

ROUND RIDE SYSTEMS AND METHODS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims priority to and the benefit of U.S. Provisional Application No. 63/471,452, entitled “ROUND RIDE SYSTEMS AND METHODS” and filed June 6, 2023, which is hereby incorporated by reference in its entirety for all purposes.

BACKGROUND

[0002] This section is intended to introduce the reader to various aspects of art that may be related to various aspects of the present techniques, which are described and/or claimed below. This discussion is believed to be helpful in providing the reader with background information to facilitate a better understanding of the various aspects of the present disclosure. Accordingly, it should be understood that these statements are to be read in this light, and not as admissions of prior art.

[0003] Entertainment venues may include various features to provide unique experiences to guests. For example, an amusement park may include various attractions, such as rides and shows that entertain guests. Certain attractions may include ride vehicles that carry the guests along a track to provide changes in motion to entertain the guests, and certain attractions may provide visual and/or audible effects to entertain the guests. Ride vehicle motion is often combined with show elements (e.g., visual and/or audio effects) to increase entertainment value. For example, a ride may utilize a ride vehicle to provide thrilling movements while carrying the guests through a scene or environment that includes visual and/or audible effects.

SUMMARY

[0004] Certain embodiments commensurate in scope with the originally claimed subject matter are summarized below. These embodiments are not intended to limit the scope of the disclosure, but rather these embodiments are intended only to provide a brief summary

of certain disclosed embodiments. Indeed, the present disclosure may encompass a variety of forms that may be similar to or different from the embodiments set forth below.

[0005] In an embodiment, a round ride system includes a center wheel, a first drive system configured to drive rotation of the center wheel, and multiple spokes coupled to the center wheel. The round ride system also includes multiple ride vehicles, wherein each ride vehicle of the multiple ride vehicles is coupled to a respective spoke of the multiple spokes. The round ride system further includes a second drive system configured to independently drive each spoke of the multiple spokes in a circumferential direction relative to the center wheel to adjust respective angles defined between respective pairs of adjacent spokes of the multiple spokes.

[0006] In an embodiment, a round ride system includes a center wheel and a first drive system configured to drive rotation of the center wheel. The round ride system also includes multiple spokes coupled to the center wheel, multiple ride vehicles coupled to the multiple spokes, a second drive system configured to independently drive each spoke of the multiple spokes relative to the center wheel, and a third drive system configured to independently drive each ride vehicle of the multiple ride vehicles along a respective spoke of the multiple spokes. The round ride system further includes a ride controller configured to provide instructions to the first drive system, the second drive system, and the third drive system to move the multiple ride vehicles through a show set.

[0007] In an embodiment, a ride system includes a loading station, a round ride system, and one or more paths configured to support movement of one or more ride vehicles from the loading station to the round ride system. The round ride system includes a center wheel, a first drive system configured to drive rotation of the center wheel, a plurality of spokes coupled to the center wheel, and a plurality of payload portions, wherein each payload portion of the plurality of payload portions is coupled to a respective spoke of the plurality of spokes and is configured to receive a respective ride vehicle of the plurality of ride vehicles from the one or more paths.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] These and other features, aspects, and advantages of the present disclosure will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

[0009] FIG. 1 is a perspective view of a round ride system that includes spokes that rotate and lift ride vehicles, in accordance with an embodiment of the present disclosure;

[0010] FIG. 2 is a perspective view of a round ride system that includes spokes that rotate and lift ride vehicles, wherein angles between adjacent spokes are adjustable, in accordance with an embodiment of the present disclosure;

[0011] FIG. 3 is a perspective view of a round ride system that includes spokes that couple to ride vehicles, wherein the spokes are supported on an outer ring and angles between adjacent spokes are adjustable, in accordance with an embodiment of the present disclosure;

[0012] FIG. 4 is an overhead view of the round ride system of FIG. 3 in association with a show set, in accordance with an embodiment of the present disclosure;

[0013] FIG. 5 is a perspective view of a portion of the round ride system of FIG. 3 in association with the show set, in accordance with an embodiment of the present disclosure;

[0014] FIG. 6 is a side view of a portion of the round ride system of FIG. 2, in accordance with an embodiment of the present disclosure;

[0015] FIG. 7 is a side view of a radially inner portion of the round ride system of FIG. 3, in accordance with an embodiment of the present disclosure;

[0016] FIG. 8 is a side view of a radially outer portion of the round ride system of FIG. 3, in accordance with an embodiment of the present disclosure;

[0017] FIG. 9 is a side view of a ride vehicle trolley system that may be utilized in the round ride system of FIG. 3, in accordance with an embodiment of the present disclosure;

[0018] FIG. 10 is a side view of a portion of a ride system that is configured to pick up a ride vehicle, in accordance with an embodiment of the present disclosure;

[0019] FIG. 11 is a side view of a portion of a ride system that is configured to pick up a ride vehicle and support the ride vehicle on a platform, in accordance with an embodiment of the present disclosure; and

[0020] FIG. 12 is a side view of a portion of a ride system that is configured to pick up and transfer a ride vehicle from one portion of a path to another portion of the path, in accordance with an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0021] One or more specific embodiments will be described below. In an effort to provide a concise description of these embodiments, not all features of an actual implementation are described in the specification. It should be noted that in the development of any such actual implementation, as in any engineering or design project, numerous implementation-specific decisions must be made to achieve the developers' specific goals, such as compliance with system-related and business-related constraints, which may vary from one implementation to another. Moreover, it should be noted that such a development effort might be complex and time consuming, but would nevertheless be a routine undertaking of design, fabrication, and manufacture for those of ordinary skill having the benefit of this disclosure. When introducing elements of various embodiments of the present disclosure, the articles "a," "an," "the," and "said" are intended to mean that there are one or more of the elements. The terms "comprising," "including," and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

[0022] The present disclosure relates generally to round ride systems and methods that may be used in any suitable venue, such as any suitable entertainment venue (e.g., amusement park, fair, shopping mall). As used herein, the term “round ride systems” refers to ride systems that rotate one or more ride vehicles about a common center axis (e.g., to travel along a circular path or in a loop). The round ride systems may include spokes that extend outwardly from a center wheel. For example, each of the spokes may include a respective first end (e.g., first end portion) that couples to the center wheel. Each of the spokes may also support or be coupled to a respective ride vehicle. For example, each of the spokes may include a respective second end (e.g., second end portion) that couples to a respective ride vehicle. In operation, the spokes may lift and/or rotate the ride vehicles (e.g., lift relative to a ground surface and/or rotate about a central axis of the center wheel).

[0023] The round ride systems may include other features. For example, the round ride systems may enable adjustment of angles between adjacent spokes, which may provide for variations in speed of travel for the ride vehicles as the spokes rotate the ride vehicles. Further, the adjustment of the angles between the adjacent spokes may facilitate operation in conjunction with a show set, as one spoke of the spokes may hold (e.g., slow or block rotation; rotate at a first rate) at least one ride vehicle of the ride vehicles within a portion of the show set for a period of time that corresponds to an audio and/or a visual performance in the portion of the show set, even while other spokes of the spokes continue to rotate (e.g., continue rotation; rotate at a second rate) other ride vehicles of the ride vehicles.

[0024] With the foregoing in mind, FIG. 1 is a perspective view of an embodiment of a round ride system 10 that includes spokes 12 that extend outwardly (e.g., radially) from a center wheel 14 (e.g., hub; rotatable structure of any suitable cross-sectional shape, such as round, square, and so forth). As shown, the round ride system 10 includes twelve spokes 12; however, it should be appreciated that the round ride system 10 may include any number of spokes 12 (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, or more). To facilitate discussion, the round ride system 10 and its components may be described with

reference to a vertical axis or direction 2, a radial or lateral axis or direction 4, and/or a circumferential axis or direction 6.

[0025] As shown, each of the spokes 12 includes a first end 16 (e.g., first end portion) that is coupled to the center wheel 14. Further, each of the spokes 12 may be coupled to a respective ride vehicle 18 that is configured to carry one or more guests. In FIG. 1, each of the spokes 12 includes a second end 20 (e.g., second end portion) that is coupled to the respective ride vehicle 18. In particular, the respective ride vehicle 18 is suspended from the second end 20. However, it should be appreciated that each of the spokes 12 may include another attachment portion (e.g., between the first end 16 and the second end 20) that is coupled to the respective ride vehicle 18. In an embodiment, each of the spokes 12 may be slidably coupled to the respective ride vehicle 18. For example, each of the spokes 12 may include a track 22 that enables sliding motion of the respective ride vehicle 18 along the track 22 (e.g., sliding motion back and forth between the first end 16 and the second end 20; via wheels of the respective ride vehicle 18). Further, instead of the respective ride vehicle 18 being suspended from the second end 20, the respective ride vehicle 18 may be positioned on top of the respective spoke 12 or on top of a platform that is positioned at the second end 20.

[0026] In FIG. 1, each of the ride vehicles 18 includes a payload portion 24 (e.g., passenger portion (e.g., seat portion), container portion) that houses or carries the one or more guests and a ride vehicle actuator system 26 (e.g., ride vehicle actuator assembly) that connects the payload portion 24 to the respective spoke 12. Each ride vehicle actuator system 26 may be configured to move the respective ride vehicle 18 relative to the respective spoke 12. For example, each ride vehicle actuator system 26 may be configured to shake, pitch (e.g., about a first lateral axis 36), roll (e.g., about a second lateral axis 37 orthogonal to the first lateral axis 36), and/or rotate (e.g., yaw; about a respective central axis 38) the respective ride vehicle 18 relative to the respective spoke 12.

