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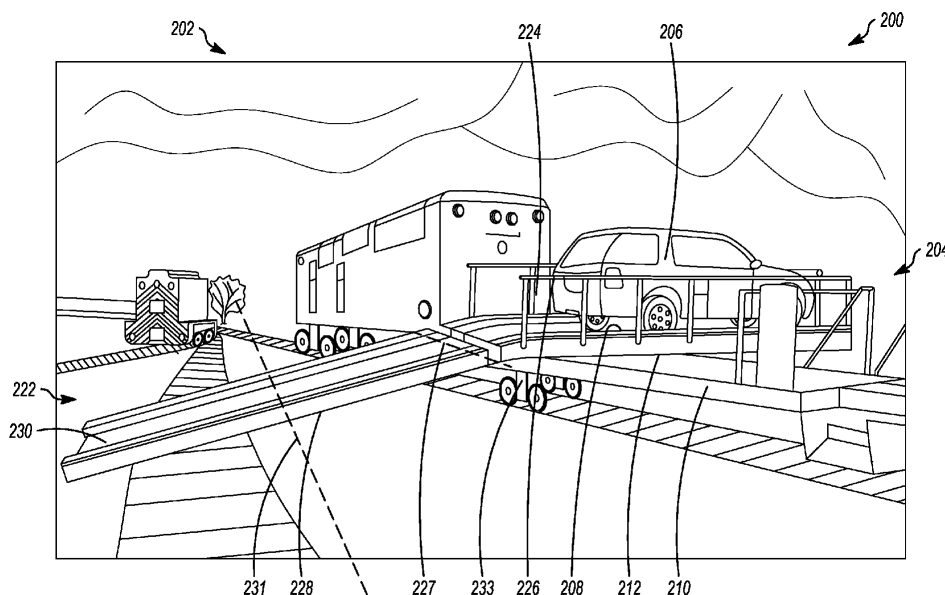
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(54) **LOADING ASSEMBLY FOR A VEHICLE**

(57) An assembly is provided that may include a platform that may be coupled with a vehicle. The platform may rotate from a first platform position to a second platform position relative to a chassis of the vehicle. The assembly may include an extendable ramp coupled to the platform and configured to extend relative to the platform from a first ramp position to a second ramp position. This ramp may be positioned in the second platform po-

sition to allow a second vehicle to be driven up the ramp and onto the first vehicle, with the ramp then moved to the first platform position to allow the first vehicle to carry the second vehicle to another location. The ramp can be moved to the first platform position to the second platform position to allow the second vehicle to disembark from the first vehicle and travel separately from the first vehicle.

**FIG. 3****EP 4 249 343 A1**

Description

BACKGROUND

Technical Field.

[0001] The subject matter described herein relates to an assembly for loading.

Description of the Art.

[0002] Certain vehicle systems present two or more vehicles that are coupled with one another, are aligned, and may carry cargo, materials, and the like, over significant distances. In one example, a rail vehicle may include numerous vehicles, with each vehicle including individual vehicles that may be used to haul materials such as coal, grain, dirt, ore, and the like from one location to another. In other examples, mining vehicles, off-road vehicles, agricultural vehicles, and the like, may be similarly coupled to one another for transporting materials.

[0003] Often, operators or workers that man a vehicle system drive a second vehicle (such as an automobile, motorcycle, or the like) to a location of the vehicle system before boarding the vehicle system. The second vehicle is then left behind at that location. However, on occasion there is a desire by the person manning the vehicle system to have their second vehicle at a different location, so that when the vehicle system reaches a final location, the second vehicle is available. One manner to address this desire for the person manning the vehicle system is to hire an individual that drives the second vehicle from the first location to the second stopping location. For example, for projects involving work in a remote location, a person may drive a pickup truck or other automobile to the remote location so that operators working at the remote location have the truck or automobile available to travel to other nearby locations (e.g., for lodging, food, etc.). This may be a time-consuming and cost-intensive endeavor.

[0004] In addition to second vehicles such as automobiles that are driven by an individual on the vehicle system, many vehicle system may include second vehicles that assist in the loading and unloading of materials on the vehicle system, or may perform other such functions. For example, electrically powered vehicles that unload materials may be desired to be kept with a vehicle system at all times throughout a trip, where such second vehicle need to be hauled by the vehicle system. Thus, it may be desirable to have one or more vehicles of a vehicle system that can accommodate second vehicles that differs from those that are currently known.

BRIEF DESCRIPTION

[0005] In accordance with one embodiment, an assembly is provided that may include a platform that may be coupled with a first vehicle. The platform may rotate

from a first platform position to a second platform position relative to a chassis of the first vehicle. The assembly may include an extendable ramp coupled to the platform and configured to extend relative to the platform from a first ramp position to a second ramp position. In one example, this ramp may be positioned in the second platform position to allow a second vehicle to be driven up the ramp and onto the first vehicle, with the ramp then moved to the first platform position to allow the first vehicle to haul (e.g., carry) the second vehicle to one or more other locations. The ramp can be moved to the first platform position to the second platform position to allow the second vehicle to disembark from the first vehicle and travel separately from the first vehicle.

[0006] In accordance with one embodiment, an assembly is provided that may include a platform coupled to a chassis of a vehicle via a turntable wherein the platform may be configured to receive a second vehicle and may be configured to rotate from a first platform position to a second platform position to receive the second vehicle. The assembly may include an extendable ramp pivotably coupled to the platform between a first rail and a second rail, the extendable ramp may move relative to the platform from a first ramp position to a second ramp position to receive the second vehicle.

[0007] In accordance with one embodiment, an assembly is provided that may include a rail vehicle that may be part of a rail vehicle system and having a platform that may rotate from a first platform position configured to be aligned with another rail vehicle of the rail vehicle system to a second platform position configured to receive a load.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The inventive subject matter may be understood from reading the following description of non-limiting embodiments, with reference to the attached drawings, wherein below:

Figure 1 is a schematic view of a vehicle system;

Figure 2 is a perspective view of an assembly of a vehicle system;

Figure 3 is a perspective view of an assembly of a vehicle system;

Figure 4 is a top plan view of an assembly of a vehicle system;

Figure 5 is a schematic diagram of a hydraulic system of an assembly of a vehicle system; and

Figure 6 is a schematic block flow diagram of a process for loading a vehicle system.

DETAILED DESCRIPTION

[0009] One or more embodiments of the subject matter described herein relates to an assembly for a vehicle system that includes a platform for positioning the platform for loading another vehicle onto the vehicle system. Once in a loading position, an extendable ramp (which is coupled to the end of the platform) may move from an initial first ramp position where a first section of the extendable ramp is oriented vertically to the platform and a second section of the extendable ramp is oriented generally transverse to the first section, to a second ramp position where the first section and second section align. The second section distal edge may contact the ground or a loading dock, or the like. A second vehicle or another load may then be loaded onto the platform. After loading, the extendable ramp may be retracted, and the platform moved back to an initial position, and locked for travel. To move from the first to the second position, or vice versa, one embodiment has the platform rotate, and thus is rotatably coupled to the chassis of the vehicle system. In one embodiment, a turntable structure may facilitate the rotation.

