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United States Patent	12391068
Kind Code	B1
Date of Patent	August 19, 2025
Inventor(s)	Smith; David Alan et al.

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### Axle assembly with interchangeable shafts

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#### Abstract

A golf vehicle includes a chassis having a front end and a rear end, a suspension system coupled to the chassis, a first plurality of tractive assemblies, a second plurality of tractive assemblies, a first axle assembly coupled to the suspension system and the first plurality of tractive assemblies, and a second axle assembly. The second axle assembly is coupled to the suspension system and the second plurality of tractive assemblies, and includes a first shaft assembly and a second shaft assembly. The first shaft assembly and the second shaft assembly are interchangeable to transition the second axle assembly between (i) a first configuration that provides a first ride height for the front end or the rear end and (ii) a second configuration that provides a second ride height for the front end or the rear end that is greater than the first ride height.

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**Appl. No.:** 18/743366

**Filed:** June 14, 2024

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#### Publication Classification

**Int. Cl.:** B60B35/14 (20060101); B60B35/16 (20060101)

**U.S. Cl.:**

**CPC** B60B35/14 (20130101); B60B35/16 (20130101);

#### Field of Classification Search

## References Cited

### U.S. PATENT DOCUMENTS

Patent No.	Issued Date	Patentee Name	U.S. Cl.	CPC
3933367	12/1975	Tamas	N/A	N/A
4027898	12/1976	Steen	N/A	N/A
4134604	12/1978	Jackson	N/A	N/A
4141428	12/1978	Loeb	N/A	N/A
4192396	12/1979	Austermann et al.	N/A	N/A
4227716	12/1979	Nordstrom	N/A	N/A
4322061	12/1981	Masser	N/A	N/A
4331348	12/1981	Raidel	N/A	N/A
4519589	12/1984	Skynar	N/A	N/A
4611793	12/1985	Nishiyama et al.	N/A	N/A
4732371	12/1987	Pflederer	N/A	N/A
4733744	12/1987	Glaze	N/A	N/A
5114125	12/1991	Srch et al.	N/A	N/A
5458360	12/1994	Raidel	N/A	N/A
5599038	12/1996	German	N/A	N/A
5810377	12/1997	Keeler et al.	N/A	N/A
5921570	12/1998	Lie	N/A	N/A
5950971	12/1998	Koumbis et al.	N/A	N/A
5971654	12/1998	Sweeney, Jr.	N/A	N/A
6082750	12/1999	Merkler et al.	N/A	N/A
6257606	12/2000	Hynes et al.	N/A	N/A
6364333	12/2001	Atkinson	N/A	N/A
6406008	12/2001	Dudding et al.	N/A	N/A
6478320	12/2001	Encio Martinez	N/A	N/A
6910681	12/2004	Hitt et al.	N/A	N/A
6941634	12/2004	Bigsby	N/A	N/A
7025428	12/2005	Gabella et al.	N/A	N/A
7077413	12/2005	Svartz et al.	N/A	N/A
7290758	12/2006	Svendsen et al.	N/A	N/A
7469913	12/2007	Leden et al.	N/A	N/A
7520517	12/2008	Svendsen et al.	N/A	N/A
8356827	12/2012	Takeda	N/A	N/A
8464611	12/2012	Chandler	74/607	B60K 17/165
8540262	12/2012	Reiter et al.	N/A	N/A
9114685	12/2014	Wilson et al.	N/A	N/A
9340084	12/2015	Klinger et al.	N/A	N/A
9776467	12/2016	Gaw et al.	N/A	N/A
10589589	12/2019	Buchwitz et al.	N/A	N/A
11648745	12/2022	Peck	83/465	B21D 53/90
12066072	12/2023	Tatum	N/A	F16D 9/06
2005/0269796	12/2004	Sawarynski et al.	N/A	N/A
2006/0022389	12/2005	Svendsen et al.	N/A	N/A

2006/0244236	12/2005	Cortez et al.	N/A	N/A
2008/0001379	12/2007	Myers et al.	N/A	N/A
2008/0042393	12/2007	Humphreys	N/A	N/A
2009/0189364	12/2008	Smith	N/A	N/A
2010/0038877	12/2009	Cortez et al.	N/A	N/A
2011/0127753	12/2010	Griffin	N/A	N/A
2014/0035250	12/2013	Dilworth et al.	N/A	N/A
2017/0129559	12/2016	Slesinski et al.	N/A	N/A
2018/0264903	12/2017	Stuart et al.	N/A	N/A
2019/0118600	12/2018	Gerhards et al.	N/A	N/A
2021/0323393	12/2020	Kontermann et al.	N/A	N/A

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## Background/Summary

### BACKGROUND

(1) Vehicles typically have a pre-set, manufactured ride height. Some consumers, however, desire to adjust the ride height to their preference. Such adjustment typically requires an aftermarket kit and complex installation processes that many consumers may not have the ability to perform themselves, leading to increased ride height adjustment costs and increased downtime of the vehicle.

### SUMMARY

(2) One embodiment relates to a golf vehicle. The golf vehicle includes a chassis having a front end and a rear end, a suspension system coupled to the chassis, a first plurality of tractive assemblies, a second plurality of tractive assemblies, a first axle assembly coupled to the suspension system and the first plurality of tractive assemblies, and a second axle assembly. The second axle assembly is coupled to the suspension system and the second plurality of tractive assemblies, and includes a first shaft assembly and a second shaft assembly. The first shaft assembly and the second shaft assembly are interchangeable to transition the second axle assembly between (i) a first configuration that provides a first ride height for the front end or the rear end of the chassis and (ii) a second configuration that provides a second ride height for the front end or the rear end of the chassis that is greater than the first ride height.

(3) Another embodiment relates to a vehicle. The vehicle includes a chassis having a front end and a rear end, a suspension system coupled to the chassis and including a first leaf spring and a second leaf spring, a first tractive element, a second tractive element, and an axle assembly coupled to the first leaf spring, the second leaf spring, the first tractive element, and the second tractive element. The axle assembly includes a first shaft assembly, a second shaft assembly, and a differential. The first shaft assembly includes a first suspension support coupled to the first leaf spring. The second shaft assembly includes a second suspension support coupled to the second leaf spring. The differential has a first side and an opposing second side. The first shaft assembly and the second shaft assembly are selectively couplable to the first side and the opposing second side. The first shaft assembly and the second shaft assembly are coaxial about an axis of rotation of the axle assembly. The first shaft assembly and the second shaft assembly are interchangeable between the first side and the second side of the differential to transition the axle assembly between (i) a first configuration that provides a first ride height for the front end or the rear end of the chassis and (ii)

a second configuration that provides a second ride height for the front end or the rear end of the chassis that is greater than the first ride height.