[0027] Each of the spokes 12 is also coupled to a respective spoke actuator system 28 (e.g., one or more spoke actuator assemblies, one or more spoke actuator components, one

or more linear actuators). Each spoke actuator system 28 may include a first end 30 (e.g., first end portion) and a second end 32 (e.g., second end portion), wherein the first end 30 may be coupled to the center wheel 14 and the second end 32 may be coupled to a respective spoke 12. In operation, the spokes 12 and the spoke actuator systems 28 may rotate with the center wheel 14 (e.g., which may be driven to rotate constantly at a fixed or variable rate or intermittently) due to connections at the first ends 16 of the spokes 12 and the first ends 30 of the spoke actuator systems 28, respectively. The respective connections between the first ends 16 of the spokes 12 and the center wheel 14 may include rotatable joints 33 (e.g., hinge joints) that enable the spokes 12 to lift relative to the center wheel 14. Thus, the spoke actuator systems 28 may extend and retract to drive the spokes 12 and the ride vehicles 18 coupled thereto to lift and lower relative to a ground surface 34. In particular, as the center wheel 14, the spokes 12, the ride vehicles 18, and the spoke actuator systems 28 may rotate about a central axis 35 of the center wheel 14, the spoke actuator systems 28 lift and lower the spokes 12 and the ride vehicles 18 coupled thereto relative to the ground surface 34. Additionally, the ride vehicle actuator systems 26 may move the payload portions 24 of the ride vehicles 18 relative to the spokes 12 (e.g., shake, pitch, roll, and/or rotate).

[0028] It should be appreciated that a ride controller 40 may instruct any combination of these motions over a ride cycle (e.g., between loading and unloading of the one or more guests) according to programmed ride settings. Additionally or alternatively, the ride controller 40 may be configured to receive one or more inputs from an operator and/or the one or more guests, such as via operator devices (e.g., tablets; laptops; desktop computer), guest devices (e.g., mobile phones), and/or input devices (e.g., user interfaces; touchscreens; joysticks) located in the ride vehicles 18. In response to receipt of the one or more inputs, the ride controller 40 may provide and/or adjust these motions accordingly. For example, the one or more guests may provide inputs via the input devices located in the respective ride vehicle 18 to control a position of the respective spoke actuator system 28 to adjust the lift of the respective ride vehicle 18, while the ride controller 40 maintains rotation of the center wheel 14, the spokes 12, and the ride vehicles 18 about the central

axis 35 of the center wheel 14 according to the programmed ride settings (e.g., at constant or variable rate according to the programmed ride settings).

[0029] Thus, in an embodiment, each ride vehicle 18 may experience guest-controlled motion relative to the respective spoke 12, as well as programmed motion during rotation about the central axis 35 of the center wheel 14. As a result, each ride vehicle 18 may be in a lowest position relative to the ground surface 34 during a portion of a ride cycle (e.g., along a platform 48) with guest-controlled motion deactivated or unavailable, then rise to a highest position relative to the ground surface 34 during another portion of the ride cycle (e.g., immediately after leaving the platform 48) with guest-controlled motion activated or available, and so forth. In such cases, the rotation about the central axis 35 of the center wheel 14 and up/down motion imparted by the spoke actuator systems 28 may result in some consistent aspects of motion for each ride vehicle 18 according to the programmed ride settings during the ride cycle, along with some variable or enhanced motion according to the one or more inputs from the one or more guests during the ride cycle. It should be appreciated that any of a variety of control schemes or aspects are envisioned, including complete control via the programmed ride settings (e.g., no inputs from the one or more guests) or enabling the one or more guests to provide additional inputs to control (e.g., instruct) the rotation (e.g., maintain the rotation, increase the rate of rotation, decrease the rate of rotation) about the central axis 35 of the center wheel 14 and/or the up/down motion via the spoke actuator systems 28. Further, the programmed ride settings may be variable and/or change based on various factors (e.g., achievements recorded by the one or more guests in an interactive experience prior to and/or during the ride cycle; random selection of available programmed ride settings from a library; visual and/or audible effects in a show played during the ride cycle) to provide a wider variety of ride experiences via the round ride system 10. To facilitate discussion, a motor 46 that drives rotation of the center wheel 14, the spoke actuator systems 28, and the ride vehicle actuator systems 26 may be considered drive systems (e.g., first, second, and third drive systems).

[0030] The ride controller 40 (e.g., control system, control assembly, control circuitry) may include a processor 42(s) (e.g., processor system, processor assembly, processing circuitry) and a memory device 44. The processor 42(s) may provide control signals (e.g., data, instructions) to certain controllable devices and components (e.g., motors, actuators) associated with the various drive systems (e.g., the center wheel 14, the spoke actuator systems 28, the ride vehicle actuator systems 26). The memory device 44 may include one or more tangible, non-transitory, computer-readable media that store instructions executable by the processor(s) 42. For example, the memory device 44 may include random access memory (RAM), read only memory (ROM), rewritable non-volatile memory such as flash memory, hard drives, optical discs, and/or the like. Additionally, the processor(s) 42 may include one or more general purpose microprocessors, one or more application specific processors (ASICs), one or more field programmable gate arrays (FPGAs), or any combination thereof. Additionally or alternatively, the ride controller 40 may include individual (or multiple, distributed) controllers. For example, each ride vehicle actuator system 26 may have a respective dedicated controller that is communicatively coupled to a central controller that controls (e.g., instructs) motion of the center wheel 14 and/or the spoke actuator systems 28. Indeed, present embodiments may include a processing system (e.g., processing circuitry) with any number of processors (e.g., including the processor(s) 42 and/or additional processor(s)), and the processing system may be configured to carry out the operations described herein in any suitable manner (e.g., the operations described herein may be distributed between the processor(s) 42 and/or additional processor(s); one of the processor(s) 42 may perform certain operations and another one of the processor(s) 42 may perform other operations).

[0031] In an embodiment, the round ride system 10 may be associated with the platform 48. The platform 48 may be part of a loading station to load the one or more guests into the ride vehicles 18, an unloading station to unload the one or more guests from the ride vehicles 18, or both. The platform 48 may include a fixed path or a moving conveyor to carry and/or guide the one or more guests. The ride controller 40 may control (e.g., instruct) the ride vehicle actuator systems 26 and/or the spoke actuator systems 28 to

position the ride vehicles 18 adjacent to (e.g., vertically aligned with) the platform 48 as the ride vehicles 18 pass the platform 48 during rotation of the ride vehicles 18 about the central axis 35 of the center wheel 14. In this way, the ride vehicles 18 may be positioned to enable the one or more guests to efficiently load and/or unload from the ride vehicles 18.

[0032] FIG. 2 is a perspective view of an embodiment of a round ride system 100 that includes spokes 102 that extend outwardly (e.g., radially) from a center wheel 104 (e.g., hub; rotatable structure of any suitable cross-sectional shape, such as round, square, and so forth). As shown, the round ride system 100 includes twelve spokes 102; however, it should be appreciated that the round ride system 100 may include any number of spokes 12 (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, or more). To facilitate discussion, the round ride system 100 and its components may be described with reference to a vertical axis or direction 2, a radial or lateral axis or direction 4, and/or a circumferential axis or direction 6.

[0033] Each of the spokes 102 includes a first end 106 (e.g., first end portion) that is coupled to the center wheel 104. Further, each of the spokes 102 may be coupled to a respective ride vehicle 108 that is configured to carry one or more guests. In FIG. 1, each of the spokes 102 includes a second end 110 (e.g., second end portion) that may be coupled to the respective ride vehicle 108. In particular, the respective ride vehicle 108 is suspended from the second end 110. However, it should be appreciated that each of the spokes 102 may include another and/or alternative attachment portion (e.g., between the first end 106 and the second end 110) that is coupled to the respective ride vehicle 108. In an embodiment, each of the spokes 102 may be slidingly (e.g., via linear slides or rolling wheels) coupled to the respective ride vehicle 108. For example, each of the spokes 102 may include a track 112 that enables sliding motion of the respective ride vehicle 108 along the track 112 (e.g., sliding motion back and forth between the first end 106 and the second end 20). Further, instead of the respective ride vehicle 108 being suspended from the

second end 110, the respective ride vehicle 108 may be positioned on top of the respective spoke 102 or on top of a platform that is positioned at the respective second end 110.

[0034] In FIG. 2, each of the ride vehicles 108 includes a payload portion 114 (e.g., passenger portion (e.g., seat portion), container portion) that houses or carries the one or more guests and a ride vehicle actuator system 116 (e.g., ride vehicle actuator assembly) that couples (e.g., connects) the payload portion 114 to the respective spoke 102. Each ride vehicle actuator system 116 may be configured to move the respective ride vehicle 108 relative to the respective spoke 102. For example, each ride vehicle actuator system 116 may be configured to shake, pitch, roll, and/or rotate (e.g., yaw) the respective ride vehicle 108 relative to the respective spoke 102.