[0010] In one embodiment, rather than rotate, the platform may translate or re-orient to allow for ingress and egress of a vehicle. The platform would have a first configuration in which it may be stowed (loaded or unloaded) for movement, and a second configuration in which it may deploy the ramp to receive or discharge. That is, rotation may not be involved in switching from the first to the second configuration, or vice versa. In another embodiment, a sled is used that translates and it extends a ramp equivalent portion from the wayside to the chassis.

[0011] Figure 1 illustrates a schematic diagram of one example of a vehicle system 100 in accordance with an embodiment of the invention. Figure 1 shows a vehicle system that is a rail vehicle. In other embodiments, as suitable vehicle system can be an off road vehicle, construction vehicle, mining vehicle, marine vessel, and the like. The vehicle system may include two or more vehicles. The vehicle system may travel along a route 104 on a trip from a starting or departure location to a destination or arrival location. In the illustrated example, the vehicle system may include a propulsion-generating vehicle 108 and a non-propulsion-generating vehicle 110. These vehicles may be mechanically interconnected to one another to travel together along the route. In another embodiment, the vehicles in the vehicle system may be logically or virtually coupled together, but not mechanically coupled together. For example, the vehicles may communicate with each other to coordinate their movements so that the vehicles move together as a convoy, platoon, swarm, fleet or consist without the vehicles being mechanically coupled with each other by couplers.

[0012] Figures 2-4 illustrates an assembly 200 of a vehicle system 202 that includes a vehicle 204 that may be used to load and unload a second vehicle 206. The vehicle system may be the vehicle system of Figure 1, a

rail vehicle, off road vehicle, construction vehicle, mining vehicle, marine vessel, or the like. The second vehicle may include an automobile, truck, motorcycle, self-propelled implement including self-propelled implements for loading or unloading materials, or the like. In one example, the self-propelled implement may include a robotic component, be automated, utilize an artificial intelligence algorithm, implement machine learning etc. In another embodiment, the second vehicle may be an automobile of a worker, operator, passenger, etc. of the vehicle system.

[0013] The vehicle may include a platform 208 that may be rotatably coupled to a chassis 210 of the vehicle with a turntable 212. In one example, the turntable may be a motorized turntable. The turntable may rotate 360° degrees to allow the platform to provide loading from any angle or direction. In one example, the platform rotates from a first platform position to a second platform position relative to the chassis. In this manner, if an inclined, decline, curve, etc. exist at a place where loading or unloading of a second vehicle takes place, the platform may be rotated the best location for the loading and unloading. The turntable may include a locking mechanism (FIG. 5) that prevents rotation of the platform. In one example, the locking mechanism may include a pin element that is disposed through the turntable and coupled to the chassis to prevent rotation. Alternatively, the turntable may be hydraulically powered to rotate, and a hydraulic lock may be provided. In one example, the platform may include a platform sensor 215 that may provide signals related to whether the platform is locked in a first platform position. In one example, the first vehicle may not operate until the platform sensor indicates the platform is locked in the first platform position.

[0014] The platform may include an electrical connector 216 that couples a first energy storage device of a second vehicle to a second energy storage device 218 of the vehicle. In an example when the second vehicle is a self-propelled implement that is electrically powered, and the platform includes the electrical connector configured to conductively couple to a first energy storage device to transfer energy between the second energy storage device of the vehicle and the first energy storage device.

[0015] The vehicle may include an extendable ramp 222 coupled at a proximate tip of the platform between a first rail 224 and a second rail 226. The first rail and second rail are laterally spaced apart in parallel to one another and are each located at a perimeter of the platform. In one example, the extendable ramp is pivotably coupled to the platform between the first rail and the second rail. In one example, the extendable ramp is pivotably coupled to the platform along a first pivot axis 227. In one example, the ramp moves relative to the platform from a first ramp position to a second ramp position.

[0016] The extendable ramp may include a first section 228 and a second section 230 pivotably coupled to one another along a second pivot axis 231 such that in the

first ramp position, the first section is vertically oriented relative to the platform between the first rail and the second rail. In the first ramp position, the second section meanwhile is transversely oriented away from the first section away from the platform. In the first ramp position, the extendable ramp is being stored on the platform for when the vehicle system is moving. In this manner, the platform may remain at about the same height and generally level with a top surface of the chassis, and the ramp is configured to reversibly pivot so that a distal tip of the ramp is substantially lower relative to the proximate tip of the platform.

[0017] In addition, the ramp may include a ramp sensor 233 that may be associated with the ramp to detect the position of the ramp. The ramp sensor may provide signals related to whether the ramp is locked in the first position. In this manner, the ramp sensor may be coupled or communicate with a controller of the first vehicle to prevent movement of the first vehicle unless the ramp is determined to be in the stowed first position. Other features may include the prevention of movement in the event that the ramp is not locked, the platform is not in a determined alignment, and the like. Other systems may be in place to prevent movement of the ramp, the platform, the turntable, or the load if a 'clear to move' signal (or the equivalent) is not received. In one aspect, a 'notice of imminent movement' signal may be used to announce activation of any of the system prior to actual movement. In one embodiment, proximity sensors may be used to ensure that designated movement areas are free of obstructions or people prior to moving any or all of the movable components.

[0018] A hydraulic assembly 232 may include a first hydraulic arm 234 and a second hydraulic arm 236 coupled between the chassis and the second section. When the extendable ramp is in the first ramp position, the first hydraulic arm and second hydraulic arm may be hydraulically locked in place to hold the extendable ramp in place when in the first ramp position. In an example, each of the first hydraulic arm and second hydraulic arm may be a hydraulic piston. In one example, a first support element and a second support element may be coupled to the extendable ramp to hold the extendable ramp in place when in the first ramp position. In one example, the first support element and second support element may each be a chain that is coupled to the platform, chassis, etc. to hold the extendable ramp in the first ramp position even if failure of hydraulic locking mechanisms of the hydraulic assembly were to occur.

[0019] The hydraulic assembly may be actuated to place the extendable ramp into a second ramp position. The first hydraulic arm and second hydraulic arm may each extend so that the first section of the extendable ramp and the second section of the extendable ramp extend pivotably away from one another along the second pivot axis until reaching the second ramp position. At the second ramp position, the first section and the second section align with one another, and the extend-

able ramp has rotated about the first pivot axis between the platform and the extendable ramp until the second section engages the ground for unloading. Because extendable ramp is coupled to the platform, the rotation of the platform rotates the extendable ramp. In this manner, the extendable ramp may be rotated while still in the first ramp position to a desired location, then extended to the second ramp position for loading of the second vehicle.

