SERVICE AREAS

AU - 19.11.2020

Int.Class [B65G 1/04](#) Appl.No 2020275488 Applicant Attabotics Inc. Inventor DHALIWAL, Sundeeep

An order fulfillment system including an automated storage and retrieval system (ASRS) structure, robotic vehicles, storage bins, and different service areas in a continuous arrangement positioned adjacent to an outer perimeter of the ASRS structure at one or more service levels of the ASRS structure, is provided. The robotic vehicles are navigable within the ASRS structure at the service level(s) positioned above and/or below storage levels of the ASRS structure. The robotic vehicles carry the storage bins within the ASRS structure during transfer of the storage bins to and from storage locations of the ASRS structure. Each service area includes one or more workstations of a type configured for one or more tasks different from one or more workstations at another service area. Each service area receives a drop-off of the storage bins at and/or a travel of the storage bins through each service area by the robotic vehicles.

77. [20210139302](#) METHODS FOR ROBOTIC HANDLING OF STORAGE UNITS IN A THREE-DIMENSIONAL STORAGE SYSTEM

US - 13.05.2021

Int.Class [B66F 9/06](#) Appl.No 17091494 Applicant Attabotics Inc. Inventor Scott Gravelle

In combination, a storage unit storable within a three-dimensional storage system and a storage/retrieval vehicle navigable through the three-dimensional storage system to storage locations therein at which the storage unit is selectively storable and retrievable. The storage/retrieval vehicle comprises a frame conveyable through the three-dimensional storage system, a platform atop the frame for receipt of the storage unit on the platform, and a loading/unloading mechanism operable to load and unload the storage unit to and from the platform at four different sides thereof. The storage unit and the storage/retrieval vehicle are configured to enable unloading of the storage unit from the platform in any one of four different directions at four different respective sides of the vehicle regardless of an original orientation in which the storage unit was previously loaded onto the platform and without reorienting the storage unit from the original orientation.

78. [3288865](#) STORAGE AND RETRIEVAL SYSTEM

PT - 16.02.2022

Int.Class [B65G 1/04](#) Appl.No 167857077 Applicant ATTABOTICS INC. Inventor79. [2021277710](#) STORAGE AND RETRIEVAL SYSTEM

AU - 16.12.2021

Int.Class [B65G 1/04](#) Appl.No 2021277710 Applicant Attabotics Inc. Inventor COWLEY, Robert Guy

Bins or other storage units contained within a three-dimensional grid structure are arranged in cells, each of which has multiple storage units surrounding a central void or space on different sides thereof. This void space is slightly larger than each storage unit, enabling the unit to be pulled into the void by mechanical means, and allowing access to the bins on all sides of the void. The storage units are stacked within the three-dimensional grid structure, which can be built or expanded to a predetermined footprint. The aligned voids of stacked cells create vertical shafts spanning between upper and lower tracks of the grid structure on which robotic retrieval vehicles can horizontally travel to and from any given shaft. The robotic retrieval vehicles can directly access any storage unit via the vertical shafts.

80. [2016253994](#) STORAGE AND RETRIEVAL SYSTEM

AU - 03.11.2016

Int.Class [B65G 1/04](#) Appl.No 2016253994 Applicant Attabotics Inc. Inventor Cowley, Robert Guy

Bins or other storage units contained within a three-dimensional grid structure are arranged in cells, each of which has multiple storage units surrounding a central void or space on different sides thereof. This void space is slightly larger than each storage unit, enabling the unit to be pulled into the void by mechanical means, and allowing access to the bins on all sides of the void. The storage units are stacked within the three-dimensional grid structure, which can be built or expanded to a predetermined footprint. The aligned voids of stacked cells create vertical shafts spanning between upper and lower tracks of the grid structure on which robotic retrieval vehicles can horizontally travel to and from any given shaft. The robotic retrieval vehicles can directly access any storage unit via the vertical shafts.

81. [2905931](#) SISTEMA DE ALMACENAMIENTO Y RECUPERACIÓN

ES - 12.04.2022

Int.Class [B65G 1/04](#) Appl.No 16785707 Applicant Attabotics Inc. Inventor GRAVELLE, Scott

Un sistema de almacenamiento que comprende: uno o más vehículos de almacenamiento/recuperación [36]; una estructura tridimensional en rejilla que comprende: una pluralidad de celdas de almacenamiento [10] dispuestas en pilas [16] y cada una comprende una pluralidad de ubicaciones de almacenamiento dispuestas alrededor de un vacío central [14] en diferentes lados respectivos de las mismas, cada espacio de unidad se dimensiona para

