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MOTORIZED VEHICLES FOR TRANSPORTING MATERIAL

Abstract

A motorized vehicle is provided for transporting material and selectively dumping the material from the vehicle. In one example, the motorized vehicle includes a frame, first and second forward wheel assemblies coupled to the frame, and a rearward wheel assembly coupled to the frame. An engine is supported by the frame and configured to rotate the first and second forward wheel assemblies to move the motorized vehicle. And, a steering assembly comprising a power steering unit is configured to move the first and second tires of the rearward wheel assembly, via the power steering unit, for steering the motorized vehicle. The motorized vehicle also includes a bucket supported by the frame and configured to hold material on the motorized vehicle and selectively dump the material from the motorized vehicle, the bucket assembly disposed adjacent the first and second forward wheel assemblies.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application claims the benefit of, and priority to, U.S. Provisional Application No. 63/554,896, filed Feb. 16, 2024. The entire disclosure of the above application is incorporated herein by reference.

FIELD
[0002] The present disclosure is generally directed to motorized vehicles (e.g., power buggies, etc.) for transporting material and methods related thereto.
BACKGROUND
[0003] This section provides background information related to the present disclosure which is not necessarily prior art.
[0004] Power buggies are often used to haul material from one location to another, for example, at construction sites, etc. The buggies can generally handle loads of material ranging from a few hundred pounds up to a few tons. In addition, the buggies are generally sized to operate in smaller areas than conventional dump trucks or concrete trucks, for example, along narrow paths, between doorways, within structures, etc. In connection therewith, the buggies typically include buckets for holding the material being hauled, and for subsequently dumping the material directly in front of the buggies. Operators walk behind the buggies, or stand on platforms or sit on seats mounted on rearward portions of the buggies to control the hauling movements and dumping actions.
SUMMARY
[0005] This section provides a general summary of the disclosure, and is not a comprehensive disclosure of its full scope or all of its features.
[0006] Example embodiments of the present disclosure are generally directed to motorized vehicles for transporting material. In one example embodiment, such a motorized vehicle generally includes a frame having a longitudinal axis; first and second forward wheel assemblies, the first forward wheel assembly including at least one tire disposed toward a first side of the frame and the second forward wheel assembly including at least one tire disposed toward a second side of the frame, the at least one tire of the first forward wheel assembly spaced apart from the at least one tire of the second forward wheel assembly along a forward axis, the forward axis disposed generally perpendicular to the longitudinal axis of the frame; a rearward wheel assembly including a first tire disposed toward the first side portion of the frame and a second tire disposed toward the second side portion of the frame, the first tire of the rearward wheel assembly spaced apart from the second tire of the rearward wheel assembly along a rearward axis, the rearward axis disposed generally perpendicular to the longitudinal axis of the frame; an engine supported by the frame and configured to rotate the at least one tire of the first forward wheel assembly and the at least one tire of the second forward wheel assembly to thereby move the motorized vehicle; a steering assembly comprising a power steering unit, the steering assembly configured to move the first and second tires of the rearward wheel assembly, via the power steering unit, for steering the motorized vehicle; and a bucket assembly supported by the frame and configured to hold material on the motorized vehicle and selectively dump the material from the motorized vehicle, the bucket assembly disposed adjacent the first and second forward wheel assemblies.
[0007] In another example embodiment, such a motorized vehicle generally includes a frame having a longitudinal axis; first and second forward wheel assemblies coupled to the frame, the first forward wheel assembly disposed toward a first side of the frame and the second forward wheel assembly disposed toward a second side of the frame; a rearward wheel assembly coupled to the frame; an engine supported by the frame and configured to rotate the first and second forward

wheel assemblies to thereby move the motorized vehicle; a steering assembly comprising a power steering unit, the steering assembly configured to move the rearward wheel assembly, via the power steering unit, to steer the motorized vehicle; and a bucket supported by the frame adjacent the first and second forward wheel assemblies, the bucket configured to hold material on the motorized vehicle and selectively dump the material from the motorized vehicle.

[0008] Further areas of applicability will become apparent from the description provided herein. The description and specific examples in this summary are intended for purposes of illustration only and are not intended to limit the scope of the present disclosure.

Description

DRAWINGS

[0009] The drawings described herein are for illustrative purposes only of selected embodiments and not all possible implementations, and are not intended to limit the scope of the present disclosure.