[0035] Each of the spokes 102 may also be coupled to a spoke actuator system 115 (e.g., one or more spoke actuator assemblies 115, 118 (e.g., one or more spoke actuator components; one or more spoke linear actuators)). Each spoke actuator assembly 115, 118 includes a first end 120 (e.g., first end portion) that is coupled to the center wheel 104 and a second end 122 (e.g., second end portion) that is coupled to a respective spoke 102. In operation, the first ends 106 of the spokes 102 and the first ends 120 of the spoke actuator assemblies 115, 118 rotate with the center wheel 104 (e.g., rotate at the same rate of rotation as the center wheel 104) due to respective connections with the center wheel 104. However, the respective connections between the first ends 106 of the spokes 102 and the center wheel 104 may include one or more movable connections 138 (e.g., pins, joints (e.g., rotatable joints (e.g., pivot joints, ball joints, universal joints), one or more sliding joints)) that enable the spokes 102 to lift and rotate relative to the center wheel 104.

[0036] In particular, the spoke actuator assemblies 115, 118 may drive the spokes 102 and the ride vehicles 108 coupled thereto to lift and lower the spokes 102 and/or the ride vehicles 108 coupled thereto relative to a ground surface 140. As the center wheel 104, the first ends 106 of the spokes 102, and the first ends 120 of the spoke actuator assemblies 115, 118 rotate about a central axis 142 of the center wheel 104, the spoke actuator assemblies 115, 118 may lift and/or lower the spokes 102 and the ride vehicles 108 coupled

thereto relative to the ground surface 140. Additionally, independently of the rotation of the center wheel 104, the spoke actuator assemblies 115, 118 may drive movement and/or orientation of one or more of the spokes 102 and the respective ride vehicles 108 coupled thereto relative to position, movement, and/or orientation of the center wheel 104 and/or relative to each of the other spokes 102 (e.g., each spoke 102 of the one or more spokes 102 being driven independently of the rotation of the center wheel 104 may also be driven independently from actuation of any or all other spokes 102). In this way, the spoke actuator assemblies 115, 118 may cause (e.g., drive) adjustments to angles 144 between adjacent spokes 102 (e.g., during rotation of the center wheel 104, during a ride cycle, the angles 144 between adjacent spokes 102 from an overhead or top perspective, the angles 144 between adjacent spokes 102 in a lateral plane). Depending on a position and/or orientation of the spoke actuator assemblies 115, 118, the spoke actuator assemblies 115, 118 may drive movement (e.g., change of position and/or orientation) of the spokes 102 along the vertical axis 2 and/or the circumferential axis 6 (e.g., to lift the spokes 102 upwardly (e.g., raise) and about the center wheel 104, move the spokes 102 vertically (e.g., raise, lower) relative to the center wheel 104 and circumferentially about the center wheel 104, move the spokes 102 along an arc-shaped path). In this way, the spoke actuator assemblies 115, 118 may transition the spokes 102 to rotate at the first ends 106 of the spokes 102 about the central axis 142 of the center wheel 104 and relative to the rotation of center wheel 104, to thereby alter circumferential spacing between the second ends 110 of the spokes 102.

[0037] To facilitate discussion, FIG. 2 includes reference to a first spoke actuator assembly 115, 118A and a second spoke actuator assembly 115, 118B that are coupled to a first spoke 102A. A ride controller 150 may control (e.g., instruct (e.g., instruct actuation of) the first spoke actuator assembly 115, 118A and the second spoke actuator assembly 115, 118B in a manner that causes a change (e.g., increase or decrease, rate of increase or decrease) in the respective angle 144 defined between the first spoke 102A and a second spoke 102B that is adjacent to the first spoke 102A. For example, the ride controller 150 may instruct the first spoke actuator assembly 115, 118A to extend a first distance and the

second spoke actuator assembly 115, 118B to extend a second distance that is greater than the first distance to increase the respective angle 144 and to move the respective second end 110A of the first spoke 102A away from a respective second end 110B of a second spoke 102B. In this way, the rate of rotation of a first ride vehicle 108A may temporarily change (e.g., decrease) its rate of rotation relative to the rate of rotation of the center wheel 14 to provide enhanced motion experiences and/or to facilitate loading and/or unloading at the first ride vehicle 108A via a platform 160. Additionally, in this way, the position of the first ride vehicle 108A may temporarily change relative to a second ride vehicle 108B (e.g., increasing circumferential spacing between the first ride vehicle 108A and the second ride vehicle 108B). Further, where the second ride vehicle 108B and other ride vehicles 108 remain fixed relative to the center wheel 104 (e.g., the rate of rotation of the second ride vehicle 108B and other ride vehicles 108 match the rate of rotation of the center wheel 104), the circumferential spacing between the first ride vehicle 108A and a leading ride vehicle (e.g., the second ride vehicle 108B) may increase, and the circumferential spacing between the first ride vehicle 108A and a trailing ride vehicle may decrease.

[0038] Similarly, the ride controller 150 may instruct the first spoke actuator assembly 115, 118A to extend a third distance and the second spoke actuator assembly 115, 118B to extend the second distance that is less than the third distance to decrease the respective angle 144 and to move the respective second end 110A of the first spoke 102A toward the respective second end 110B of the second spoke 102B. In this way, the rate of rotation of the first ride vehicle 108A may temporarily change (e.g., increase) relative to the rate of rotation of the center wheel 14 to provide enhanced motion experiences and/or to return to an initial or target value of the respective angle 144 (e.g., that would provide equidistant spacing (e.g., equidistant circumferential spacing) of the spokes 102 about the center wheel 104). Additionally, in this way, the position of the first ride vehicle 108A relative to the second ride vehicle 108B may temporarily change (e.g., decreasing circumferential spacing between the first ride vehicle 108A and the second ride vehicle 108B). Further, where the second ride vehicle 108B and other ride vehicles 108 remain fixed relative to the center wheel 104 (e.g., rate of rotation of the second ride vehicle 108B and other ride vehicles

108 match the rate of rotation of the center wheel 104), the circumferential spacing between the first ride vehicle 108A and the leading ride vehicle (e.g., the second ride vehicle 108B) may decrease, and the circumferential spacing between the first ride vehicle 108A and the trailing ride vehicle may increase. Indeed, any of the spoke actuator assemblies 115, 118 may be controlled (e.g., instructed (e.g., instructed to actuate)) to position the spokes 102 at any of a variety of angles 144 relative to one another during the ride cycle, as well as to change the angles 144 during the ride cycle.

[0039] It should be appreciated that the round ride system 100 may include any of a variety of structural features and configurations (e.g., various types of actuators at any suitable locations) to enable adjustment of the angles 144. It should be appreciated that certain features of the round ride system 10 of FIG. 1 may be incorporated into the round ride system 100 of FIG. 2. For example, the ride controller 150 may include a processor 152 and a memory device 154, wherein the ride controller 150 may be configured to implement programmed ride settings, receive one or more inputs from input devices, and so forth, as described with reference to FIG. 1. To facilitate discussion, a motor 156 that drives rotation of the center wheel 104, the spoke actuator system 115 (e.g., the spoke actuator assemblies 115, 118), and the ride vehicle actuator systems 116 may be considered drive systems (e.g., first, second, and third drive systems). Additionally, while the one or more spoke actuator assemblies 115, 118 are shown in FIG. 2, FIG. 2 may allow for the spoke actuator system 115. That is, the spoke actuator system 115 having any suitable components with any suitable structure may carry out and/or support operations (e.g., rotation, lift) described as performed by the one or more spoke actuator assemblies 115, 118.

[0040] FIG. 3 is a perspective view of an embodiment of a round ride system 200 that includes spokes 202 that extend outwardly (e.g., radially) from a center wheel 204 (e.g., hub; rotatable structure of any suitable cross-sectional shape, such as round, square, and so forth). As shown, the round ride system 200 includes sixteen spokes 202; however, it should be appreciated that the round ride system 200 may include any number of spokes

202 (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, or more). To facilitate discussion, the round ride system 200 and its components may be described with reference to a vertical axis or direction 2, a radial or lateral axis or direction 4, and/or a circumferential axis or direction 6.

[0041] Each of the spokes 202 includes a first end 206 (e.g., first end portion) may be coupled to the center wheel 204 and a second end 208 (e.g., second end portion) may be supported on an outer ring 210. Further, each of the spokes 202 may support a respective ride vehicle 212 that may be configured to carry one or more guests. In FIG. 3, each of the spokes 202 suspends a respective ride vehicle 212 (e.g., the respective ride vehicle 212 is positioned below and hangs from the respective spoke 202). However, it should be appreciated that each of the spokes 202 may be coupled to a respective ride vehicle 212 in any suitable manner. For example, the respective ride vehicle 212 may be positioned on an opposite side of the respective spoke 202 (e.g., on top of the respective spoke 202) or on any other side of the respective spoke 202.