acomodar una unidad de almacenamiento respectiva [12] en el mismo; comprendiendo cada pila [16] un grupo respectivo de las celdas de almacenamiento [10] que residen en una relación apilada una sobre otra con los vacíos centrales [14] de dicho grupo respectivo de las celdas de almacenamiento [10] alineados entre sí para formar un respectivo conducto central vertical [18] de dicha pila [16]; cada conducto vertical central [18] se dimensiona para acomodar las unidades de almacenamiento respectivas [12] del grupo respectivo de celdas de almacenamiento [10] dentro de dicho conducto vertical [18] para permitir la recuperación de dichas unidades de almacenamiento respectivas [12] a través de dicho conducto central vertical [18]; en donde las pilas [16] de la estructura en rejilla comprenden pilas de lados completos en las que el conducto central vertical [18] es rodeado por las ubicaciones de almacenamiento del respectivo grupo de celdas de almacenamiento [10] en cuatro lados diferentes de dicho conducto central vertical [18]; en donde la estructura de rejilla tridimensional comprende además estantes [112a, 112b, 112c] por los que las unidades de almacenamiento [12] son contenedores soportados individualmente para permitir la extracción de las unidades de almacenamiento inferiores [12] de cada pila [16] sin perturbar a otras unidades de almacenamiento [12] que residen encima de dichos contenedores de almacenamiento inferiores [12] en la misma pila [16]; y que comprende además un sistema de vías en rejilla [22, 24] en el que dichos uno o más vehículos de almacenamiento/recuperación [36] son cada uno a) trasladables en dicho sistema de vías en rejilla hacia y desde los conductos centrales verticales [18]; el sistema de almacenamiento se caracteriza por que en el sistema de vías en rejilla [22, 24], dichos uno o más vehículos de almacenamiento/recuperación [36] son b) trasladables a través de dicho conducto central vertical [18] para acceder a las ubicaciones de almacenamiento desde allí; y por que cada uno de dichos uno o más vehículos de almacenamiento/recuperación [36] comprende una torreta rotatoria [96] y un brazo extensible [100] extensible selectivamente a una posición de despliegue que llega hacia fuera más allá del perímetro de dicha torreta [96], siendo rotatoria dicha torreta [96] a cuatro posiciones de trabajo diferentes en las que la extensión del brazo extensible [100] desplegará dicho brazo extensible hacia fuera desde la torreta [96] en cuatro lados respectivos diferentes del vehículo [36] para acceder a las ubicaciones de almacenamiento en diferentes lados del conducto central vertical [18] de cualquiera de las pilas [16].

82. 2983630 STORAGE AND RETRIEVAL SYSTEM

CA - 03.11.2016

Int.Class B65G 1/04 Appl.No 2983630 Applicant ATTABOTICS INC. Inventor GRAVELLE, SCOTT

Bins or other storage units contained within a three-dimensional grid structure are arranged in cells, each of which has multiple storage units surrounding a central void or space on different sides thereof. This void space is slightly larger than each storage unit, enabling the unit to be pulled into the void by mechanical means, and allowing access to the bins on all sides of the void. The storage units are stacked within the three-dimensional grid structure, which can be built or expanded to a predetermined footprint. The aligned voids of stacked cells create vertical shafts spanning between upper and lower tracks of the grid structure on which robotic retrieval vehicles can horizontally travel to and from any given shaft. The robotic retrieval vehicles can directly access any storage unit via the vertical shafts.

83. 3288865 OPBEVARINGS- OG HENTNINGSSYSTEM

DK - 14.02.2022

Int.Class B65G 1/04 Appl.No 16785707 Applicant Attabotics Inc. Inventor GRAVELLE, Scott

Bins or other storage units contained within a three-dimensional grid structure are arranged in cells, each of which has multiple storage units surrounding a central void or space on different sides thereof. This void space is slightly larger than each storage unit, enabling the unit to be pulled into the void by mechanical means, and allowing access to the bins on all sides of the void. The storage units are stacked within the three-dimensional grid structure, which can be built or expanded to a predetermined footprint. The aligned voids of stacked cells create vertical shafts spanning between upper and lower tracks of the grid structure on which robotic retrieval vehicles can horizontally travel to and from any given shaft. The robotic retrieval vehicles can directly access any storage unit via the vertical shafts.

84. 2020289823 STORAGE AND RETRIEVAL SYSTEM

AU - 21.01.2021

Int.Class B65G 1/04 Appl.No 2020289823 Applicant Attabotics Inc. Inventor COWLEY, Robert Guy

Bins or other storage units contained within a three-dimensional grid structure are arranged in cells, each of which has multiple storage units surrounding a central void or space on different sides thereof. This void space is slightly larger than each storage unit, enabling the unit to be pulled into the void by mechanical means, and allowing access to the bins on all sides of the void. The storage units are stacked within the three-dimensional grid structure, which can be built or expanded to a predetermined footprint. The aligned voids of stacked cells create vertical shafts spanning between upper and lower tracks of the grid structure on which robotic retrieval vehicles can horizontally travel to and from any given shaft. The robotic retrieval vehicles can directly access any storage unit via the vertical shafts.