[0020] The platform may include a mounting device 240 that accepts and discharges the second vehicle. In one example, the mounting device includes a winch 242 and a metal cable 244 that may attach to the second vehicle. In one example the cable includes a hook, loop, or the like for coupling to a frame, axle, or other component of the second vehicle. The mounting device may include a mechanical spool 246 for rotatably loading the second vehicle by pulling the vehicle onto the platform. The spool may be manually rotated, electrically rotated, hydraulically rotated, or the like. In one example, the platform may include retaining mechanisms 248 that receive and couple to the wheels, frame, chassis, axle, etc. of the second vehicle. In an example, the retaining mechanisms may be adjustable to the width, and length of the second vehicle. The retaining mechanisms may be clamps, straps, blocks, or the like. In this manner the retaining mechanisms prevent movement of the second vehicle on the platform while the first vehicle is moving. In one example, the retaining mechanisms can include a locking mechanism 249 to lock the second vehicle in place on the platform.

[0021] Figure 5 illustrates a schematic flow block diagram of a hydraulic assembly 500. In one example the hydraulic assembly of Figure 5 is the hydraulic assembly of Figures 2-4. The hydraulic assembly includes a hydraulic power unit 502 that is coupled to a hydraulic valve 504. The hydraulic valve functions to direct fluid along fluid lines 506 to operate different working systems of the vehicles. A first working system is the hydraulic lift system 508 that in one example may include a first hydraulic arm and a second hydraulic arm. The lift system lifts, or moves the hydraulic arms to place the extendable ramp in the first ramp position. A second working system is the lowering system 510 that may include the first hydraulic arm and second hydraulic arm. The lowering system 510 causes the first hydraulic arm and second hydraulic arm to move downward toward a second ramp position.

[0022] In addition, the working systems include a rotating system 512 for rotating the turntable. The rotating system includes a clockwise portion 514 for rotating the platform in a clockwise direction, and a counterclockwise portion 516 for rotating the platform in a counterclockwise direction. In particular, a series of manifolds 518 and hydraulic couplings 520 are utilized for controlling the direction of the movement. In addition, another working systems include a locking system 522 and unlocking system 524 that are coupled with a locking mechanism for locking the turntable in place. In this manner, the hydraulic assembly controls the rotation of the turntable and

thus platform, and is able to lock the turntable and platform in a location. The locking mechanism may be actuated during loading of a load such as a second vehicle, or when the platform is rotated to a driving position.

[0023] Figure 6 illustrates a block flow diagram of a process for loading a second vehicle onto a vehicle of a vehicle system 600. In one example, the vehicle system is a rail vehicle. In another example, the vehicle system is the vehicle system illustrated in Figure 1. In yet another example, the vehicle is the vehicle illustrated in Figures 2-4 and utilized the hydraulic assembly of Figure 5.

[0024] At step 602, a turntable rotates a platform from a first platform position aligned with another vehicle in the vehicle system to a second platform position for loading the second vehicle. In one example, the second platform position may be perpendicular to the first platform position. In another example, the first platform position is transverse to the second platform position. In one embodiment, the second vehicle is a vehicle of an individual riding on the vehicle system. In another embodiment, the second vehicle may be a self-propelled vehicle that includes an implement such as an unloader.

[0025] At step 604, an extendable ramp extends from a first ramp position where a first section of the extendable ramp is generally vertical to the platform and a second section of the extendable ramp is transverse to the first section, to a second ramp position wherein the first section aligns with the second section, and the second section engages the ground. In one example, the extendable ramp includes at least one hydraulic arm that moves the extendable ramp from the first ramp position to the second ramp position. The extendable ramp is located between a first rail and second rail of the platform at the end of the platform. The extendable ramp is of size and shape to accommodate the second vehicle. In one example, a remote control is utilized to control the hydraulic assembly and extend the extendable ramp. Alternatively, a controller, whether onboard or offboard, may be coupled to a platform sensor that provides signals related to whether the platform has finished rotating and is locked in a first platform position for loading of the second vehicle. The controller in response to sensing the locking of the turntable may then automatically extend the extendable ramp.

[0026] At step 606, the second vehicle drives up the extendable ramp onto the platform. Whether the second vehicle is an automobile, truck, manufacturing equipment, self-propelled implement, or the like, the extendable ramp allows the second vehicle to drive onto the platform. In one example, when the second vehicle is a self-propelled implement, the platform may include an electrical coupling to provide a second vehicle charging path from an energy source of the vehicle or vehicle system to a power source of the second vehicle.

[0027] At step 608, the extendable ramp is retracted back to the first ramp position and locked in place. Once the second vehicle is on the platform, the extendable ramp may be retracted. In one example a remote control

may be used to retract the extendable ramp. In another example, a vehicle sensor is provided that indicates when the second vehicle is in an appropriate position on the platform, and the extendable ramp automatically retracts to the first ramp position in response to the vehicle sensor making the detection of the second vehicle in the correct location on the platform. Once the extendable ramp is back in the first ramp position, the extendable ramp may be locked in place by locking a first and/or second hydraulic arms. In another example, support element such as chains are provided to hold the extendable ramp in the first ramp position.

[0028] At step 610, the turn table is rotated back to the first platform position and locked in place. Again, once the second vehicle is loaded and extendable ramp back to a first ramp position, the turntable rotates the platform to align with the vehicle of the vehicle system in front of the vehicle having the platform. Then the turntable is locked in place by a locking mechanism to prevent rotation of the platform while the vehicle is moving along a route.

[0029] An assembly and method facilitate loading a load onto a vehicle of a vehicle system. The assembly may accommodate an elevation, terrain, or the like by rotating to the best location for loading. The extendable ramp can then be extended for loading and retracted for traveling, making a compact and easy to use ramp. In addition, multiple locking mechanisms are provided to enhance safety of the assembly.

[0030] In one or more example embodiments an assembly is provided that may include a platform that may be coupled with a vehicle. The platform may rotate from a first platform position to a second platform position relative to a chassis of the vehicle. The assembly may include an extendable ramp coupled to the platform and configured to extend relative to the platform from a first ramp position to a second ramp position.

[0031] Optionally, the assembly may include the vehicle and the vehicle may be a rail vehicle. In one aspect, the platform may be coupled to the chassis by a turntable. In another aspect, the assembly may include an electrical connector that may conductively couple to a first energy storage device in a second vehicle to transfer energy between a second energy storage device of the vehicle having the platform and the first energy storage device. In one example, the platform may include a locking mechanism that can prevent rotation of the platform.

[0032] Optionally, the extendable ramp may include a first section pivotably coupled to a second section. In one aspect, the extendable ramp may include at least one actuator for moving the extendable ramp from the first ramp position to the second ramp position. In another aspect, the platform may include a rail frame having a first rail and a second rail, and the extendable ramp may be disposed between the first rail and the second rail. In one example, in the first ramp position, a first section of the extendable ramp may be vertically oriented relative to the platform between the first rail and the second rail,

and a second section of the extendable ramp may be transversely oriented away from the first section and away from the platform. In another example, the assembly may include a support element coupled to the first section of the extendable ramp and may hold the extendable ramp in place in the first ramp position. In yet another example, the assembly may include a hydraulic assembly coupled to a locking mechanism of a turntable of the platform and coupled to at least one hydraulic actuator coupled between the platform and the extendable ramp.