[0042] In an embodiment, each of the ride vehicles 212 may include a payload portion 24 (e.g., passenger portion (e.g., seat portion), container portion) that may house or carry the one or more guests, a ride vehicle trolley system 216 (e.g., ride vehicle trolley system) that slides along a track 218 in and/or on the respective spoke 202, and/or a ride vehicle actuator system 220 (e.g., ride vehicle actuator assembly) that may connect the payload portion 214 to the ride vehicle trolley system 216. Each ride vehicle trolley system 216 may include a trolley frame 222 and wheels 224 that are configured to engage and roll along the track 218 in the respective spoke 202 to thereby travel (and carry the respective ride vehicle 212) between the center wheel 204 and the outer ring 210 along the respective spoke 202.

[0043] Each ride vehicle actuator system 220 may be configured to move the respective ride vehicle 212 relative to the respective ride vehicle trolley system 216. For example, each ride vehicle actuator system 220 may be configured to shake, pitch (e.g., about a first lateral axis 230), roll (e.g., about a second lateral axis 232 orthogonal to the first lateral

axis 230), and/or rotate (e.g., yaw; about a respective central axis 234) the respective ride vehicle 212 relative to the respective ride vehicle trolley system 216. Further, each ride vehicle actuator system 220 may be configured to move the respective ride vehicle 212 up and/or down along the respective central axis 234 (e.g., away from and/or toward (respectively) a ground surface 236).

[0044] To facilitate these movements, each ride vehicle actuator system 220 may include a linkage 238 that extends between the trolley frame 222 of the respective ride vehicle trolley system 216 and a base plate 240. The linkage 238 may be configured to adjust between a compressed configuration and an expanded configuration to move the respective ride vehicle 212 up and down along the respective central axis 234. Each ride vehicle actuator system 220 may include any suitable components to adjust or to drive the linkage 238 in this manner. For example, each ride vehicle actuator system 220 may include a pulley system with cables that connect the trolley frame 222 of the respective ride vehicle trolley system 216 and the base plate 240. In such cases, the pulley system may retract and release the cables to move (e.g., pull up and release down) the base plate 240 relative to the trolley frame 222, which may cause the linkage 238 to adjust between the compressed configuration and the expanded configuration to move the respective ride vehicle 212 up and down along the respective central axis 234. As another example, one or more actuators (e.g., linear actuators, rotatable actuators) may be coupled to or integrated into the linkage 238 and/or coupled between the base plate 240 and the trolley frame 222 to adjust the linkage 238 between the compressed configuration and the expanded configuration to move the respective ride vehicle 212 up and down along the respective central axis 234. Each ride vehicle actuator system 220 may also include one or more actuators 242 positioned between the payload portion 214 and the base plate 240 to drive the respective ride vehicle 212 to shake, pitch, roll, and/or rotate relative to the respective ride vehicle trolley system 216.

[0045] As noted herein, each of the spokes 202 includes the first end 206 that is coupled to the center wheel 204 and the second end 208 that is supported on the outer ring 210. In

an embodiment, each of the spokes 202 includes the first end 206 that is coupled to the center wheel 204 via a respective inner connection 250, which may be a movable connection (e.g., pivot pin; hinge) that allows the respective spoke 202 to pivot about the respective inner connection 250 as shown by arrow 252. In an embodiment, each of the spokes 202 includes the second end 208 that is supported on the outer ring 210 via a respective outer connection 254 to a respective bogie 256 (e.g., spoke actuator system, spoke actuator assembly). In an embodiment, each of the bogies 256 includes a bogie frame 258 and wheels 260 that are configured to engage and roll along the outer ring 210. In this way, the bogie 256 carries the respective second end 208 of the respective spoke 202 along the outer ring 210. In an embodiment, both the center wheel 204 and the bogies 256 are actively driven to rotate the spokes 202 and the ride vehicles 212 coupled thereto circumferentially about a central axis 262 of the center wheel 204. Indeed, as described herein, such a configuration may enable a variety of motion patterns and ride experiences for the one or more guests during the ride cycle. However, it should be appreciated that active rotation of the center wheel 204 along with passive travel of the bogies 256 (or vice versa, passive rotation of the center wheel 204 along with active travel of the bogies 256) will result in rotation of the spokes 202 and the ride vehicles 212 coupled thereto circumferentially about a central axis 262 of the center wheel 204. In an embodiment, the center wheel 204 rotates constantly at a fixed or variable rate or intermittently (e.g., during the ride cycle).

[0046] In an embodiment, each outer connection 254 may include an interface 264 that enables relative movement between the second end 208 of the respective spoke 202 and the bogie frame 258 of the respective bogie 256. For example, the interface 264 may include a key-slot interface, such as a key or pin formed in the second end 208 of the respective spoke 202 that slides within a slot formed in the bogie frame 258 of the respective bogie 256 (or vice versa, the key or pin formed in the bogie frame 258 and the slot formed in the second end 208). In operation, a ride controller 270 may provide instructions to each of the bogies 256 to independently drive or travel along the outer ring 210 with defined characteristics (e.g., speed). In this way and with the structural features

described herein, the ride controller 270 may control (e.g., instruct) each of the bogies 256 to cause adjustments to angles 266 between adjacent spokes 202.

[0047] Thus, with reference to FIG. 3, a first bogie 256A is coupled to a first spoke 202A and a second bogie 256B is coupled to a second spoke 202B. The ride controller 270 may control (e.g., instruct) the first bogie 256A (e.g., via instructing a respective motor of the first bogie 256A) and the second bogie 256B (e.g., via instructing a respective motor of the second bogie 256B) in a manner that causes a change (e.g., increase or decrease) in the respective angle 266 defined between the first spoke 202A and a second spoke 202B. For example, the ride controller 270 may instruct the first bogie 256A to travel at a first speed and the second bogie 256B to travel at a second speed that is greater than the first speed to increase the respective angle 266 and to move the second end 208A of the first spoke 202A away from the second end 208B of the second spoke 202B. In this way, a first ride vehicle 212A may temporarily slow its rotation relative to the center wheel 204 to provide enhanced motion experiences and/or to facilitate loading and/or unloading at the first ride vehicle 212A via a platform 280. Additionally, in this way, the first ride vehicle 112A may temporarily change its position relative to a second ride vehicle 112B.

[0048] Similarly, the ride controller 270 may instruct the first bogie 256A to travel at a third speed and the second bogie 256B to travel at the second speed that is less than the third speed to decrease the respective angle 266 and to move the second end 208A of the first spoke 202A toward the second end 208B of the second spoke 202B. In this way, the first ride vehicle 212A may temporarily increase its rotation relative to the center wheel 204 to provide enhanced motion experiences and/or to return to an initial or target value of the respective angle 266 (e.g., that would provide equidistant spacing of the spokes 202 about the center wheel 204). Additionally, in this way, the first ride vehicle 112A may temporarily change its position relative to the second ride vehicle 112B. Indeed, any of the bogies 256 may be controlled (e.g., instructed) to actuate and/or position the spokes 102 at any of a variety of angles 266 relative to one another during the ride cycle, as well as to actuate and/or change the angles 266 during the ride cycle.

[0049] In an embodiment, the round ride system 200 may include the platform 280 proximate to the center wheel 204. This configuration may enable the one or more guests to load and/or unload at certain ride vehicles 212 without affecting movement of a remainder of the ride vehicles 212. For example, the one or more guests may wait on the platform 280 as a third ride vehicle 212C is at an inner position (e.g., innermost position) along a third spoke 202C. The third ride vehicle 212C may remain at the inner position along the third spoke 202C and continue to rotate with the center wheel 204 until the one or more guests successfully (e.g., completely) load into the third ride vehicle 212C. Indeed, the third ride vehicle 212C may remain at the inner position along the third spoke 202C and continue to rotate with the center wheel 204 through one or more revolutions about the central axis 262. For example, even if it is expected that the one or more guests will load into the third vehicle 212C during only a portion of one revolution about the central axis 262 (e.g., a quarter of one revolution about the central axis 262), the round ride system 200 may efficiently accommodate unexpected or longer loading times without affecting movement of the remainder of the ride vehicles 212 (e.g., the remainder of the ride vehicles 212 may continue to slide along the spokes 202 and rotate with the center wheel 214 to provide the one or more guests in the remainder of the ride vehicles 212 with a ride experience). In an embodiment, the platform 280 is an annular platform that enables the one or more guests to load and/or to unload at the ride vehicles 212 at any location about the central axis 262. In an embodiment, the platform 280 may be considered to be part of a loading station, an unloading station, or both. Further, the platform 280 may include a fixed path or a moving conveyor to carry the one or more guests.

[0050] It should be appreciated that certain features of the round ride system 10 of FIG. 1 and/or the round ride system 100 of FIG. 2 may be incorporated into the round ride system 200 of FIG. 3. For example, the ride controller 270 may include a processor 272 and a memory device 274 that are configured to implement programmed ride settings, receive one or more inputs from input devices, and so forth, as described with reference to FIG. 1. To facilitate discussion, a motor 276 that drives rotation of the center wheel 204, the spoke actuator system (e.g., the bogies 256), and/or portions of the ride vehicle 212 (e.g., the ride

vehicle trolley systems 216 and/or the ride vehicle actuator systems 220) may be considered drive systems (e.g., first, second, and third drive systems). It should be appreciated that the center wheel 204 may instead rotate passively (e.g., without the motor 276; via displacement (e.g., motion, rotation) of the spokes 212 carried on the bogies 256).