(4) Still another embodiment relates to an axle assembly for a vehicle. The vehicle includes (i) a chassis having a front end and a rear end, (ii) a differential, and (iii) a suspension system. The axle assembly includes a first shaft assembly and a second shaft assembly. The first shaft assembly includes a first suspension support configured to couple to the suspension system and the differential. The second shaft assembly includes a second suspension support configured to couple to the suspension system and the differential. The first shaft assembly and the second shaft assembly are configured to selectively couple to the differential. The first shaft assembly and the second shaft assembly are interchangeable between a first side of the differential and an opposing second side of the differential to transition the axle assembly between (i) a first configuration that provides a first ride height for the front end or the rear end of the chassis and (ii) a second configuration that provides a second ride height for the front end or the rear end of the chassis that is greater than the first ride height.

(5) This summary is illustrative only and is not intended to be in any way limiting. Other aspects, inventive features, and advantages of the devices or processes described herein will become apparent in the detailed description set forth herein, taken in conjunction with the accompanying figures, wherein like reference numerals refer to like elements.

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## Description

### BRIEF DESCRIPTION OF THE DRAWINGS

(1) FIG. 1 is a perspective view of a vehicle, according to an exemplary embodiment.

(2) FIG. 2 is a schematic block diagram of the vehicle of FIG. 1, according to an exemplary embodiment.

(3) FIG. 3 is a perspective view of an axle assembly in a lowered configuration, according to an exemplary embodiment.

(4) FIG. 4 is a perspective view of the axle assembly of FIG. 3 with a shaft assembly in the lowered configuration and in a raised configuration, according to an exemplary embodiment.

(5) FIG. 5 is a perspective view of the axle assembly of FIG. 3 with a shaft assembly in the lowered configuration and in a raised configuration, according to an exemplary embodiment.

(6) FIG. 6 is a perspective view of the axle assembly of FIG. 3 in a raised configuration, according to an exemplary embodiment.

(7) FIG. 7 is a side view of the axle assembly of FIG. 3 in the lowered configuration and coupled to the vehicle of FIG. 1, according to an exemplary embodiment.

(8) FIG. 8 is a side view of the axle assembly of FIG. 3 in the raised configuration and coupled to the vehicle of FIG. 1, according to an exemplary embodiment.

### DETAILED DESCRIPTION

(9) Before turning to the figures, which illustrate certain exemplary embodiments in detail, it should be understood that the present disclosure is not limited to the details or methodology set forth in the description or illustrated in the figures. It should also be understood that the terminology used herein is for the purpose of description only and should not be regarded as limiting.

(10) According to an exemplary embodiment, the vehicle of the present disclosure includes an axle assembly configured to facilitate varying a height (e.g., a ride height, a ground clearance, etc.) of the vehicle. The axle assembly includes a first shaft assembly and a second shaft assembly configured to couple to opposing sides of a differential. The differential is configured to allocate torque to the axles of the first shaft assembly and the second shaft assembly to provide rotational energy to tractive elements coupled thereto. The first shaft assembly includes a first suspension

support configured to facilitate coupling one or more components of a suspension system of the vehicle (e.g., a leaf spring) with the first shaft assembly. Similarly, the second shaft assembly includes a second suspension support configured to facilitate coupling one or more components of the suspension system of the vehicle (e.g., a leaf spring) with the second shaft assembly. The first shaft assembly and the second shaft assembly are coaxial with each other about an axis of rotation. The first shaft assembly and the second shaft assembly are interchangeable with each other by flipping or swapping them (i) about a substantially vertical plane perpendicular to the axis of rotation and (ii) between the first side and the second side of the differential to transition the axle assembly between a first, lowered configuration and a second, raised configuration. The first shaft assembly and the second shaft assembly have a symmetric design such that the first shaft assembly and the second shaft assembly are interchangeable with each other to have the first suspension support and the second suspension support positioned on a top side of the first shaft assembly and the second shaft assembly, respectively. In this manner, the leaf spring can be mounted directly to the top side of the first shaft assembly and the second shaft assembly without the need for additional parts. In the first configuration, the axle assembly is configured to space the chassis a first distance from a ground surface by a first distance. In the second configuration, the axle assembly is configured to space the chassis a second distance from the ground surface that is greater than the first distance.

#### (11) Overall Vehicle

(12) As shown in FIGS. **1** and **2**, a machine or vehicle, shown as vehicle **10**, includes a chassis, shown as frame **12**; a body assembly, shown as body **20**, coupled to the frame **12** and having an occupant portion or section, shown as occupant seating area **30**; operator input and output devices, shown as operator controls **40**, that are disposed within the occupant seating area **30**; a drivetrain, shown as driveline **50**, coupled to the frame **12** and at least partially disposed under the body **20**; a vehicle suspension system, shown as suspension system **60**, coupled to the frame **12** and one or more components of the driveline **50**; a vehicle braking system, shown as braking system **70**, coupled to one or more components of the driveline **50** to facilitate selectively braking the one or more components of the driveline **50**; one or more first sensors, shown as sensors **90**; and a control system, shown as vehicle control system **100**, coupled to the operator controls **40**, the driveline **50**, the suspension system **60**, the braking system **70**, and the sensors **90**. In some embodiments, the vehicle **10** includes more or fewer components.

(13) According to an exemplary embodiment, the vehicle **10** is an off-road machine or vehicle. In some embodiments, the off-road machine or vehicle is a lightweight or recreational machine or vehicle such as a golf cart, an all-terrain vehicle (“ATV”), a utility task vehicle (“UTV”), a low speed vehicle (“LSV”), and/or another type of lightweight or recreational machine or vehicle. In some embodiments, the off-road machine or vehicle is a chore product such as a lawnmower, a turf mower, a push mower, a ride-on mower, a stand-on mower, aerator, turf sprayers, bunker rake, and/or another type of chore product (e.g., that may be used on a golf course). In some embodiments, the vehicle **10** is an on-road vehicle such as a passenger vehicle (e.g., car, sedan, truck, etc.).

(14) According to the exemplary embodiment shown in FIG. **1**, the occupant seating area **30** includes a plurality of rows of seating including a first row of seating, shown as front row seating **32**, and a second row of seating, shown as rear row seating **34**. In some embodiments, the occupant seating area **30** includes a third row of seating or intermediate/middle row seating positioned between the front row seating **32** and the rear row seating **34**. According to the exemplary embodiment shown in FIG. **1**, the rear row seating **34** is facing forward. In some embodiments, the rear row seating **34** is facing rearward. In some embodiments, the occupant seating area **30** does not include the rear row seating **34**. In some embodiments, in addition to or in place of the rear row seating **34**, the vehicle **10** includes one or more rear accessories. Such rear accessories may include a golf bag rack, a bed, a cargo body (e.g., for a drink cart), and/or other rear accessories.

(15) According to an exemplary embodiment, the operator controls **40** are configured to provide an operator with the ability to control one or more functions of and/or provide commands to the vehicle **10** and the components thereof (e.g., turn on, turn off, drive, turn, brake, engage various operating modes, raise/lower an implement, etc.). As shown in FIGS. **1** and **2**, the operator controls **40** include a steering interface (e.g., a steering wheel, joystick(s), etc.), shown steering wheel **42**, an accelerator interface (e.g., a pedal, a throttle, etc.), shown as accelerator **44**, a braking interface (e.g., a pedal), shown as brake **46**, and one or more additional interfaces, shown as operator interface **48**. The operator interface **48** may include one or more displays and one or more input devices. The one or more displays may be or include a touchscreen, a LCD display, a LED display, a speedometer, gauges, warning lights, etc. The one or more input device may be or include buttons, switches, knobs, levers, dials, etc.