[0033] In one or more example embodiments, an assembly is provided that may include a platform coupled to a chassis of a vehicle via a turntable wherein the platform may be configured to receive a second vehicle and may be configured to rotate from a first platform position to a second platform position to receive the second vehicle. The assembly may include an extendable ramp pivotably coupled to the platform between a first rail and a second rail, the extendable ramp may move relative to the platform from a first ramp position to a second ramp position to receive the second vehicle.

[0034] In one embodiment, the turntable may rotate up to ninety degrees (90°). In other embodiments, the turntable may rotate in a range of from about 90° to about 180°, in a range of from about 90° to about 270°. In one embodiment, the turntable may rotate 360°.

[0035] The assembly may include one or more devices that power the rotation of turntable, the extension of the ramp, and the raising or lowering of the ramp edge. Other features may be powered, such as safety blocks, roll stops, and the like. Suitable power devices may include a hydraulic assembly. A suitable hydraulic assembly may include at least one hydraulic actuator coupled to the extendable ramp and that may move the extendable ramp from the first ramp position to the second ramp position. The hydraulic assembly may include a selectable locking mechanism that may prevent the turntable from rotating. Other suitable power devices may include electric motors, compressed air actuators, and the like.

[0036] In another aspect, in the first ramp position a first section of the extendable ramp may be vertically oriented relative to the platform between the first rail and the second rail, and a second section of the extendable ramp may transversely oriented away from the first section and away from the platform. In one example, the assembly may include a support element coupled to the first section of the extendable ramp and may hold the extendable ramp in place in the first ramp position. In another example, the assembly may include an electrical connector that may conductively couple to a first energy storage device in the second vehicle to transfer energy between a second energy storage device of the vehicle having the platform and the first energy storage device.

[0037] In one or more example embodiments an assembly is provided that may include a rail vehicle that may be part of a rail vehicle system and having a platform that may rotate from a first platform position configured to be aligned with another rail vehicle of the rail vehicle

system to a second platform position configured to receive a load.

[0038] Optionally, the assembly may include an extendable ramp having a first section pivotably coupled to the platform and a second section pivotably coupled to the first section. The extendable ramp may move relative to the platform from a first ramp position that may have the first section oriented vertical to the platform to a second ramp position wherein the first section aligns with the second section and the extendable ramp may be configured receive a second vehicle. In one aspect, the assembly may include an electrical connector that may conductively couple to a first energy storage device in the second vehicle to transfer energy between a second energy storage device of the rail vehicle having the platform and the first energy storage device.

[0039] In some example embodiments, the device performs one or more processes described herein. In some example embodiments, the device performs these processes based on processor executing software instructions stored by a computer-readable medium, such as a memory and/or a storage component. A computer-readable medium (e.g., a non-transitory computer-readable medium) is defined herein as a non-transitory memory device. A memory device includes memory space located inside of a single physical storage device or memory space spread across multiple physical storage devices.

[0040] Software instructions may be read into a memory and/or a storage component from another computer-readable medium or from another device via the communication interface. When executed, software instructions stored in a memory and/or a storage component cause the processor to perform one or more processes described herein. Additionally or alternatively, hardwired circuitry may be used in place of or in combination with software instructions to perform one or more processes described herein. Thus, embodiments described herein are not limited to any specific combination of hardware circuitry and software.

[0041] As used herein, the terms "processor" and "computer," and related terms, e.g., "processing device," "computing device," and "controller" may be not limited to just those integrated circuits referred to in the art as a computer, but refer to a microcontroller, a microcomputer, a programmable logic controller (PLC), field programmable gate array, and application specific integrated circuit, and other programmable circuits. Suitable memory may include, for example, a computer-readable medium. A computer-readable medium may be, for example, a random-access memory (RAM), a computer-readable non-volatile medium, such as a flash memory. The term "non-transitory computer-readable media" represents a tangible computer-based device implemented for short-term and long-term storage of information, such as, computer-readable instructions, data structures, program modules and sub-modules, or other data in any device. Therefore, the methods described herein may be encoded as executable instructions embodied in a tangible,

non-transitory, computer-readable medium, including, without limitation, a storage device and/or a memory device. Such instructions, when executed by a processor, cause the processor to perform at least a portion of the methods described herein. As such, the term includes tangible, computer-readable media, including, without limitation, non-transitory computer storage devices, including without limitation, volatile and non-volatile media, and removable and non-removable media such as firmware, physical and virtual storage, CD-ROMs, DVDs, and other digital sources, such as a network or the Internet.

[0042] In one embodiment, the system may have a local data collection system deployed that may use machine learning to enable derivation-based learning outcomes. The communication system may learn from and make decisions on a set of data (including data provided by the various sensors), by making data-driven predictions and adapting according to the set of data. In embodiments, machine learning may involve performing a plurality of machine learning tasks by machine learning systems, such as supervised learning, unsupervised learning, and reinforcement learning. Supervised learning may include presenting a set of example inputs and desired outputs to the machine learning systems. Unsupervised learning may include the learning algorithm structuring its input by methods such as pattern detection and/or feature learning. Reinforcement learning may include the machine learning systems performing in a dynamic environment and then providing feedback about correct and incorrect decisions. In examples, machine learning may include a plurality of other tasks based on an output of the machine learning system. In examples, the tasks may be machine learning problems such as classification, regression, clustering, density estimation, dimensionality reduction, anomaly detection, and the like. In examples, machine learning may include a plurality of mathematical and statistical techniques. In examples, the many types of machine learning algorithms may include decision tree based learning, association rule learning, deep learning, artificial neural networks, genetic learning algorithms, inductive logic programming, support vector machines (SVMs), Bayesian network, reinforcement learning, representation learning, rule-based machine learning, sparse dictionary learning, similarity and metric learning, learning classifier systems (LCS), logistic regression, random forest, K-Means, gradient boost, K-nearest neighbors (KNN), a priori algorithms, and the like. In embodiments, certain machine learning algorithms may be used (e.g., for solving both constrained and unconstrained optimization problems that may be based on natural selection). In an example, the algorithm may be used to address problems of mixed integer programming, where some components restricted to being integer-valued. Algorithms and machine learning techniques and systems may be used in computational intelligence systems, computer vision, Natural Language Processing (NLP), recommender systems, re-

inforcement learning, building graphical models, and the like. In an example, machine learning may be used for vehicle performance and behavior analytics, and the like.