[0051] FIG. 4 is an overhead view of an embodiment of the round ride system 200. As shown, respective angles 266 defined between respective pairs of adjacent spokes 202 may vary (e.g., be different from one another) at least during certain portions of a ride cycle. FIG. 4 also illustrates an example of the round ride system 200 in association with a show set 300. Additionally, FIG. 5 is a perspective view of an embodiment of a portion of the round ride system 200 in association with the show set 300.

[0052] With reference to FIG. 4, in an embodiment, the platform 280 may be associated with an unload chute 302 (e.g., return chute) and a load chute 304 (e.g., ride chute). As shown, the unload chute 302 and/or the load chute 304 may be defined by physical walls 306. However, it should be appreciated the unload chute 302 and/or the load chute 304 may be unmarked pathways (e.g., without being defined by any physical walls), but generally refer to or encompass areas in which the ride vehicles 212 (e.g., move quickly, move slowly, move at various speeds) along the spokes 202 toward and/or away from the platform 280, respectively. For example, in response to reaching or aligning with the unload chute 302 along the circumferential axis 6, the respective ride vehicle trolley system 216 may travel along the respective spoke 202 to carry the respective ride vehicle 212 toward the platform 280. In an embodiment, in response to reaching or aligning with the unload chute 302 along the circumferential axis 6, the respective ride vehicle trolley system 216 may accelerate and/or travel at an increased speed (e.g., relative to a time period in the ride cycle prior to reaching or aligning with the unload chute 302; relative to a rotational speed about the platform 280) along the respective spoke 202 to quickly carry the respective ride vehicle 212 toward the platform 280. Such movement may also provide a ride effect of travel through a portal or tunnel to return to a real-world environment after visiting a fictional or other type of environment presented in the show set 300. Then, once

the respective ride vehicle 212 reaches the platform 280, the one or more guests may unload from the respective ride vehicle 212 onto the platform 280.

[0053] The respective ride vehicle 212 may continue to rotate with the center wheel 204 as one or more additional guests load into the respective ride vehicle 212 from the platform 280 (e.g., step into the respective ride vehicle 212 from the platform 280). Then, in response to reaching or aligning with the load chute 304 along the circumferential axis 6, the respective ride vehicle trolley system 216 may travel along the respective spoke 202 to carry the respective ride vehicle 212 away from the platform 280. In an embodiment, in response to reaching or aligning with the load chute 304 along the circumferential axis 6, the respective ride vehicle trolley system 216 may accelerate and/or travel at an increased speed (e.g., relative to a rotational speed about the platform 280) along the respective spoke 202 to quickly carry the respective ride vehicle 212 away the platform 280. Such movement may also provide another ride effect of travel through another portal or tunnel to leave the real-world environment to visit the fictional or other type of environment presented in the show set 300.

[0054] In an embodiment, failure to complete a loading process as the respective ride vehicle 212 travels about the platform 280 from a first position at an exit of the unload chute 302 and a second position at an entrance of the load chute 304 may not affect an experience of any other guests in a remainder of the ride vehicles 212. In such cases, the respective ride vehicle 212 may not launch or move through the load chute 304, but instead the respective ride vehicle 212 may remain at the inner position along the respective spoke 202 and travel about the platform 280 until the one or more additional guests load into the respective ride vehicle 212 (e.g., even if it takes more than one revolution).

[0055] In an embodiment, the ride controller 270 may receive one or more inputs indicative of the one or more additional guests being successfully loaded into the respective ride vehicle 212 prior to instructing the respective ride vehicle 212 to move along the respective spoke 202 through the load chute 304. For example, in response to receiving the one or more inputs and then reaching or aligning with the load chute 304, the ride

controller 270 may instruct the respective ride vehicle trolley system 216 to travel along the respective spoke 202 to carry the respective ride vehicle 212 away from the platform 280. In this way, the respective ride vehicle 212 only travels through the load chute 304 after the one or more additional guests load into the respective ride vehicle 212. The one or more inputs may be provided by an operator of the round ride system 200, one or more sensors located on the respective ride vehicle 212 (e.g., door lock sensors, pressure sensors on seats, cameras), one or more sensors located proximate to the platform 280 (e.g., cameras), or any combination thereof.

[0056] With reference to FIGS. 4 and 5, the ride controller 270 may provide instructions to various components of the round ride system 200 to carry the ride vehicles 212 through the show set 300. For example, the ride controller 270 may instruct the motor 276, the respective ride vehicle trolley system 216, the respective bogie 256, and the respective ride vehicle actuator system 220 to operate in a coordinated manner to move the respective ride vehicle 212 around and through various structural features of the show set 300. For example, the ride controller 270 may instruct the respective ride vehicle trolley system 216 to move toward the outer ring 210, while also instructing the respective bogie 256 to move at a particular speed to navigate around (e.g., avoid) a set wall 308 while also continuing to move about the central axis 262. Once the respective ride vehicle 212 is positioned within a scene 310, the ride controller 270 may instruct the respective ride vehicle actuator system 220 to lower the respective ride vehicle 212 toward the ground surface 236 to provide a ride effect of entry into the scene 310 and/or to surround the respective ride vehicle 212 with the scene 310. Further, the ride controller 270 may instruct the respective ride vehicle actuator system 220 to shake, pitch, roll, and/or rotate within the scene 310. Further, the ride controller 270 may instruct the respective bogie 256 to continue to move at the particular speed or to move at another particular speed based on desired ride effects (e.g., to decrease to cause the respective ride vehicle 212 to remain in the scene 310 for a longer period of time to prolong enjoyment of features in the scene 310, or to increase to cause the respective ride vehicle 212 to move quickly through the scene 310 to provide a ride effect of racing to escape from the scene 310).

[0057] Then, the respective ride vehicle 212 may move into an additional scene 312 (e.g., via the respective bogie 256 moving about the outer ring 210). In an embodiment, the additional scene 312 may include a display screen 314 that is configured to display visual media (e.g., a movie). In an embodiment, the ride controller 270 may instruct the respective ride vehicle actuator system 220 to raise the respective ride vehicle 212 away from the ground surface 236 to provide a better view of the display screen 314. Further, the ride controller 270 may instruct the respective bogie 256 to continue to move at the particular speed or to move at another particular speed based on desired ride effects (e.g., to decrease to cause the respective ride vehicle 212 to remain in the scene 312 for a longer period of time to prolong enjoyment of visual media, or to increase to cause the respective ride vehicle 212 to move quickly through the scene 312 to provide a ride effect of racing to escape from the scene 312).

[0058] In this way, the round ride system 200 may transport the one or more guests through the show set 300 with various changes in movement that may provide enjoyment via the movement itself, as well as by coordinating the movement with scenes (e.g., the scenes 310, 312) and/or physical structures (e.g., the wall 308) in the show set 300. It should be appreciated that the round ride system 200 may provide any of a variety of combinations of movement (e.g., along the spokes 202; about the central axis 262; toward and away from the ground surface 236; shake, pitch, roll, and/or rotate) as the ride vehicles 212 travel through the show set 300.

[0059] At least certain aspect of the round ride system 10 of FIG. 1, the round ride system 100 of FIG. 2, and/or the round ride system 200 of FIGS. 3-5 may be incorporated into other ride systems. For example, with reference to examples illustrated in FIGS. 10-12, the round ride systems 10, 100, 200 may be utilized to pick up one or more ride vehicles at a first location (e.g., pick up zone or loading zone), carry the one or more ride vehicles about at least a portion of the center hub 14, 104, 204 (e.g., a quarter, a half, an entire turn about the center hub 14, 104, 204), and then deposit the one or more ride vehicles at another location (e.g., drop off zone or unloading zone). In this way, the one or more ride vehicles

may travel along a path (e.g., a track, a conveyor) through a first portion of a ride attraction, then be picked up and carried by one of the round ride systems 10, 100, 200 through a second portion of the ride attraction, and then deposited back onto the path to continue through a third portion of the ride attraction.

[0060] With reference to FIG. 1 and FIGS. 10-12, each spoke 12 may be configured to removably couple to one or more ride vehicles 18. For example, the second end 20 may be configured to removably latch onto a respective ride vehicle 18 via a mechanical locking interface (e.g., hook and ring), a magnetic locking interface (e.g., permanent magnet, magnetic material, and/or electromagnetic locking interface(s)), and/or any suitable type of locking interface. In one embodiment, the respective ride vehicle 18 may include the payload portion 24 and/or the ride vehicle actuator 26 (e.g., the payload portion 24 and/or the ride vehicle actuator 26 are integrated into the respective ride vehicle 18 that travels along the path, and these components are picked up, carried, and dropped off together by the respective spoke 12). In one embodiment, the payload portion 24 and/or the ride vehicle actuator 26 may be part of the respective spoke 12 and thus, the respective ride vehicle 18 may move (e.g., drive) into the payload portion 24 to enable the second end 20 to removably couple to the respective ride vehicle 18. In one embodiment, the payload portion 24 may be integrated into the path and/or not visible to the one or more guests as the respective ride vehicle 18 carrying the one or more guests approaches the payload portion 24. For example, the payload portion 24 may include or be a platform that is aligned with or appears to be part of the path (e.g., the platform is a segment of the path; the platform is a bottom of the container 24 and walls of the payload portion 24 form a tunnel or some other structure that blends into an environment of the ride attraction; the platform the bottom of the payload portion 24 and is mounted on top of the respective spoke 12). In this way, the one or more guests may be surprised to be lifted and carried via the round ride system 10 and may experience multiple different types of movement (e.g., travel along the path in the respective ride vehicle 18, as well as being lifted and carried via the round ride system 10) as the one or more guests travel through the ride attraction.