(16) According to an exemplary embodiment, the driveline **50** is configured to propel the vehicle **10**. As shown in FIGS. **1** and **2**, the driveline **50** includes a primary driver, shown as prime mover **52**, an energy storage device, shown as energy storage **54**, a first tractive assembly (e.g., axles, wheels, tracks, differentials, etc.), shown as rear tractive assembly **56**, and a second tractive assembly (e.g., axles, wheels, tracks, differentials, etc.), shown as front tractive assembly **58**. In some embodiments, the driveline **50** is a conventional driveline whereby the prime mover **52** is an internal combustion engine and the energy storage **54** is a fuel tank. The internal combustion engine may be a spark-ignition internal combustion engine or a compression-ignition internal combustion engine that may use any suitable fuel type (e.g., diesel, ethanol, gasoline, natural gas, propane, etc.). In some embodiments, the driveline **50** is an electric driveline whereby the prime mover **52** is an electric motor and the energy storage **54** is a battery system. In some embodiments, the driveline **50** is a fuel cell electric driveline whereby the prime mover **52** is an electric motor and the energy storage **54** is a fuel cell (e.g., that stores hydrogen, that produces electricity from the hydrogen, etc.). In some embodiments, the driveline **50** is a hybrid driveline whereby (i) the prime mover **52** includes an internal combustion engine and an electric motor/generator and (ii) the energy storage **54** includes a fuel tank and/or a battery system. According to the exemplary embodiment shown in FIG. **1**, the rear tractive assembly **56** includes rear tractive elements and the front tractive assembly **58** includes front tractive elements that are configured as wheels. In some embodiments, the rear tractive elements and/or the front tractive elements are configured as tracks.

(17) According to an exemplary embodiment, the prime mover **52** is configured to provide power to drive the rear tractive assembly **56** and/or the front tractive assembly **58** (e.g., to provide front-wheel drive, rear-wheel drive, four-wheel drive, and/or all-wheel drive operations). In some embodiments, the driveline **50** includes a transmission device (e.g., a gearbox, a continuous variable transmission (“CVT”), etc.) positioned between (i) the prime mover **52** and (ii) the rear tractive assembly **56** and/or the front tractive assembly **58**. The rear tractive assembly **56** and/or the front tractive assembly **58** may include a drive shaft, a differential, and/or an axle. In some embodiments, the rear tractive assembly **56** and/or the front tractive assembly **58** include two axles or a tandem axle arrangement. In some embodiments, the rear tractive assembly **56** and/or the front tractive assembly **58** are steerable (e.g., using the steering wheel **42**). In some embodiments, both the rear tractive assembly **56** and the front tractive assembly **58** are fixed and not steerable (e.g., employ skid steer operations).

(18) In some embodiments, the driveline **50** includes a plurality of prime movers **52**. By way of example, the driveline **50** may include a first prime mover **52** that drives the rear tractive assembly **56** and a second prime mover **52** that drives the front tractive assembly **58**. By way of another example, the driveline **50** may include a first prime mover **52** that drives a first one of the front tractive elements, a second prime mover **52** that drives a second one of the front tractive elements, a third prime mover **52** that drives a first one of the rear tractive elements, and/or a fourth prime mover **52** that drives a second one of the rear tractive elements. By way of still another example, the driveline **50** may include a first prime mover **52** that drives the front tractive assembly **58**, a

second prime mover **52** that drives a first one of the rear tractive elements, and a third prime mover **52** that drives a second one of the rear tractive elements. By way of yet another example, the driveline **50** may include a first prime mover **52** that drives the rear tractive assembly **56**, a second prime mover **52** that drives a first one of the front tractive elements, and a third prime mover **52** that drives a second one of the front tractive elements.

(19) According to an exemplary embodiment, the suspension system **60** includes one or more suspension components (e.g., shocks, dampers, springs, etc.) positioned between the frame **12** and one or more components (e.g., tractive elements, axles, etc.) of the rear tractive assembly **56** and/or the front tractive assembly **58**. In some embodiments, the vehicle **10** does not include the suspension system **60**.

(20) According to an exemplary embodiment, the braking system **70** includes one or more braking components (e.g., disc brakes, drum brakes, in-board brakes, axle brakes, etc.) positioned to facilitate selectively braking one or more components of the driveline **50**. In some embodiments, the one or more braking components include (i) one or more front braking components positioned to facilitate braking one or more components of the front tractive assembly **58** (e.g., the front axle, the front tractive elements, etc.) and (ii) one or more rear braking components positioned to facilitate braking one or more components of the rear tractive assembly **56** (e.g., the rear axle, the rear tractive elements, etc.). In some embodiments, the one or more braking components include only the one or more front braking components. In some embodiments, the one or more braking components include only the one or more rear braking components. In some embodiments, the one or more front braking components include two front braking components, one positioned to facilitate braking each of the front tractive elements. In some embodiments, the one or more rear braking components include two rear braking components, one positioned to facilitate braking each of the rear tractive elements.

(21) The sensors **90** may include various sensors positioned about the vehicle **10** to acquire vehicle information or vehicle data regarding operation of the vehicle **10** and/or the location thereof. By way of example, the sensors **90** may include an accelerometer, a gyroscope, a compass, a position sensor (e.g., a GPS sensor, etc.), an inertial measurement unit ("IMU"), suspension sensor(s), wheel sensors, an audio sensor or microphone, a camera, an optical sensor, a proximity detection sensor, and/or other sensors to facilitate acquiring vehicle information or vehicle data regarding operation of the vehicle **10** and/or the location thereof. According to an exemplary embodiment, one or more of the sensors **90** are configured to facilitate detecting and obtaining vehicle telemetry data including position of the vehicle **10**, whether the vehicle **10** is moving, travel direction of the vehicle **10**, slope of the vehicle **10**, speed of the vehicle **10**, vibrations experienced by the vehicle **10**, sounds proximate the vehicle **10**, suspension travel of components of the suspension system **60**, and/or other vehicle telemetry data.

(22) The vehicle control system **100** may be implemented as a general-purpose processor, an application specific integrated circuit ("ASIC"), one or more field programmable gate arrays ("FPGAs"), a digital-signal-processor ("DSP"), circuits containing one or more processing components, circuitry for supporting a microprocessor, a group of processing components, or other suitable electronic processing components. According to the exemplary embodiment shown in FIG. 2, the vehicle control system **100** includes a processing circuit **102**, a memory **104**, and a communications interface **106**. The processing circuit **102** may include an ASIC, one or more FPGAs, a DSP, circuits containing one or more processing components, circuitry for supporting a microprocessor, a group of processing components, or other suitable electronic processing components. In some embodiments, the processing circuit **102** is configured to execute computer code stored in the memory **104** to facilitate the activities described herein. The memory **104** may be any volatile or non-volatile or non-transitory computer-readable storage medium capable of storing data or computer code relating to the activities described herein. According to an exemplary embodiment, the memory **104** includes computer code modules (e.g., executable code, object code,

source code, script code, machine code, etc.) configured for execution by the processing circuit

**102**. In some embodiments, the vehicle control system **100** may represent a collection of processing devices. In such cases, the processing circuit **102** represents the collective processors of the devices, and the memory **104** represents the collective storage devices of the devices.