[0043] In one embodiment, the system may include a policy engine that may apply one or more policies. These policies may be based at least in part on characteristics of a given item of equipment or environment. With respect to control policies, a neural network can receive input of a number of environmental and task-related parameters. These parameters may include an identification of a determined trip plan for a vehicle group, data from various sensors, and location and/or position data. The neural network can be trained to generate an output based on these inputs, with the output representing an action or sequence of actions that the vehicle group should take to accomplish the trip plan. During operation of one embodiment, a determination can occur by processing the inputs through the parameters of the neural network to generate a value at the output node designating that action as the desired action. This action may translate into a signal that causes the vehicle to operate. This may be accomplished via back-propagation, feed forward processes, closed loop feedback, or open loop feedback. Alternatively, rather than using backpropagation, the machine learning system of the controller may use evolution strategies techniques to tune various parameters of the artificial neural network. The maintenance system may use neural network architectures with functions that may not always be solvable using backpropagation, for example functions that are non-convex. In one embodiment, the neural network has a set of parameters representing weights of its node connections. A number of copies of this network are generated and then different adjustments to the parameters are made, and simulations are done. Once the output from the various models is obtained, they may be evaluated on their performance using a determined success metric. The best model is selected, and the vehicle controller executes that plan to achieve the desired input data to mirror the predicted best outcome scenario. Additionally, the success metric may be a combination of the optimized outcomes, which may be weighed relative to each other.

[0044] The singular forms "a", "an", and "the" include plural references unless the context clearly dictates otherwise. "Optional" or "optionally" means that the subsequently described event or circumstance may or may not occur, and that the description may include instances where the event occurs and instances where it does not. Approximating language, as used herein throughout the specification and clauses, may be applied to modify any quantitative representation that could permissibly vary without resulting in a change in the basic function to which it may be related. Accordingly, a value modified by a term or terms, such as "about," "substantially," and "approximately," may be not to be limited to the precise value specified. In at least some instances, the approximating language may correspond to the precision of an instrument for measuring the value. Here and throughout the

specification and clauses, range limitations may be combined and/or interchanged, such ranges may be identified and include all the sub-ranges contained therein unless context or language indicates otherwise.

[0045] This written description uses examples to disclose the embodiments, including the best mode, and to enable a person of ordinary skill in the art to practice the embodiments, including making and using any devices or systems and performing any incorporated methods. The clauses define the patentable scope of the disclosure, and include other examples that occur to those of ordinary skill in the art. Such other examples are intended to be within the scope of the clauses if they have structural elements that do not differ from the literal language of the clauses, or if they include equivalent structural elements with insubstantial differences from the literal language of the clauses.

Claims

1. A system comprising:

a platform rotatably coupled with a vehicle, the platform configured to rotate from a first platform position to a second platform position relative to a chassis of the vehicle; and
a ramp coupled to the platform at a proximate tip of the platform and configured to pivot relative to the platform from a first ramp position to a second ramp position.

2. The system of claim 1, wherein the vehicle is a rail vehicle, and the platform is configured to accept and to discharge a second vehicle that is not a rail vehicle.

3. The system of claim 2, further comprising a mounting device configured to accept and discharge the second vehicle.

4. The system of claim 1, wherein the platform is configured to remain at about the same height and generally level with a top surface of the chassis, and the ramp is configured to reversibly pivot so that a distal tip of the ramp is lower relative to the proximate tip of the platform.

5. The system of claim 1, wherein the platform is coupled to the chassis by a motorized turntable and includes a locking mechanism to selectively prevent rotation of the platform.

6. The system of claim 1, wherein the ramp is extendable and includes at least one actuator for moving the ramp from the first ramp position to a second ramp position.

7. The system of claim 1, further comprising a rail frame

coupled to the platform and having a first rail and a second rail, and the ramp is disposed between the first rail and the second rail.

8. The system of claim 1, further comprising an electrical connector configured to conductively couple to a first energy storage device in a second vehicle, and thereby to transfer electrical energy from offboard the second vehicle to the first energy storage device.

9. The system of claim 1, further comprising a retaining mechanism on the platform configured to couple to a second vehicle and prevent movement of the second vehicle on the platform.

10. The system of claim 1, further comprising a platform sensor associated with the platform configured to provide signals related to whether the platform is locked in the first platform position.

11. The system of claim 10, further comprising one or more processors configured to determine the platform is not locked in the first platform position based on the signals provided by the platform sensor, and prevent movement of the vehicle based on determining the platform is not locked in the first platform position.

12. The system of claim 1, further comprising a ramp sensor associated with the ramp configured to provide signals related to whether the ramp is locked in a first position.

13. The system of claim 12, further comprising one or more processors configured to determine the ramp is not locked in the first position based on the signals provided by the ramp sensor, and prevent movement of the vehicle based on determining the ramp is not locked in the first position.

14. The system of claim 1, further comprising a vehicle locking mechanism on the platform and configured to secure the vehicle to the platform.

15. A method comprising:

rotating platform of a vehicle of a vehicle system from a first platform position to a second platform position;
extending a ramp coupled to the platform at a proximate tip of the platform from a first position to a second position;
loading a second vehicle onto the platform;
retracting the ramp from the second position to the first position after the second vehicle is loaded onto the platform;
rotating the platform from the second platform position to the first platform position after retract-

ing the ramp to the first position.

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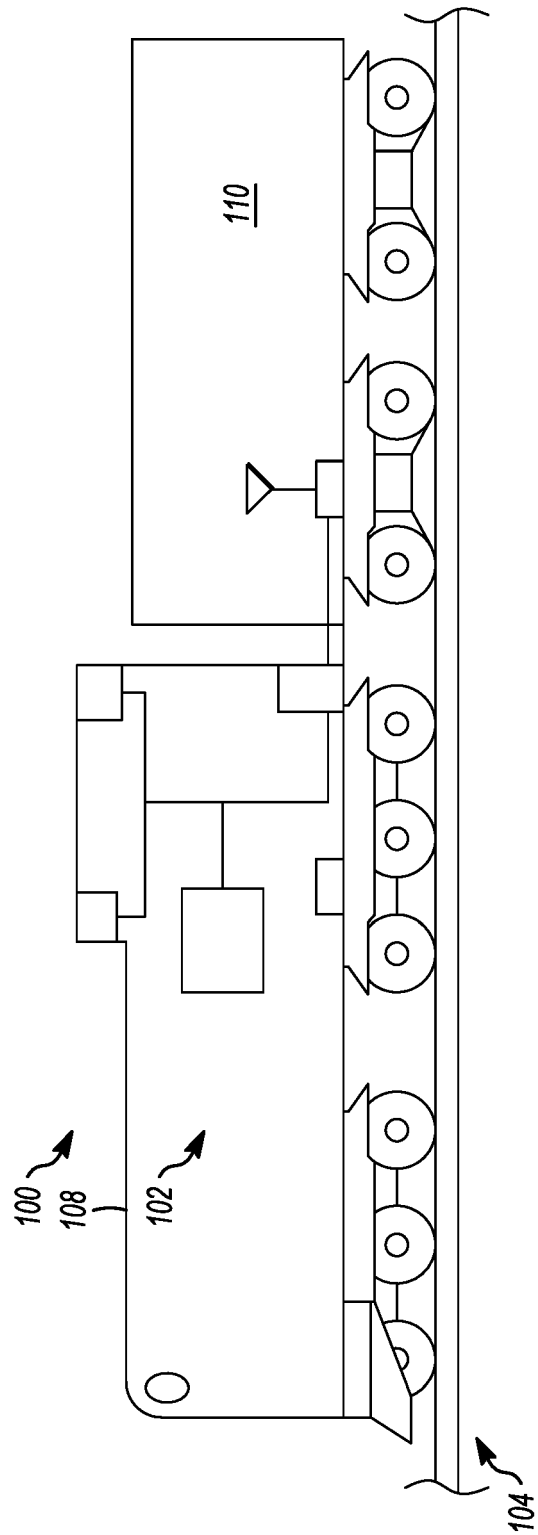