[0061] With reference to FIG. 2 and FIGS. 10-12, the each spoke 102 may be configured to removably couple to one or more ride vehicles 108. For example, the second end 110 may be configured to removably latch onto a respective ride vehicle 108 via a mechanical locking interface (e.g., hook and ring), a magnetic locking interface (e.g., permanent magnet, magnetic material, and/or electromagnetic locking interface(s)), and/or any suitable type of locking interface. In one embodiment, the respective ride vehicle 108 may include the payload portion 114 and/or the ride vehicle actuator 116 (e.g., the payload portion 114 and/or the ride vehicle actuator 116 are integrated into the respective ride vehicle 108 that travels along the path, and these components are picked up, carried, and dropped off together by the respective spoke 102). In one embodiment, the payload portion 114 and/or the ride vehicle actuator 116 may be part of the respective spoke 102 and thus, the respective ride vehicle 108 may move (e.g., drive) into the payload portion 114 to enable the second end 110 to removably couple to the respective ride vehicle 108. In one embodiment, the payload portion 114 may be integrated into the path and/or not visible to the one or more guests as the respective ride vehicle 108 carrying the one or more guests approaches the payload portion 114 (e.g., the payload portion 114 may include or be the platform), as described herein. Advantageously, operational features of the round ride system 100 that enable adjustment to the angles 144 may provide variable rates of movement, enable the respective spoke 102 to remain stationary and in line with the path as the respective ride vehicle 108 approaches the respective spoke 102 even while other spokes 102 continue to rotate about the hub 104, and so forth.

[0062] With reference to FIGS. 3-5 and FIGS. 10-12, the each spoke 202 may be configured to removably couple to one or more ride vehicles 212 via a mechanical locking interface (e.g., hook and ring), a magnetic locking interface (e.g., permanent magnet, magnetic material, and/or electromagnetic locking interface(s)), and/or any suitable type of locking interface. In one embodiment, a respective ride vehicle 212 may include the payload portion 214 and/or the ride vehicle actuator 220 (e.g., the payload portion 214 and/or the ride vehicle actuator 220 are integrated into the respective ride vehicle 212 that travels along the path, and these components are picked up, carried, and dropped off

together by the respective spoke 202). In one embodiment, the payload portion 214 and/or the ride vehicle actuator 220 may be part of the respective spoke 202 and thus, the respective ride vehicle 212 may move (e.g., drive) into the payload portion 214 to enable the respective spoke 202 to removably couple to the respective ride vehicle 212. In one embodiment, the payload portion 214 may be integrated into the path and/or not visible to the one or more guests as the respective ride vehicle 212 carrying the one or more guests approaches the payload portion 214 (e.g., the payload portion 214 may include or be the platform), as described herein. Advantageously, operational features of the round ride system 200 that enable adjustment to the angles 266 may provide variable rates of movement, enable the respective spoke 202 to remain stationary and in line with the path as the respective ride vehicle 212 approaches the respective spoke 202 even while other spokes 202 continue to rotate about the hub 204, and so forth.

[0063] FIGS. 6-9 illustrate embodiments of connections and interfaces that may be utilized in round ride systems, such as in the round ride systems 10, 100, 200. In particular, FIG. 6 is an embodiment of a portion of the round ride system 100 of FIG. 2. As shown, each of the spokes 102 may include the first end 106 that is coupled to the center wheel 104 via a coupler (e.g., connector, coupling system (e.g., coupling assembly, coupling device)) 103. The coupler 103 may include a slot 105 that is configured to receive a first joint 107 (e.g., pin; vertical pin; one of the movable joints 138 of FIG. 2) to enable the respective spoke 102 to rotate (e.g., pivot) to change the respective angle 144 (FIG. 2). Further, the coupler 103 may include a second joint 109 (e.g., pin; lateral pin; one of the movable joints 138 of FIG. 2) to enable the respective spoke 102 to rotate (e.g., pivot) to lift the second end 110 (FIG. 2) of the respective spoke 102 relative to the first end 106 of the respective spoke 102 and relative to the center wheel 104. In FIG. 6, the spoke actuator system 115 (e.g., the one or more spoke actuator assemblies 115, 118) may drive movement of the respective spoke 102. Each of the one or more spoke actuator assemblies 115, 118 may include a cardan joint 111 (e.g., universal coupling; u-joint) to facilitate connection and ability to drive movement of the respective spoke 102.

[0064] FIG. 7 is an embodiment of a portion of the round ride system 200 of FIGS. 3-5. As shown, each of the spokes 202 may include the first end 206 that is coupled to the center wheel 204 via a coupler 203 (e.g., connector, coupling system (e.g., coupling assembly, coupling device)). The coupler 203 may be integrated into or coupled to the respective spoke 202, and the coupler 203 may include a slot 205 that is configured to receive a joint 207 (e.g., pin; vertical pin; the respective inner connection 250 of FIG. 3) to enable the respective spoke 202 to rotate (e.g., pivot) to change the respective angle 266 (FIGS. 3 and 4). As shown, the center wheel 204 is rotatably supported on a tower 209 via a bearing 211 (e.g., annular bearing; turntable bearing; fixed to the center wheel 204). A drive system 213 (e.g., drive assembly) may drive rotation of the bearing 211 (and the center wheel 204 and the spokes 202 coupled thereto) about the central axis (FIGS. 3-5). The drive system 213 may include a motor 215 and a gearbox 217 that drive a pinion 219, and the pinion 219 may interface with (e.g., via teeth) and drive rotation of the bearing 211. In some embodiments, the drive system may include multiple motors 215, gearboxes 217, and pinions 219 distributed circumferentially about the center wheel 204. For example, 2, 3, 4, or more sets of these components may be distributed circumferentially about the center wheel 204. However, it should be appreciated that the drive system 213 may have any suitable components and configuration.

[0065] FIG. 8 is an embodiment of a portion of the round ride system 200 of FIGS. 3-5. As shown, each of the spokes 202 may include the second end 208 that is supported on the outer ring 210 via the respective bogie 256. The respective bogie 256 includes the bogie frame 258 and the wheels 260 that are configured to engage and roll along a track 221 of the outer ring 210. As described herein, each outer connection 254 includes the interface 264 that enables relative movement between the second end 208 of the respective spoke 202 and the bogie frame 258 of the respective bogie 256. For example, the interface 264 may include a translation bearing 223 that enables sliding motion (e.g., radially) of the respective spoke 202 relative to the bogie frame 258 and/or an additional bearing 225 that enables rotation of respective spoke 202 relative to the bogie frame 258.

[0066] FIG. 9 is an embodiment of a portion of the round ride system 200 of FIGS. 3-5. As shown, each of the spokes 202 may slidably support a respective ride vehicle 212 via a respective ride vehicle trolley system 216 (e.g., ride vehicle trolley assembly). In some embodiments, each ride vehicle trolley system 216 is coupled to a cable drive system 227 that includes a cable 229 and multiple pulleys 231. In particular, each ride vehicle trolley system 216 is coupled to a portion of a respective cable 229, such that rotation of at least one of the multiple pulleys 231 drives the respective cable 229 and the respective ride vehicle trolley system 216 (and the respective ride vehicle 212 coupled thereto) to translate along the respective spoke 202 as shown by arrow 233. However, it should be appreciated that each ride vehicle trolley system 216 may have any suitable components and configuration, each of the spokes 202 may slidably support a respective ride vehicle 212 via any of a variety of components with any of a variety of configurations.

[0067] As noted herein, FIGS. 10-12 provide examples of other ride systems that may include or work in conjunction with a round ride system, such as any of the round ride systems 10, 100, 200. To facilitate discussion, FIGS. 10-12 include separate reference numbers for components; however, it should be appreciated that certain components (e.g., spokes, center wheels, actuators, ride vehicles) in FIGS. 10-12 may be representative of and/or may be exchanged for similar components (e.g., spokes, center wheels, actuators, ride vehicles) in FIGS. 1-9.

[0068] With the foregoing in mind, FIG. 10 is a side view of an embodiment of a portion of a ride system 400 that is configured to pick up one or more ride vehicles 402. The ride system 400 may include one or more conveyors 404 (e.g., belts; moving tracks or paths) that are configured to carry and support movement of the one or more ride vehicles 402 between a loading station 406 and a round ride system 408. While the one or more conveyors 404 are shown as one linear conveyor in FIG. 10, it should be appreciated that the one or more conveyors 404 may have any suitable number, configuration, and/or shape. For example, the one or more conveyors 404 may curve to travel through scenery, themed areas, and so forth.