(23) In one embodiment, the vehicle control system **100** is configured to selectively engage, selectively disengage, control, or otherwise communicate with components of the vehicle **10** (e.g., via the communications interface **106**, a controller area network (“CAN”) bus, etc.). According to an exemplary embodiment, the vehicle control system **100** is coupled to (e.g., communicably coupled to) components of the operator controls **40** (e.g., the steering wheel **42**, the accelerator **44**, the brake **46**, the operator interface **48**, etc.), components of the driveline **50** (e.g., the prime mover **52**), components of the braking system **70**, and the sensors **90**. By way of example, the vehicle control system **100** may send and receive signals (e.g., control signals, location signals, etc.) with the components of the operator controls **40**, the components of the driveline **50**, the components of the braking system **70**, the sensors **90**, and/or remote systems or devices (via the communications interface **106** as described in greater detail herein).

(24) Axle Assemble with Interchangeable Shafts

(25) As shown in FIGS. **3-8**, the driveline **50** includes an axle system (e.g., a split-axle assembly), shown as axle assembly **300**, including a first half-shaft assembly, shown as first shaft assembly **304**, a second half-shaft assembly, shown as second shaft assembly **308**, and a torque allocator, shown as differential **312**, coupled to and between the first shaft assembly **304** and the second shaft assembly **308**. In some embodiments, the axle assembly **300** is included as part of the rear tractive assembly **56** and/or the front tractive assembly **58**. In some embodiments, the axle assembly **300** does not include the differential **312**. In such embodiments, the differential **312** may be replaced with the prime mover **52** and/or a transaxle, or the axle assembly **300** may include a single solid axle (e.g., a non-driven axle, a solid front axle for the front tractive assembly **58** and a split-shaft rear axle for the rear tractive assembly **56**, etc.). According to an exemplary embodiment, a free end of each of the first shaft assembly **304** and the second shaft assembly **308** opposite the differential **312** is coupled to a shaft-end assembly including a brake (e.g., one or more components of the braking system **70**), one or more suspension components (e.g., of the suspension system **60**, the leaf spring **390**, etc.), one or more steering components, a wheel hub, a tractive element, a tire, and/or other features.

(26) The differential **312** is configured to be coupled to one or more components of the driveline **50** of the vehicle **10** (e.g., a driveshaft of the driveline **50**, the prime mover **52**, a transmission of the driveline **50**, etc.). The differential **312** is configured to receive rotational energy from the prime mover **52** (e.g., via the driveshaft, via the transmission, directly, etc.). As shown in FIGS. **3-6**, the differential **312** is coupled to the first shaft assembly **304** and the second shaft assembly **308** to allocate torque provided by the prime mover **52** between the first shaft assembly **304** and the second shaft assembly **308** of the axle assembly **300**. The first shaft assembly **304** and the second shaft assembly **308** are configured to deliver the rotational energy to tractive elements coupled thereto. According to the exemplary embodiment shown in FIGS. **3-6**, the axle assembly **300** is configured as a split-axle assembly where the first shaft assembly **304** and the second shaft assembly **308** independently deliver the rotational energy to the respective tractive elements coupled thereto. In embodiments where the axle assembly **300** does not include the differential **312**, the first shaft assembly **304** and the second shaft assembly **308** may be selectively coupled directly to each other (e.g., to rotate simultaneously) or coupled to each other by a component other than the differential **312**.

(27) As shown in FIGS. **3-8**, each of the first shaft assembly **304** and the second shaft assembly **308** include an outer shaft (e.g., an axle housing), shown as tube **316**, and an inner shaft, shown as axle **320**. The axle **320** is configured to be received, at least partially, within an interior volume defined by the tube **316**. The axle **320** may be rotatably coupled to the tube **316** (e.g., using one or more



bearings) such that the axle **320** rotates within the tube **316** about an axis of rotation, shown as axis A. As shown in FIGS. **3-6**, the tube **316** and the axle **320** are coaxial with each other about the axis A and the first shaft assembly **304** and the second shaft assembly **308** are coaxial with each other about the axis A. According to an exemplary embodiment, the axle **320** is coupled to the differential **312** and configured to receive rotational energy from the prime mover **52**. In some embodiments (e.g., embodiments that do not include the differential **312**), the axle **320** is coupled to a transaxle and/or the prime mover **52**. As shown in FIGS. **3-6**, a portion of the axle **320** extends outside of the tube **316**. The portion of the axle **320** extending outside of the tube **316** is configured to couple to a tractive element to provide the rotational energy thereto.

(28) As shown in FIGS. **3-8**, the first shaft assembly **304** includes a first interface (e.g., a plate, a bracket, etc.), shown as first suspension support **324**, and the second shaft assembly **308** includes a second interface (e.g., a plate, a bracket, etc.), shown as second suspension support **328**. As shown in FIGS. **3, 5, and 6**, the first suspension support **324** includes a first mount, shown as first mounting plate **332**, a first protrusion, shown as first extension **336**, extending from the first mounting plate **332**, and a first plurality of engagement features, shown as first tabs **340**, extending in a direction away from the first mounting plate **332** and the first extension **336** (e.g., substantially perpendicular thereto). The first mounting plate **332** extends within a substantially horizontal plane (e.g., a plane substantially parallel to a plane in which the axis A extends) and defines a generally rectangular shape. In some embodiments, the first mounting plate **332** defines another suitable shape (e.g., ovular, circular, hexagonal, etc.). As shown in FIGS. **3, 5, 6, and 8**, the first extension **336** is integrally formed with the first mounting plate **332** and extends from the first mounting plate **332** within the substantially horizontal plane defined thereby (e.g., such that the first extension **336** and the first mounting plate **332** are coplanar). The first mounting plate **332** and the first extension **336** collectively define a first support surface (e.g., suspension perch, an outer face, etc.), shown as first surface **342**. As shown in FIGS. **3, 5, and 6**, the first extension **336** extends (i) in an inward direction (e.g., in a direction along the axis A towards the differential **312**) and (ii) in a direction perpendicular to the axis A within the substantially horizontal plane. As shown in FIGS. **3, 5, and 6**, the first mounting plate **332** and the first extension **336** define a plurality of apertures, shown as apertures **344**, extending therethrough. In some embodiments, the apertures **344** are configured to receive fasteners (e.g., bolts, screws, nails, rivets, etc.) to facilitate coupling one or more components of the vehicle **10** (e.g., a component of the suspension system **60**) to the first mounting plate **332** and the first extension **336**.