FIG. 1

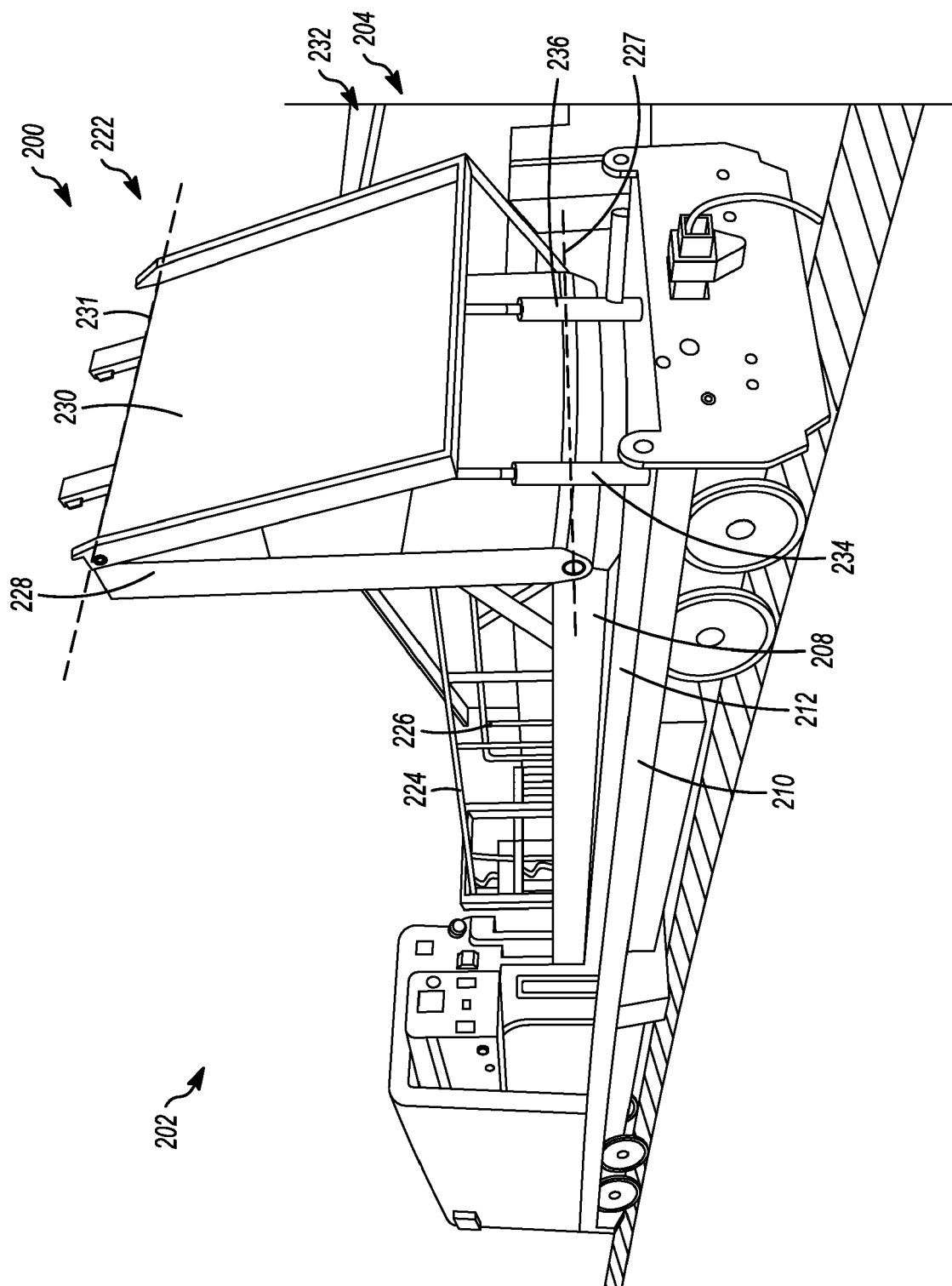


FIG. 2

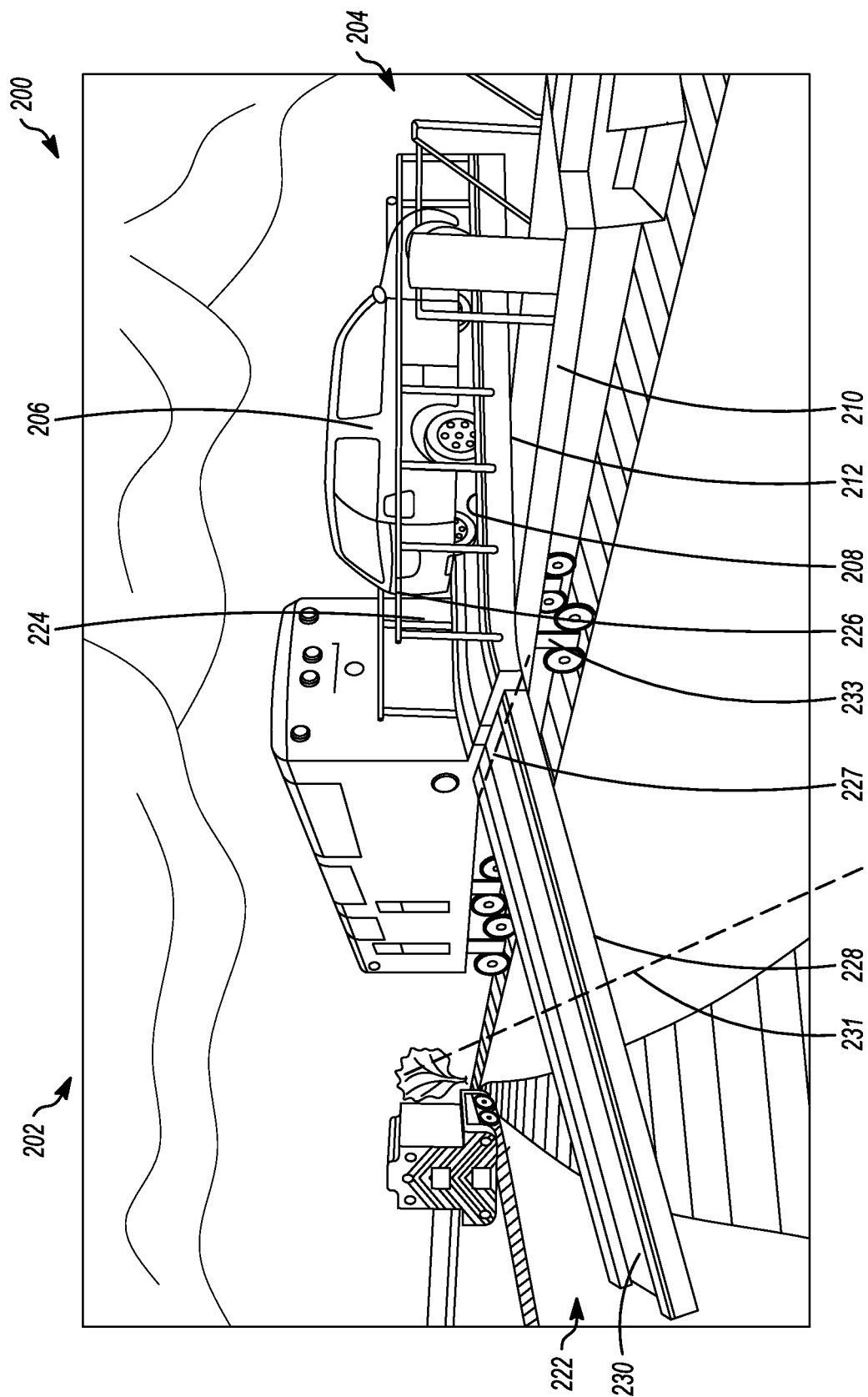


FIG. 3

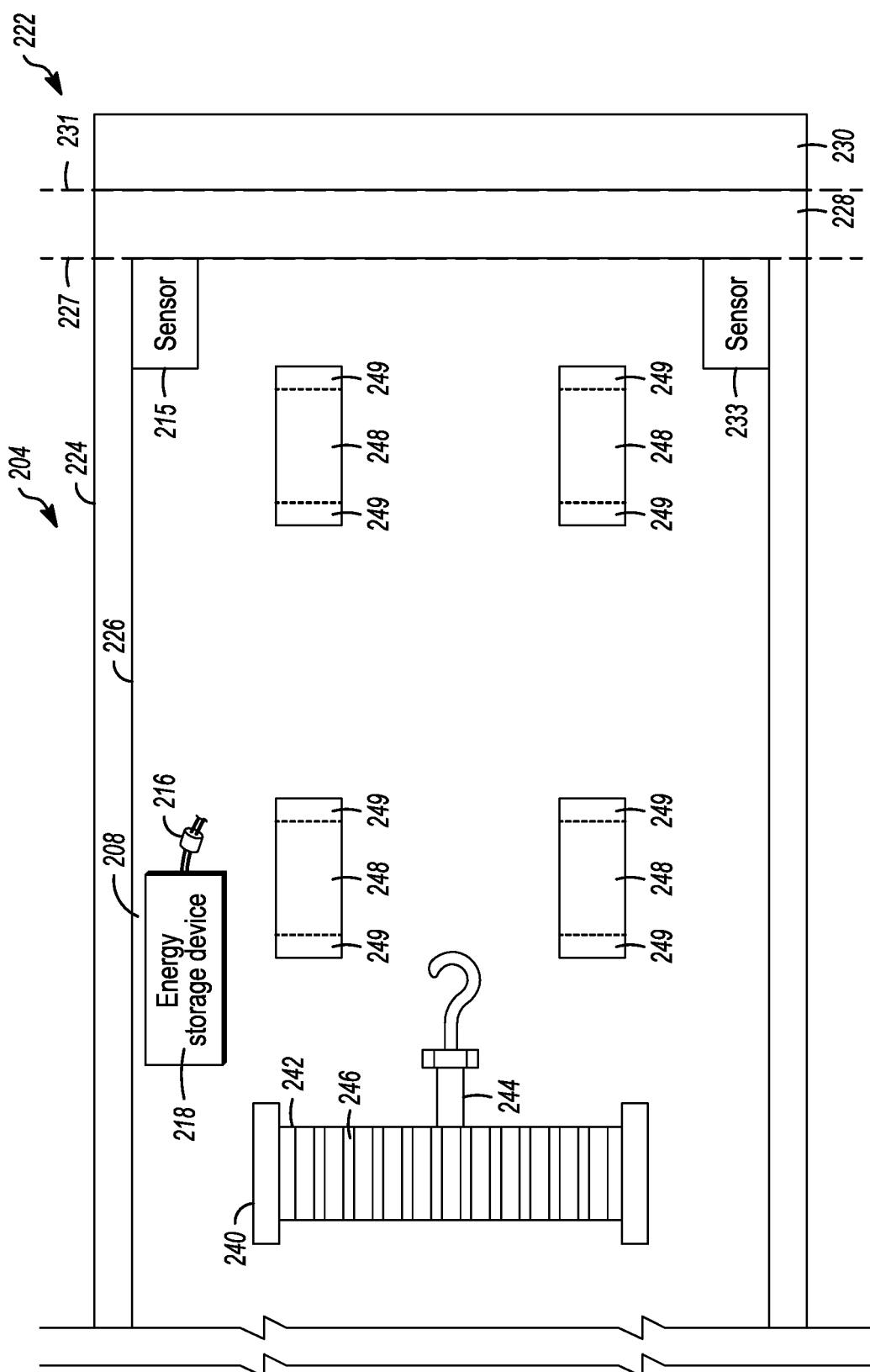