[0069] The round ride system 408 includes one or more spokes 410 supported on a center wheel 412. The one or more spokes 410 may rotate about a central axis 414 of the center wheel 412 via any techniques disclosed herein. Further, the one or more spokes 410 may rotate independent or separately from one another (e.g., so as to change angles between adjacent spokes of the one or more spokes 410; the angles in a lateral plane). Additionally or alternatively, the one or more spokes 410 may move vertically (e.g., raise, lower) relative to the center wheel 412 via any techniques disclosed herein. For example, the one or more spokes 410 may rotate and/or raise relative to a ground surface and the one or more conveyors 404 to carry the one or more ride vehicles 402 away from the one or more conveyors 404 and through a scene with themed props, animated characters, and so forth.

[0070] In FIG. 10, each spoke 410 of the one or more spokes 410 includes or is coupled to a payload portion 416 (e.g., passenger portion, container portion) and/or a ride vehicle actuator system 418. Thus, a respective ride vehicle 402 may move (e.g., be conveyed via the one or more conveyors 404) into a respective payload portion 416, and a respective ride vehicle actuator system 418 may couple the respective payload portion 416 with the respective ride vehicle 402 to a respective spoke 410. In this way, the respective ride vehicle 402 may be efficiently, removably coupled to the respective spoke 410.

[0071] In one embodiment, the payload portion 416 may be integrated into a path and/or may be not visible to the one or more guests as the respective ride vehicle 402 carrying the one or more guests approaches the payload portion 416. For example, the payload portion 416 may include or be a platform 420 (e.g., additional conveyor) that is aligned with or appears to be part of the one or more conveyors 404 (e.g., the platform 420 is a segment of the path at an end portion of the one or more conveyors 404; the platform 420 is a bottom of a container, such that walls of the payload portion 416 form a tunnel or some other structure that blends into an environment). In this way, the one or more guests may be surprised to be lifted and carried via the round ride system 408 and may experience multiple different types of movement (e.g., travel along the one or more conveyors 404 in the

respective ride vehicle 402, as well as being lifted and carried via the round ride system 408) as the one or more guests travel through an environment.

[0072] As shown in FIG. 10, the payload portion 416 is suspended from the respective spoke 410, and the ride vehicle actuator system 418 may actuate to move the respective ride vehicle 402 within the payload portion 416 relative to the respective spoke 410 (e.g., shake, pitch, roll, and/or rotate). In an embodiment, the conveyor 404 and/or the platform 420 may carry the respective ride vehicle 402 into the payload portion 416, and the platform 420 may then lock to block movement of the respective ride vehicle 402 relative to the payload portion 416 as the respective spoke 410 rotates, raises, and/or lowers the respective ride vehicles 402, for example. In an embodiment, the respective ride vehicle 402 and/or the payload portion 416 may include a mechanical lock or other locking structure to secure the respective ride vehicle 402 to the payload portion 416 as the respective spoke 410 rotates, raises, and/or lowers the respective ride vehicles 402, for example. It should be appreciated that the one or more conveyors 404 may also return the one or more ride vehicles 402 to an unloading station, which may be separate from or co-located with the loading station 406.

[0073] FIG. 11 is a side view of a portion of an embodiment of a ride system 500 that is configured to pick up one or more ride vehicle 502. The ride system 500 may include one or more paths 504 (e.g., track; rail; trackless path) that are configured to enable and support movement (e.g., driving movement, such as via motors that drive rolling wheels of the one or more ride vehicles 502) of the one or more ride vehicles 502 between a loading station 506 and a round ride system 508. While the one or more paths 504 are shown as one linear path in FIG. 11, it should be appreciated that the one or more paths 504 may have any suitable number, configuration, and/or shape. For example, the one or more paths 504 may curve to travel through scenery, themed areas, and so forth.

[0074] The round ride system 508 includes one or more spokes 510 supported on a center wheel 512. The one or more spokes 510 may rotate about a central axis 514 of the center wheel 512 via any techniques disclosed herein. Further, the one or more spokes 510

may rotate independent or separately from one another (e.g., so as to change angles between adjacent spokes of the one or more spokes 510; the angles in a lateral plane). Additionally or alternatively, the one or more spokes 510 may move vertically (e.g., raise, lower) relative to the center wheel 512 via any techniques disclosed herein. For example, the one or more spokes 510 may rotate and/or raise relative to a ground surface and the one or more paths 504 to carry the one or more ride vehicles 502 away from the one or more paths 504 and through a scene with themed props, animated characters, and so forth.

[0075] In FIG. 11, each spoke 510 of the one or more spokes 510 includes or is coupled to a payload portion 516 (e.g., passenger portion, container portion, platform portion) and/or a ride vehicle actuator system 518. Thus, a respective ride vehicle 502 may move (e.g., be conveyed via the one or more paths 504) into a respective payload portion 516, and a respective ride vehicle actuator system 518 may couple the respective payload portion 516 with the respective ride vehicle 502 to a respective spoke 510. In this way, the respective ride vehicle 502 may be efficiently, removably coupled to the respective spoke 510.

[0076] In one embodiment, the payload portion 516 may be integrated into the one or more paths 504 and/or may be not visible to the one or more guests as the respective ride vehicle 502 carrying the one or more guests approaches the payload portion 516. For example, the payload portion 516 may include or be a platform 520 (e.g., additional path having a similar or same structure as the one or more paths 504, such as tracks, rails, or other surface) that is aligned with or appears to be part of the one or more paths 504 (e.g., the platform 520 is a separate section at an end portion of the one or more paths 504 or some other structure that blends into an environment). In this way, the one or more guests may be surprised to be lifted and carried via the round ride system 508 and may experience multiple different types of movement (e.g., travel along the one or more paths 504 in the respective ride vehicle 502, as well as being lifted and carried via the round ride system 508) as the one or more guests travel through an environment.

[0077] As shown in FIG. 11, the payload portion 516 is supported on the respective spoke 510 (e.g., vertically above a second end of the respective spoke 510), and the ride vehicle actuator system 518 may actuate to move the respective ride vehicle 502 on the payload portion 516 relative to the respective spoke 510 (e.g., shake, pitch, roll, and/or rotate). In an embodiment, the one or more paths 504 and/or the platform 520 may enable the respective ride vehicle 502 to travel (e.g., drive) into the payload portion 516, and the platform 520 may then lock to block movement of the respective ride vehicle 502 relative to the payload portion 516 as the respective spoke 510 rotates, raises, and/or lowers the respective ride vehicles 502, for example. In an embodiment, the respective ride vehicle 502 and/or the payload portion 516 may include a mechanical lock or other locking structure to secure the respective ride vehicle 502 to the payload portion 516 as the respective spoke 510 rotates, raises, and/or lowers the respective ride vehicles 502, for example. It should be appreciated that the one or more paths 504 may also return the one or more ride vehicles 502 to an unloading station, which may be separate from or co-located with the loading station 506.

[0078] FIG. 12 is a side view of a portion of an embodiment of a ride system 600 that is configured to pick up and transfer one or more ride vehicle 602. The ride system 600 may include one or more paths 604 (e.g., conveyor; track; rail; trackless path) that are configured to carry, enable, and/or support movement of the one or more ride vehicles 602 between a loading station 606 and a round ride system 608. While the one or more paths 604 are shown as one curved path in FIG. 11, it should be appreciated that the one or more paths 604 may have any suitable number, configuration, and/or shape. For example, the one or more ride vehicles 602 may transfer from a first path of the one or more paths 604 to the round ride system 608, and then transfer from the round ride system to a second path of the one or more paths 604, and so forth.

[0079] The round ride system 608 includes one or more spokes 610 supported on a center wheel 612. The one or more spokes 610 may rotate about a central axis 614 of the center wheel 612 via any techniques disclosed herein. Further, the one or more spokes 610

may rotate independent or separately from one another (e.g., so as to change angles between adjacent spokes of the one or more spokes 610; the angles in a lateral plane). Additionally or alternatively, the one or more spokes 610 may move vertically (e.g., raise, lower) relative to the center wheel 612 via any techniques disclosed herein. For example, the one or more spokes 610 may rotate and/or raise relative to a ground surface and the one or more paths 604 to carry the one or more ride vehicles 602 away from the one or more paths 604 and through a scene with themed props, animated characters, and so forth.

[0080] In FIG. 12, each spoke 610 of the one or more spokes 610 includes or is coupled to a payload portion 616 (e.g., passenger portion, container portion, platform portion). It should be appreciated that each spoke 610 of the one or more spokes 610 may also include or be coupled to a ride vehicle actuator system, as described herein. Thus, a respective ride vehicle 602 may move (e.g., via or along the one or more paths 604) into a respective payload portion 616 to efficiently, removably couple to the respective spoke 610.

[0081] In one embodiment, the payload portion 616 may be integrated into the one or more paths 604 and/or may be not visible to the one or more guests as the respective ride vehicle 602 carrying the one or more guests approaches the payload portion 616. For example, the payload portion 616 may include or be a platform 620 (e.g., having a similar or same structure as the one or more paths 604) that is aligned with or appears to be part of the one or more paths 604. In this way, the one or more guests may be surprised to be lifted and carried via the round ride system 608 and may experience multiple different types of movement (e.g., travel along the path 604 in the respective ride vehicle 602, as well as being lifted and carried via the round ride system 608) as the one or more guests travel through an environment.