(29) As shown in FIGS. **3, 5, 6, and 8**, the first tabs **340** extend in a direction away from (e.g., substantially perpendicular to) the first mounting plate **332** and the first extension **336**. The first tabs **340** extend from peripheral edges of the first mounting plate **332** and the first extension **336**. The first tabs **340** are configured to facilitate coupling the first suspension support **324** (e.g., the first mounting plate **332** and the first extension **336**) to the tube **316** of the first shaft assembly **304**. In some embodiments, the first tabs **340** are shaped (e.g., angled, curved, etc.) to support and/or accommodate the shape of the tube **316** (e.g., to facilitate coupling the first suspension support **324** therewith). In such embodiments, the shape of the first tabs **340** substantially corresponds with or matches a curvature of an outer circumference of the tube **316**. In some embodiments, the first tabs **340** are welded to the tube **316** to fixedly couple the first suspension support **324** therewith. In other embodiments, the first tabs **340** are otherwise suitably engaged with the tube **316** (e.g., clamped on, adhered to, bolted to, etc.) to couple the first suspension support **324** therewith. In some embodiments, the first suspension support **324** is otherwise coupled to the tube **316** without the use of the first tabs **340**. In yet other embodiments, the first suspension support **324** is integrally formed with the tube **316** (e.g., manufactured as a single unitary body).

(30) As shown in FIGS. **4 and 5**, the arrangement of the second suspension support **328** (e.g., the components included therein, the shape, etc.) is substantially similar to that of the first suspension support **324**. By way of example, the arrangement of the second suspension support **328** may be a

mirror image of the first suspension support **324** about a plane (e.g., a substantially horizontal plane) in which the axis A extends (see, e.g., the second suspension support **328** on the left and right sides of the differential **312** in FIG. 4 as a mirror image of the first suspension support **324** on the left and right sides of the differential **312** in FIG. 5). By way of another example, the arrangement of the second suspension support **328** may be a mirror image of the first suspension support **324** about a substantially vertical plane perpendicular to the axis A (see, e.g., the first suspension support **324** on the left side and the second suspension support **328** on the right side of the differential **312** in FIG. 3 are mirror images of each other, and the first suspension support **324** on the right side and the second suspension support **328** on the left side of the differential **312** in FIG. 6 are mirror images of each other). In a similar manner, the first shaft assembly **304** can be considered a mirror image of the second shaft assembly **308** about a substantially vertical plane perpendicular to the axis A.

(31) As shown in FIGS. 3, 4, 6, and 7, the second suspension support **328** includes a second mount, shown as second mounting plate **352**, a second protrusion, shown as second extension **356**, extending from the second mounting plate **352**, and a second plurality of engagement features, shown as second tabs **360**, extending in a direction away from the second mounting plate **352** and the second extension **356** (e.g., substantially perpendicular thereto). The second mounting plate **352** extends within a substantially horizontal plane (e.g., a plane substantially parallel to a plane in which the axis A extends) and defines a generally rectangular shape. In some embodiments, the second mounting plate **352** defines another suitable shape (e.g., ovular, circular, hexagonal, etc.). As shown in FIGS. 3, 4, 6, and 7, the second extension **356** is integrally formed with the second mounting plate **352** and extends from the second mounting plate **352** within the substantially horizontal plane defined thereby (e.g., such that the second extension **356** and the second mounting plate **352** are coplanar). The second mounting plate **352** and the second extension **356** collectively define a second support surface (e.g., suspension perch, an outer face, etc.), shown as second surface **362**. As shown in FIGS. 3, 4, and 6, the second extension **356** extends (i) in an inward direction (e.g., in a direction along the axis A towards the differential **312**) and (ii) in a direction perpendicular to the axis A within the substantially horizontal plane. As shown in FIGS. 3, 4, and 6, the second mounting plate **352** and the second extension **356** define a plurality of apertures, shown as apertures **364**, extending therethrough. In some embodiments, the apertures **364** are configured to receive fasteners (e.g., bolts, screws, nails, rivets, etc.) to facilitate coupling one or more components of the vehicle **10** (e.g., a component of the suspension system **60**) to the second mounting plate **352** and the second extension **356**. The second tabs **360** are substantially similar to the first tabs **340** and are configured to facilitate coupling the second suspension support **328** to the tube **316** of the second shaft assembly **308**.

(32) As shown in FIGS. 3-6, each of the first shaft assembly **304** and the second shaft assembly **308** includes a coupling mechanism, shown as coupler **368**, configured to facilitate selectively coupling the first shaft assembly **304** and the second shaft assembly **308** to the differential **312**. The coupler **368** is coupled to an outer circumference of the tube **316** proximate an end of the tube **316** configured to be positioned closest to the differential **312**. In some embodiments, the coupler **368** is welded to the tube **316** to fixedly couple the coupler **368** therewith. In other embodiments, the coupler **368** is otherwise suitably engaged with the tube **316** (e.g., clamped on, adhered to, bolted to, resistance fit, etc.) to facilitate coupling the first shaft assembly **304** and the second shaft assembly **308** to the differential **312**. As shown in FIGS. 3-6, the couplers **368** define a plurality of apertures positioned about a circumference thereof that are configured to receive a plurality of fasteners, shown as fasteners **372**, to couple the couplers **368** (and, thereby, the first shaft assembly **304** and the second shaft assembly **308**) to attachment interfaces positioned on opposing sides of the differential **312**. In this manner, the first shaft assembly **304** and the second shaft assembly **308** are selectively removably coupled to the differential **312**. In some embodiments, the first shaft assembly **304** and the second shaft assembly **308** are selectively removably coupled to the

differential **312** in another way (e.g., without the use of the coupler **368**). When the first shaft assembly **304** and the second shaft assembly **308** are coupled to the differential **312**, the differential **312** is configured to allocate torque to the axles **320** to provide rotational energy to the tractive elements coupled thereto.

(33) As shown in FIGS. 3-8, the first shaft assembly **304** and the second shaft assembly **308** are interchangeable or swappable between the left and right sides of the vehicle **10**. By way of example, the first shaft assembly **304** can be coupled to either the left side or the right side of the differential **312** and the second shaft assembly **308** can be coupled to either the left side or the right side of the differential **312** such that the first shaft assembly **304** and the second shaft assembly **308** are coupled to opposite sides of the differential **312**. Interchanging or swapping the first shaft assembly **304** and the second shaft assembly **308** with each other facilitates varying a height of the vehicle **10** (e.g., a ride height, a ground clearance, etc.). As shown in FIGS. 3 and 7, the first shaft assembly **304** and the second shaft assembly **308** are coupled to the differential **312** in a first configuration, shown as lowered configuration **374**. As shown in FIGS. 6 and 8, the first shaft assembly **304** and the second shaft assembly **308** are coupled to the differential **312** in a second configuration, shown as raised configuration **378**.