FIG. 4

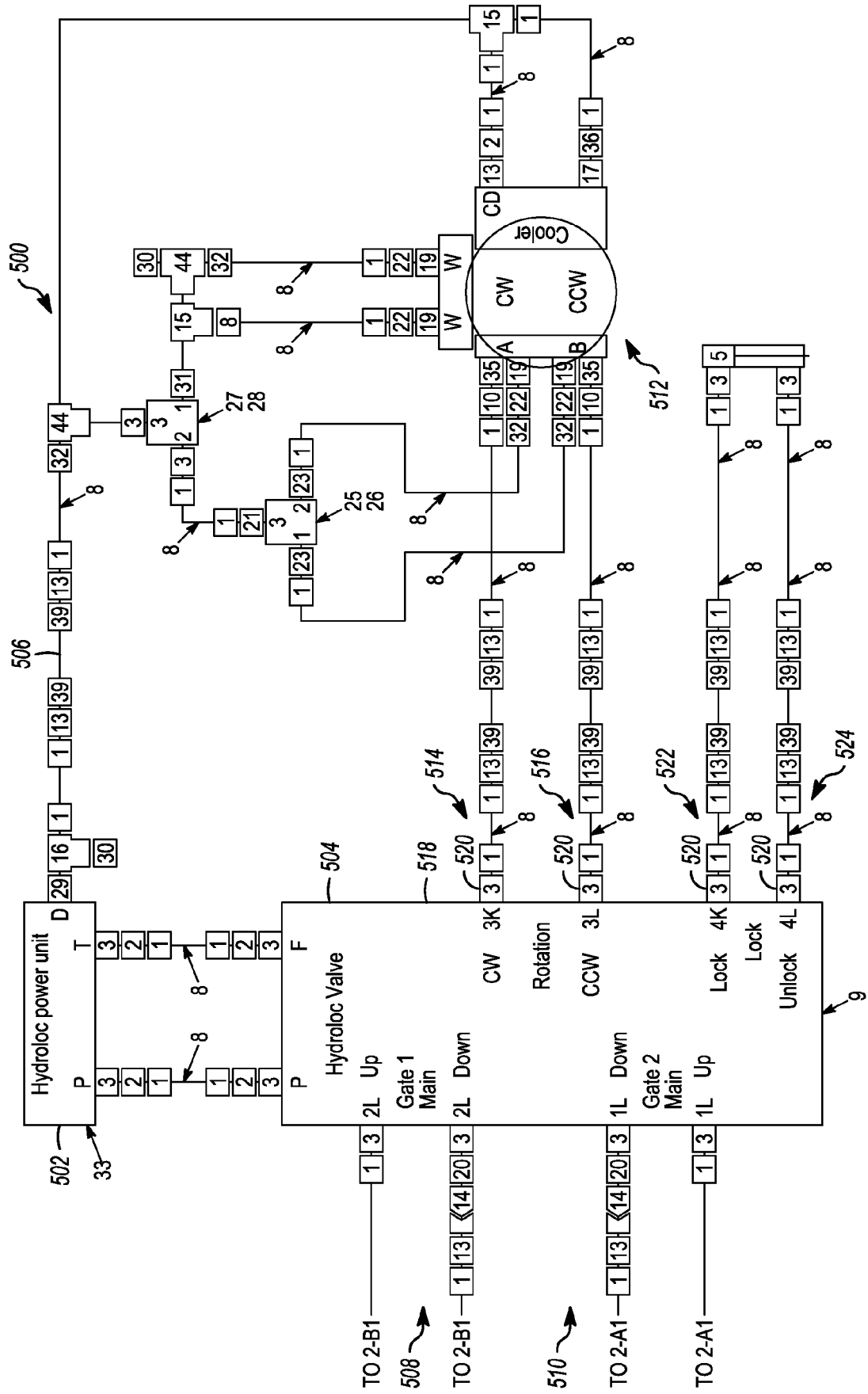
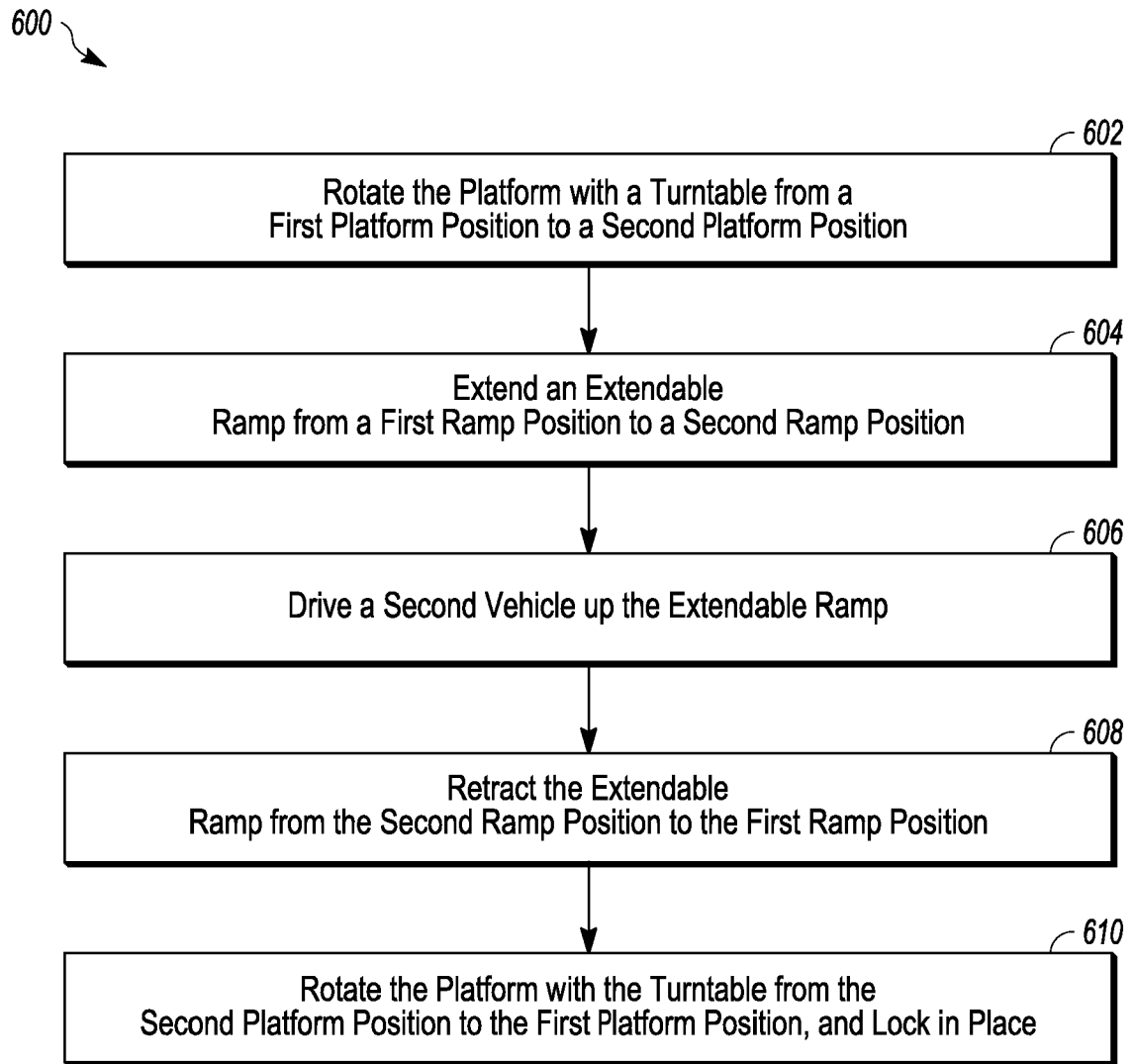


FIG. 5

**FIG. 6**



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Place of search Munich		Date of completion of the search 17 July 2023	Examiner Denis, Marco
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