[0082] As shown in FIG. 12, the payload portion 616 is supported on the respective spoke 610 (e.g., vertically above a second end of the respective spoke 610). In an embodiment, the platform 620 may lock to block movement of the respective ride vehicle 602 relative to the payload portion 616 as the respective spoke 610 rotates, raises, and/or lowers the respective ride vehicles 602, for example. In an embodiment, the respective

ride vehicle 602 and/or the payload portion 616 may include a mechanical lock or other locking structure to secure the respective ride vehicle 602 to the payload portion 616 as the respective spoke 610 rotates, raises, and/or lowers the respective ride vehicles 602, for example. It should be appreciated that the one or more paths 604 may also return the one or more ride vehicles 602 to an unloading station, which may be separate from or co-located with the loading station 606.

[0083] FIG. 12 includes a show set 622 and illustrates multiple spokes 610 carrying multiple ride vehicles 602 through the show set 622 (e.g., at one time). It should be appreciated that the ride system 400 of FIG. 10 and/or the ride system 500 of FIG. 11 may operate within a show set. That is, the ride system 400 of FIG. 10 may include multiple spokes 410 that carry multiple ride vehicles 402 through the show set (e.g., at one time), and/or the ride system 500 of FIG. 11 may include multiple spokes 510 that carry multiple ride vehicles 502 through the show set (e.g., at one time). As described herein, features of the ride systems 400, 500, 600 of FIGS. 10-12 may be utilized with any of the features of the round ride systems 100, 200, 300 shown in FIGS. 1-9. For example, the one or more spokes 410, 510, 610 may be supported on the bogies 256 that travel around the outer ring 210 of the round ride system 200.

[0084] While only certain features of present embodiments have been illustrated and described herein, many modifications and changes will occur to those skilled in the art. It is, therefore, to be understood that the appended claims are intended to cover all such modifications and changes that fall within the true spirit of the disclosure. Further, it should be understood that certain elements of the disclosed embodiments may be combined or exchanged with one another. It should be appreciated that any features shown or described with reference to FIGS. 1-12 may be combined in any suitable manner. For example, the round ride system 10 of FIG. 1 and/or the round ride system 100 of FIG. 2 may be used in conjunction with a show set, such as the show set 300 of FIGS. 4 and 5. It should also be appreciated that various other features may be added or changes, such as incorporating at least one spoke that is fixed relative to the center wheel 14, 104, 204 (e.g., non-movable

relative to the center wheel 14, 104, 204; is not driven to rotate relative to the center wheel 14, 104, 204 and/or is not driven to move vertically relative to the center wheel 14, 104, 204). For example, one of the spokes 12, 102, 202 shown in FIGS. 1-5 may be fixed relative to the center wheel 14, 104, 204 shown in FIGS. 1-5.

[0085] The techniques presented and claimed herein are referenced and applied to material objects and concrete examples of a practical nature that demonstrably improve the present technical field and, as such, are not abstract, intangible or purely theoretical. Further, if any claims appended to the end of this specification contain one or more elements designated as “means for [perform]ing [a function]...” or “step for [perform]ing [a function]...”, it is intended that such elements are to be interpreted under 35 U.S.C. 112(f). However, for any claims containing elements designated in any other manner, it is intended that such elements are not to be interpreted under 35 U.S.C. 112(f).

CLAIMS:

1. A round ride system, comprising:
 - a center wheel;
 - a first drive system configured to drive rotation of the center wheel;
 - a plurality of spokes coupled to the center wheel;
 - a plurality of ride vehicles, wherein each ride vehicle of the plurality of ride vehicles is coupled to a respective spoke of the plurality of spokes; and
 - a second drive system configured to independently drive each spoke of the plurality of spokes in a circumferential direction relative to the center wheel to adjust respective angles defined between respective pairs of adjacent spokes of the plurality of spokes.
2. The round ride system of claim 1, wherein each spoke of the plurality of spokes comprises a respective first end portion connected to the center wheel and a respective second end portion positioned radially outwardly from the respective first end portion, and each spoke of the plurality of spokes is configured to couple to at least one ride vehicle of the plurality of ride vehicles at the respective second end portion or at an attachment area located between the respective first end portion and the respective second end portion.
3. The round ride system of claim 1, comprising at least one additional spoke that supports at least one additional ride vehicle and is in a fixed position relative to the center wheel.
4. The round ride system of claim 1, comprising an outer ring disposed about the center wheel, wherein each spoke of the plurality of spokes comprises a first end portion that is coupled to the center wheel via a respective movable connection and a second end portion that is supported on the outer ring.

5. The round ride system of claim 4, wherein the second drive system comprises a plurality of bogies configured to travel along the outer ring at different rates over a ride cycle, wherein each spoke of the plurality of spokes comprises the second end portion that is coupled to a respective bogie of the plurality of bogies to enable the different rates to independently drive each spoke of the plurality of spokes in the circumferential direction relative to the center wheel to adjust the respective angles defined between the respective pairs of adjacent spokes of the plurality of spokes.

6. The round ride system of claim 4, wherein the second drive system comprises a plurality of bogies configured to travel along the outer ring, wherein each spoke of the plurality of spokes comprises the second end portion that is coupled to a respective bogie of the plurality of bogies via a key-slot interface.

7. The round ride system of claim 4, wherein each ride vehicle of the plurality of ride vehicles comprises a respective ride vehicle trolley that is configured to slide along a respective spoke of the plurality of spokes.

8. The round ride system of claim 1, comprising a ride controller configured to provide instructions to the first drive system and the second drive system to coordinate movement of the plurality of ride vehicles with a show set.

9. The round ride system of claim 1, comprising:

an outer ring, wherein each spoke of the plurality of spokes comprises a respective first end portion that is coupled to the center wheel and a respective second end portion that is coupled to a respective bogie configured to travel along the outer ring and that is part of the second drive system;

a third drive system that comprises a plurality of ride vehicle trolleys that are configured to slide along the plurality of spokes to move a respective ride vehicle of the plurality of ride vehicles along a respective spoke of the plurality of spokes; and

a ride controller configured to provide instructions to the first drive system, the second drive system, and the third drive system to coordinate movement of the plurality of ride vehicles with a show set.

10. The round ride system of claim 1, wherein each ride vehicle of the plurality of ride vehicles comprises a respective ride vehicle actuator system that is configured to cause the respective ride vehicle to shake, pitch, roll, rotate, or any combination thereof, relative to a respective spoke of the plurality of spokes.

11. The round ride system of claim 1, wherein each ride vehicle of the plurality of ride vehicles is removably coupled to a respective spoke of the plurality of spokes to enable each ride vehicle of the plurality of ride vehicles to be picked up from a first location along a path by the respective spoke of the plurality of spokes, then carried in the circumferential direction by the respective spoke of the plurality of spokes, and then released to a second location along the path by the respective spoke of the plurality of spokes.

12. The round ride system of claim 1, comprising a platform positioned proximate to the center wheel to facilitate loading of one or more guests into the plurality of ride vehicles, unloading of the one or more guests from the plurality of ride vehicles, or both.

13. A round ride system, comprising:
a center wheel;
a first drive system configured to drive rotation of the center wheel;
a plurality of spokes coupled to the center wheel;
a plurality of ride vehicles coupled to the plurality of spokes;
a second drive system configured to independently drive each spoke of the plurality of spokes relative to the center wheel;
a third drive system configured to independently drive each ride vehicle of the plurality of ride vehicles along a respective spoke of the plurality of spokes; and

a ride controller configured to provide instructions to the first drive system, the second drive system, and the third drive system to move the plurality of ride vehicles through a show set.

14. The round ride system of claim 13, comprising an outer ring, wherein each spoke of the plurality of spokes comprises a respective first end portion that is coupled to the center wheel and a respective second end portion that is coupled to a respective bogie of a plurality of bogies that are configured to travel along the outer ring and that are part of the second drive system.

15. The round ride system of claim 14, wherein the plurality of bogies are configured to travel along the outer ring at different rates over a ride cycle to independently drive each spoke of the plurality of spokes relative to the center wheel to adjust respective angles defined between respective pairs of adjacent spokes of the plurality of spokes.

16. The round ride system of claim 13, wherein the third drive system comprises a plurality of ride vehicle trolleys that are configured to slide along the plurality of spokes to move the plurality of ride vehicles along the plurality of spokes.

17. The round ride system of claim 13, wherein each ride vehicle of the plurality of ride vehicles comprises a respective ride vehicle actuator system that is configured to cause the respective ride vehicle to shake, pitch, roll, rotate, or any combination thereof, relative to a respective spoke of the plurality of spokes.

18. The round ride system of claim 13, wherein each ride vehicle of the plurality of ride vehicles is suspended from a respective spoke of the plurality of spokes.

19. The round ride system of claim 13, comprising a platform positioned proximate to the center wheel to facilitate loading of one or more guests into the plurality of ride vehicles, unloading of the one or more guests from the plurality of ride vehicles, or both.

20. A ride system, comprising:

- a loading station;

- a round ride system;

- one or more paths configured to support movement of one or more ride vehicles from the loading station to the round ride system, wherein the round ride system comprises:

- a center wheel;

- a first drive system configured to drive rotation of the center wheel;

- a plurality of spokes coupled to the center wheel; and

- a plurality of payload portions, wherein each payload portion of the plurality of payload portions is coupled to a respective spoke of the plurality of spokes and is configured to receive a respective ride vehicle of the plurality of ride vehicles from the one or more paths.