(34) In the lowered configuration **374** shown in FIGS. 3 and 7, the first shaft assembly **304** is coupled to a first side **382** of the differential **312** (e.g., a left side of the differential **312** as viewed from FIG. 3) and oriented such that the first suspension support **324** extends downward from the tube **316**. In the lowered configuration **374** shown in FIGS. 3 and 7, the second shaft assembly **308** is coupled to a second side **386** of the differential **312** (e.g., a right side of the differential **312** as viewed from FIG. 3) and oriented such that the second suspension support **328** extends downward from the tube **316**. In the lowered configuration **374**, the first suspension support **324** and the second suspension support **328** extend in a substantially horizontal plane parallel to and vertically below a plane in which the axis A extends such that (i) the first mounting plate **332** and the first extension **336** are substantially coplanar with the second mounting plate **352** and the second extension **356** and (ii) the first surface **342** is substantially coplanar with the second surface **362**. As shown in FIGS. 3 and 7, in the lowered configuration **374**, the first suspension support **324** and the second suspension support **328** are oriented (e.g., about the axis A) such that the first surface **342** and the second surface **362** face a downward direction (e.g., in a direction towards a ground surface on which the vehicle **10** is traveling).

(35) In the raised configuration **378** shown in FIGS. 6 and 8, the first shaft assembly **304** is coupled to the second side **386** of the differential **312** (e.g., the right side of the differential **312** as viewed from FIG. 6) and oriented such that the first suspension support **324** extends upward from the tube **316**. In the raised configuration **378** shown in FIGS. 6 and 8, the second shaft assembly **308** is coupled to the first side **382** of the differential **312** (e.g., the left side of the differential **312** as viewed from FIG. 6) and oriented such that the second suspension support **328** extends upward from the tube **316**. In the raised configuration **378**, the first suspension support **324** and the second suspension support **328** extend in a substantially horizontal plane parallel to and vertically above a plane in which the axis A extends such that (i) the first mounting plate **332** and the first extension **336** are substantially coplanar with the second mounting plate **352** and the second extension **356** and (ii) the first surface **342** is substantially coplanar with the second surface **362**. As shown in FIGS. 6 and 8, in the raised configuration **378**, the first suspension support **324** and the second suspension support **328** are oriented (e.g., about the axis A) such that the first surface **342** and the second surface **362** face an upward direction (e.g., in a direction away from a ground surface on which the vehicle **10** is traveling).

(36) As shown in FIGS. 4 and 5, to transition the axle assembly **300** between the lowered configuration **374** and the raised configuration **378**, the first shaft assembly **304** and the second shaft assembly **308** are swapped and are positioned to appropriately orient the first suspension support **324** and the second suspension support **328**. More specifically, as shown in FIG. 4, the

second shaft assembly **308** is coupled to the second side **386** in the lowered configuration **374**. Then, to transition the second shaft assembly **308** to the raised configuration **378**, the second shaft assembly **308** is decoupled (e.g., by the coupler **368** and the fasteners **372**) from the differential **312** at the second side **386**, moved to the first side **382** (as indicated by the arrow), and coupled (e.g., using the coupler **368** and the fasteners **372**) to the first side **382** of the differential **312** (e.g., after decoupling the first shaft assembly **304** from the differential **312**). Prior to coupling the second shaft assembly **308** to the first side **382** of the differential **312**, the second shaft assembly **308** is oriented such that the second surface **362** faces the upward direction.

(37) As shown in FIG. 5, the first shaft assembly **304** is coupled to the first side **382** in the lowered configuration **374**. Then, to transition the first shaft assembly **304** to the raised configuration **378**, the first shaft assembly **304** is decoupled (e.g., by the coupler **368** and the fasteners **372**) from the first side **382** of the differential **312**, moved to the second side **386** (as indicated by the arrow), and coupled (e.g., using the coupler **368** and the fasteners **372**) to the second side **386** of the differential **312** (e.g., after decoupling the second shaft assembly **308** from the differential **312**). Prior to coupling the first shaft assembly **304** to the second side **386** of the differential **312**, the first shaft assembly **304** is oriented such that the first surface **342** faces the upward direction.

(38) As shown in FIGS. 7 and 8, the first suspension support **324** and the second suspension support **328** are configured to facilitate coupling the axle assembly **300** to one or more components of the suspension system **60** and, thereby, to the frame **12** of the vehicle **10**. Suspension components (e.g., shocks, dampers, springs, etc.) of the suspension system **60**, shown as leaf springs **390**, are configured to couple (i) the first shaft assembly **304** with the frame **12** and (ii) the second shaft assembly **308** with the frame **12**. In some embodiments, the leaf springs **390** include several layers (e.g., leaves) stacked and clamped together and having varying lengths. In other embodiments, the leaf springs **390** are formed as a single unitary body. As shown in FIGS. 7 and 8, the leaf springs **390** define or have a shape that is generally parabolic or otherwise curved. In some embodiments, the leaf springs **390** define or have another suitable shape (e.g., semi-elliptical, quarter elliptical, three-quarter elliptical, full elliptical, etc.). In some embodiments, one or more fasteners are configured to extend through (i) the leaf springs **390** and (ii) the apertures **344** and the apertures **364** to couple the leaf springs **390** with the first suspension support **324** and the second suspension support **328**, respectively. As shown in FIGS. 7 and 8, the leaf springs **390** are oriented concave up, resembling a U-shape, when coupled to the axle assembly **300**. The shape or curvature of the leaf springs **390** may vary based on the load applied to the leaf springs **390**.

(39) As shown in FIG. 7, when the axle assembly **300** is configured in the lowered configuration **374**, at least a portion of the leaf springs **390** is positioned vertically below the axle assembly **300**. In the lowered configuration **374**, (i) the first suspension support **324** and the second suspension support **328** are positioned underneath the tubes **316** and (ii) the first surface **342** and the second surface **362** are positioned along an upper surface of the leaf springs **390** and fastened thereto.

(40) As shown in FIG. 8, when the axle assembly **300** is configured in the raised configuration **378**, the leaf springs **390** are positioned vertically above the axle assembly **300** (e.g., the entirety or at least a portion of the leaf springs **390** is positioned vertically above the axle assembly **300**). In the raised configuration **378**, (i) the first suspension support **324** and the second suspension support **328** are positioned above the tubes **316** and (ii) the first surface **342** and the second surface **362** are positioned along a lower surface of the leaf springs **390** and fastened thereto.

(41) As shown in FIG. 7, when the axle assemblies **300** are arranged in the lowered configuration **374**, the axle assemblies **300** and the leaf springs **390** are configured to space the frame **12** a first distance **394** from the ground surface. As shown in FIG. 8, when the axle assemblies **300** are arranged in the raised configuration **378**, the axle assemblies **300** and the leaf springs **390** are configured to space the frame **12** a second distance **398** from the ground surface where the second distance **398** is greater than the first distance **394** (e.g., by one, two, three, four, five, six, etc. inches). As shown in FIGS. 7 and 8, the first distance **394** and the second distance **398** are defined

as a distance between a ground surface with which the tractive elements are engaged and a lowermost surface of the frame **12**.