85. 3288865 STORAGE AND RETRIEVAL SYSTEM

EP - 07.03.2018

Int.Class B65G 1/04 Appl.No 16785707 Applicant ATTABOTICS INC Inventor GRAVELLE SCOTT

Bins or other storage units contained within a three-dimensional grid structure are arranged in cells, each of which has multiple storage units surrounding a central void or space on different sides thereof. This void space is slightly larger than each storage unit, enabling the unit to be pulled into the void by mechanical means, and allowing access to the bins on all sides of the void. The storage units are stacked within the three-dimensional grid structure, which can be built or expanded to a predetermined footprint. The aligned voids of stacked cells create vertical shafts spanning between upper and lower tracks of the grid structure on which robotic retrieval vehicles can horizontally travel to and from any given shaft. The robotic retrieval vehicles can directly access any storage unit via the vertical shafts.

86. 113544718 MULTI-NODAL SUPPLY CHAIN SYSTEM AND METHOD FOR SUPPLY CHAIN WORKFLOW EXECUTION USING TRANSPORTABLE AND CONTINUOUSLY TRACKABLE STORAGE BINS

CN - 22.10.2021

Int.Class G06Q 10/08 Appl.No 202080018113.8 Applicant ATTABOTICS INC. Inventor GRAVELLE SCOTT

A multi-nodal supply chain system including multiple interconnected entities and a method for executing a supply chain workflow using transportable and continuously trackable, standardized storage bins is provided. The entities include a network of node facilities distributed throughout a geographical region, inter-nodal transport vehicles (INTVs), storage bins storable in indexed storage locations within the node facilities and the INTVs, and a computerized system. The computerized system stores bin identifiers of the storage bins and location identifiers of the indexed storage locations and dynamic storage locations of the storage bins. The computerized system also updates the location identifiers as the storage bins are transferred between the node facilities and the INTVs. The node facilities, the INTVs, and the storage bins, in communication with the computerized system, provide a complete traceability of one or more eaches of inventory items from their input into the supply chain system to fulfillment of orders.

87. 113646793 MULTI-ENTITY INVENTORY MANAGEMENT USING STORAGE BIN AND INVENTORY REASSIGNMENT

CN - 12.11.2021

Int.Class G06Q 10/08 Appl.No 202080021057.3 Applicant ATTABOTICS INC. Inventor GRAVELLE SCOTT

A multi-entity inventory management system including reassignable storage bins and a method for managing product inventory of different entities, for example, vendors, at one or more facilities including one or more storage structures served by robotic handlers, are provided. Each storage bin stores one or more eaches of the products. A computerized inventory management system (CIMS) stores digital records including entity identifiers, product catalogues

containing product identifiers of the products offered by each entity to customers, and unique bin identifiers assigned to the storage bins. The CIMS executes a digital transfer of ownership of inventory from a stocked entity to a needful entity, for example, based on an inventory shortfall, a complete absence of inventory of the needful entity, orders for the product inventory being received, etc. Along with an inventory swap through the storage bins, the CIMS executes commerce between the entities and implements inventory reservation.

88. **113613846** MANUFACTURING SYSTEM WITH INTERCONNECTED STORAGE STRUCTURE AND MANUFACTURING CELLS SHARING COMMON ROBOTIC FLEET CN - 05.11.2021

Int.Class B25H 3/00 Appl.No 202080021487.5 Applicant ATTABOTICS INC. Inventor GRAVELLE SCOTT

A manufacturing system including an automated storage and retrieval system (ASRS) structure with a three-dimensional array of storage locations distributed throughout a two-dimensional footprint of the ASRS structure at multiple storage levels; workpieces stored within the storage locations of the ASRS structure; robotic storage/retrieval vehicles (RSRVs) navigable within the ASRS structure in three dimensions to access the storage locations, and multiple manufacturing cells positioned outside the ASRS structure, is provided. The manufacturing system includes a track structure attached to the ASRS structure and defining one or more travel paths traversable by the RSRVs from the ASRS structure. The same fleet of RSRVs that is navigable within the ASRS structure is operable to deliver the workpieces to the manufacturing cells. One or more of the manufacturing cells are positioned along the track structure, thereby receiving convenient access to the workpieces along with associated toolpieces and workpiece supports for manufacturing goods.

89. **113727920** SPACE-EFFICIENT ORDER FULFILLMENT SYSTEM FOR WORKFLOW BETWEEN SERVICE AREAS CN - 30.11.2021

Int.Class B65G 1/04 Appl.No 202080026835.8 Applicant ATTABOTICS INC. Inventor GRAVELLE SCOTT

An order fulfillment system including an automated storage and retrieval system (ASRS) structure, robotic vehicles, storage bins, and different service areas in a continuous arrangement positioned adjacent to an outer perimeter of the ASRS structure at one or more service levels of the ASRS structure, is provided. The robotic vehicles are navigable within the ASRS structure at the service level(s) positioned above and/or below storage levels of the ASRS structure. The robotic vehicles carry the storage bins within the ASRS structure during transfer of the storage bins to and from storage locations of the ASRS structure. Each service area includes one or more workstations of a type configured for one or more tasks different from one or more workstations at another service area. Each service area receives a drop-off of the storage bins at and/or a travel of the storage bins through each service area by the robotic vehicles.