(42) In some embodiments, transitioning the axle assemblies **300** from the lowered configuration **374** to the raised configuration **378** facilitates moving, lifting, or otherwise raising the leaf springs **390** relative to the axles **320** by twice the distance (e.g., a vertical distance, a minimum distance, etc.) from the axis A to an outer face (e.g., the first surface **342** and the second surface **362**) of the first suspension support **324** and the second suspension support **328**, respectively. In other words, transitioning the axle assemblies **300** from the lowered configuration **374** to the raised configuration **378** facilitates raising the ride height or clearance of the vehicle **10** by twice the distance from the axis A to an outer face (e.g., the first surface **342** and the second surface **362**) of the first suspension support **324** and the second suspension support **328**, respectively. Therefore, the second distance **398** is greater than the first distance **394** by twice the distance from the axis A to an outer face (e.g., the first surface **342** and the second surface **362**) of the first suspension support **324** and the second suspension support **328**, respectively. Similarly, transitioning the axle assembly **300** from the raised configuration **378** to the lowered configuration **374** facilitates lowering the ride height or clearance of the vehicle **10** by twice the distance from the axis A to an outer face (e.g., the first surface **342** and the second surface **362**) of the first suspension support **324** and the second suspension support **328**, respectively.

(43) As shown in FIGS. **7** and **8**, both the front axle assembly **300** and the rear axle assembly **300** are transitioned between the lowered configuration **374** and the raised configuration **378** to facilitate varying the ride height or clearance of the vehicle **10**. In some embodiments, the front axle assembly **300** and the rear axle assembly **300** are differently configured from each other to vary a rake of the vehicle **10** (e.g., an angle of the frame **12** and the vehicle **10** relative to the ground surface). By way of example, the front axle assembly **300** may be configured in the lowered configuration **374** while the rear axle assembly **300** is configured in the raised configuration **378** such that a front end of the vehicle **10** is vertically lower than a rear end of the vehicle **10** (e.g., positive rake). By way of another example, the front axle assembly **300** may be configured in the raised configuration **378** while the rear axle assembly **300** is configured in the lowered configuration **374** such that a front end of the vehicle **10** is vertically higher than a rear end of the vehicle **10** (e.g., negative rake). In some embodiments, the first suspension support **324** and the second suspension support **328** are the same for the front axle assembly **300** and the rear axle assembly **300**. In some embodiments, the first suspension support **324** and the second suspension support **328** are different such that the height of the front end of the vehicle **10** differs from the height of the rear end of the vehicle **10** when in the raised configuration (e.g., to provide a raked, raised configuration).

(44) The present disclosure provides various advantages over traditional systems to selectively raise and lower the height of a vehicle. Traditional systems require additional bracketry (e.g., beyond the components used when the vehicle is at a first, lower height) that needs to be installed with the vehicle to relocate a position of a leaf spring such that the leaf spring is positioned vertically above the axle assembly and the vehicle is at a second, raised height. Further, traditional systems require different axles or tubes (e.g., different than the axles or tubes used when the vehicle is at the first, lower height) to transition the vehicle to the second, raised height. However, the axle assembly **300** of the present disclosure includes the first shaft assembly **304** and the second shaft assembly **308** that are interchangeable with each other to vary the height of the vehicle **10** without the need for additional bracketry or different axles or tubes.

(45) As utilized herein with respect to numerical ranges, the terms “approximately,” “about,” “substantially,” and similar terms generally mean  $\pm 10\%$  of the disclosed values, unless specified otherwise. As utilized herein with respect to structural features (e.g., to describe shape, size, orientation, direction, relative position, etc.), the terms “approximately,” “about,” “substantially,” and similar terms are meant to cover minor variations in structure that may result from, for

example, the manufacturing or assembly process and are intended to have a broad meaning in harmony with the common and accepted usage by those of ordinary skill in the art to which the subject matter of this disclosure pertains. Accordingly, these terms should be interpreted as indicating that insubstantial or inconsequential modifications or alterations of the subject matter described and claimed are considered to be within the scope of the disclosure as recited in the appended claims.

(46) It should be noted that the term “exemplary” and variations thereof, as used herein to describe various embodiments, are intended to indicate that such embodiments are possible examples, representations, or illustrations of possible embodiments (and such terms are not intended to connote that such embodiments are necessarily extraordinary or superlative examples).

(47) The term “coupled” and variations thereof, as used herein, means the joining of two members directly or indirectly to one another. Such joining may be stationary (e.g., permanent or fixed) or moveable (e.g., removable or releasable). Such joining may be achieved with the two members coupled directly to each other, with the two members coupled to each other using a separate intervening member and any additional intermediate members coupled with one another, or with the two members coupled to each other using an intervening member that is integrally formed as a single unitary body with one of the two members. If “coupled” or variations thereof are modified by an additional term (e.g., directly coupled), the generic definition of “coupled” provided above is modified by the plain language meaning of the additional term (e.g., “directly coupled” means the joining of two members without any separate intervening member), resulting in a narrower definition than the generic definition of “coupled” provided above. Such coupling may be mechanical, electrical, or fluidic.

(48) References herein to the positions of elements (e.g., “top,” “bottom,” “above,” “below”) are merely used to describe the orientation of various elements in the figures. It should be noted that the orientation of various elements may differ according to other exemplary embodiments, and that such variations are intended to be encompassed by the present disclosure.

(49) The hardware and data processing components used to implement the various processes, operations, illustrative logics, logical blocks, modules, and circuits described in connection with the embodiments disclosed herein may be implemented or performed with a general purpose single- or multi-chip processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA), or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general purpose processor may be a microprocessor, or, any conventional processor, controller, microcontroller, or state machine. A processor also may be implemented as a combination of computing devices, such as a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration. In some embodiments, particular processes and methods may be performed by circuitry that is specific to a given function. The memory (e.g., memory, memory unit, storage device) may include one or more devices (e.g., RAM, ROM, Flash memory, hard disk storage) for storing data and/or computer code for completing or facilitating the various processes, layers and modules described in the present disclosure. The memory may be or include volatile memory or non-volatile memory, and may include database components, object code components, script components, or any other type of information structure for supporting the various activities and information structures described in the present disclosure. According to an exemplary embodiment, the memory is communicably connected to the processor via a processing circuit and includes computer code for executing (e.g., by the processing circuit or the processor) the one or more processes described herein.

(50) The present disclosure contemplates methods, systems, and program products on any machine-readable media for accomplishing various operations. The embodiments of the present disclosure may be implemented using existing computer processors, or by a special purpose computer

processor for an appropriate system, incorporated for this or another purpose, or by a hardwired system. Embodiments within the scope of the present disclosure include program products comprising machine-readable media for carrying or having machine-executable instructions or data structures stored thereon. Such machine-readable media can be any available media that can be accessed by a general purpose or special purpose computer or other machine with a processor. By way of example, such machine-readable media can comprise RAM, ROM, EPROM, EEPROM, or other optical disk storage, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to carry or store desired program code in the form of machine-executable instructions or data structures and which can be accessed by a general purpose or special purpose computer or other machine with a processor. Combinations of the above are also included within the scope of machine-readable media. Machine-executable instructions include, for example, instructions and data which cause a general purpose computer, special purpose computer, or special purpose processing machines to perform a certain function or group of functions.

(51) Although the figures and description may illustrate a specific order of method steps, the order of such steps may differ from what is depicted and described, unless specified differently above. Also, two or more steps may be performed concurrently or with partial concurrence, unless specified differently above. Such variation may depend, for example, on the software and hardware systems chosen and on designer choice. All such variations are within the scope of the disclosure. Likewise, software implementations of the described methods could be accomplished with standard programming techniques with rule-based logic and other logic to accomplish the various connection steps, processing steps, comparison steps, and decision steps.

(52) It is important to note that the construction and arrangement of the vehicle **10** and the systems and components thereof (e.g., the body **20**, the operator controls **40**, the driveline **50**, the suspension system **60**, the braking system **70**, the sensors **90**, the vehicle control system **100**, etc.) and the axle assembly **300** as shown in the various exemplary embodiments is illustrative only. Additionally, any element disclosed in one embodiment may be incorporated or utilized with any other embodiment disclosed herein.

## Claims

1. A golf vehicle comprising: a chassis having a front end and a rear end; a suspension system coupled to the chassis; a first plurality of tractive assemblies; a second plurality of tractive assemblies; a first axle assembly coupled to the suspension system and the first plurality of tractive assemblies; and a second axle assembly coupled to the suspension system and the second plurality of tractive assemblies, the second axle assembly including a first shaft assembly and a second shaft assembly; wherein the first shaft assembly and the second shaft assembly are interchangeable to transition the second axle assembly between (i) a first configuration that provides a first ride height for the front end or the rear end of the chassis and (ii) a second configuration that provides a second ride height for the front end or the rear end of the chassis that is greater than the first ride height.
2. The golf vehicle of claim 1, wherein the second axle assembly includes a differential positioned between the first shaft assembly and the second shaft assembly.
3. The golf vehicle of claim 2, wherein the first shaft assembly and the second shaft assembly are removably coupled to the differential to facilitate interchanging the first shaft assembly and the second shaft assembly.
4. The golf vehicle of claim 1, wherein each of the first shaft assembly and the second shaft assembly include a tube and an axle at least partially received and rotatable within the tube.
5. The golf vehicle of claim 4, wherein the first shaft assembly includes a first suspension support coupled to an outer surface of the tube of the first shaft assembly, and wherein the second shaft assembly includes a second suspension support coupled to the outer surface of the tube of the second shaft assembly.

6. The golf vehicle of claim 5, wherein the first suspension support couples the first shaft assembly to the suspension system, and wherein the second suspension support couples the second shaft assembly to the suspension system.
7. The golf vehicle of claim 6, wherein: in the first configuration, the first suspension support and the second suspension support extend downward; and in the second configuration, the first suspension support and the second suspension support extend upward.
8. The golf vehicle of claim 7, wherein: the second axle assembly includes a differential; in the first configuration, the first shaft assembly is coupled to a first side of the differential and the second shaft assembly is coupled to an opposing second side of the differential; and in the second configuration, the first shaft assembly is coupled to the opposing second side of the differential at the second side and the second shaft assembly is coupled to the first side of the differential.
9. The golf vehicle of claim 6, wherein the first shaft assembly and the second shaft assembly are coaxial about an axis of rotation.
10. The golf vehicle of claim 9, wherein the second ride height is greater than the first ride height by twice a minimum distance from (a) the axis of rotation to (b) an outer face of the first suspension support and the second suspension support.
11. The golf vehicle of claim 6, wherein each of the first suspension support and the second suspension support includes: a mounting plate having an extension coplanar therewith, the mounting plate defining a plurality of apertures; a plurality of tabs extending from the mounting, the plurality of tabs coupling the mounting plate and the extension to the outer surface of the tube; and a plurality of fasteners received by the plurality of apertures to couple the mounting plate to a component of the suspension system.
12. The golf vehicle of claim 1, wherein the first shaft assembly is a mirror image of the second shaft assembly about a substantially vertical plane perpendicular to an axis of rotation defined by the second axle assembly.
13. The golf vehicle of claim 1, wherein the second axle assembly is coupled to the suspension system proximate the rear end of the chassis.
14. The golf vehicle of claim 1, wherein the second axle assembly is coupled to the suspension system proximate the front end of the chassis.
15. The golf vehicle of claim 1, wherein the suspension system includes leaf springs coupling the first shaft assembly and the second shaft assembly to the chassis.
16. The golf vehicle of claim 15, wherein, in the first configuration, at least a portion of the leaf springs is positioned below the first shaft assembly and the second shaft assembly, and wherein, in the second configuration, the leaf springs are positioned above the first shaft assembly and the second shaft assembly.
17. The golf vehicle of claim 1, wherein the first axle assembly include a single, solid shaft or a pair of half-shafts.
18. A vehicle comprising: a chassis having a front end and a rear end; a suspension system coupled to the chassis, the suspension system including a first leaf spring and a second leaf spring; a first tractive element; a second tractive element; and an axle assembly coupled to the first leaf spring, the second leaf spring, the first tractive element, and the second tractive element, the axle assembly including: a first shaft assembly including a first suspension support coupled to the first leaf spring; a second shaft assembly including a second suspension support coupled to the second leaf spring; and a differential having a first side and an opposing second side; wherein the first shaft assembly and the second shaft assembly are selectively couplable to the first side and the opposing second side; wherein the first shaft assembly and the second shaft assembly are coaxial about an axis of rotation of the axle assembly; and wherein the first shaft assembly and the second shaft assembly are interchangeable between the first side and the second side of the differential to transition the axle assembly between (i) a first configuration that provides a first ride height for the front end or the rear end of the chassis and (ii) a second configuration that provides a second ride height for the



front end or the rear end of the chassis that is greater than the first ride height.

19. The vehicle of claim 18, wherein, in the first configuration, at least a portion of the first leaf spring and the second leaf spring is positioned below the first shaft assembly and the second shaft assembly, and wherein, in the second configuration, the first leaf spring and the second leaf spring are positioned above the first shaft assembly and the second shaft assembly.

20. An axle assembly for a vehicle including (i) a chassis having a front end and a rear end, (ii) a differential, and (iii) a suspension system, the axle assembly comprising: a first shaft assembly including a first suspension support configured to couple to the suspension system and the differential; and a second shaft assembly including a second suspension support configured to couple to the suspension system and the differential; wherein the first shaft assembly and the second shaft assembly are configured to selectively couple to the differential; and wherein the first shaft assembly and the second shaft assembly are interchangeable between a first side of the differential and an opposing second side of the differential to transition the axle assembly between (i) a first configuration that provides a first ride height for the front end or the rear end of the chassis and (ii) a second configuration that provides a second ride height for the front end or the rear end of the chassis that is greater than the first ride height.

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