[0010] FIG. **1** is an isometric view of a motorized vehicle including one or more aspects of the present disclosure, with a bucket of the motorized vehicle shown in a hauling position;

[0011] FIG. **2** is another isometric view of the motorized vehicle of FIG. **1**;

[0012] FIG. **3** is a rear elevation view of the motorized vehicle of FIG. **1**;

[0013] FIG. **4** is a bottom isometric view of the motorized vehicle of FIG. **1**;

[0014] FIG. **5** is another bottom isometric view of the motorized vehicle of FIG. **1**;

[0015] FIGS. **6-10** are fragmentary isometric views of a steering assembly of the motorized vehicle of FIG. **1**;

[0016] FIG. **11** is a side elevation view of the motorized vehicle of FIG. **1**;

[0017] FIG. **12** is a top plan view of the motorized vehicle of FIG. **1**;

[0018] FIG. **13** is an isometric view of the motorized vehicle of FIG. **1**, with the bucket shown in a forward dumping position;

[0019] FIG. **14** is an isometric view of the motorized vehicle of FIG. **1**, with the bucket shown in a left-side hauling position;

[0020] FIG. **15** is the isometric view of the motorized vehicle of FIG. **14**, with the bucket shown in a left-side dumping position;

[0021] FIG. **16** is a front elevation view of the motorized vehicle of FIG. **15**;

[0022] FIG. **17** is a top plan view of the motorized vehicle of FIG. **15**;

[0023] FIG. **18** is an isometric view of the motorized vehicle of FIG. **1**, with the bucket shown in a right-side hauling position;

[0024] FIG. **19** is the isometric view of the motorized vehicle of FIG. **18**, with the bucket shown in a right-side dumping position;

[0025] FIG. **20** is a front elevation view of the motorized vehicle of FIG. **19**;

[0026] FIG. **21** is a top plan view of the motorized vehicle of FIG. **19**;

[0027] FIG. **22** is a fragmentary isometric view of the motorized vehicle of FIG. **1**, with a bucket assembly of the vehicle removed;

[0028] FIG. **23** is a bottom plan view of the bucket assembly of the motorized vehicle of FIG. **1**;

[0029] FIG. **24** is a schematic view of the motorized vehicle of FIG. **1**, illustrating an engine of the motorized vehicle coupled to various components thereof; and

[0030] FIG. **25** is a schematic view of the motorized vehicle of FIG. **1**, illustrating an example steering assembly suitable for use in the motorized vehicle.

[0031] Corresponding reference numerals indicate corresponding parts throughout the several views of the drawings.

DETAILED DESCRIPTION

[0032] Example embodiments will now be described more fully with reference to the accompanying drawings. The description and specific examples included herein are intended for purposes of illustration only and are not intended to limit the scope of the present disclosure.
[0033] FIGS. **1-25** illustrate an example embodiment of a vehicle **100** including one or more aspects of the present disclosure. The vehicle **100** is configured (e.g., is constructed and operable, etc.) to haul material between locations (e.g., at construction sites, etc.) and to selectively dump the material, as desired. Uniquely herein, the example vehicle **100** is configured with power steering (or power assisted steering) and a pivoting steering/control wheel assembly to provide added control and/or stability to the vehicle **100** when used by an operator (e.g., to haul material, to dump material, etc.). That said, any suitable material may be hauled (and selectively dumped) by the vehicle **100** within the scope of the present disclosure including, for example, aggregate, concrete, dirt/soil, etc.
[0034] As shown in FIGS. **1-3**, the vehicle **100** includes a frame **102** (or chassis) supporting the vehicle **100** (e.g., supporting the various parts and/or components of the vehicle **100**, etc.), and two forward wheel assemblies **104**, **106** and a rearward wheel assembly **108** (or steering/control wheel assembly) coupled thereto. The wheel assemblies **104-108** position the frame **102** generally above a ground surface and facilitate movement of the vehicle **100**, as desired, across the ground surface (e.g., where the ground surface may include dirt, grass, rock, asphalt, concrete, flooring of a building, etc.). That said, the frame **102** may be constructed from suitable material capable of supporting the various parts and/or components of the vehicle **100**, including, for example, one or more metals, alloys, etc.
[0035] The vehicle **100** also includes an engine **110** mounted on the frame **102** generally between the forward wheel assemblies **104**, **106** and the rearward wheel assembly **108**, to provide power to the vehicle **100** to move the vehicle **100** and operate the various components and/or parts of the vehicle **100** (such that the vehicle **100** may be viewed as a motorized vehicle **100**, etc.). An air filter **112** and fuel tank **114** (FIG. **3**) are provided in communication with the engine **110**. And, a cover **116** is provided over these components (e.g., the engine **110**, the air filter **112**, the fuel tank **114**, etc.) to provide protection thereto (in the illustrated embodiment, a rear portion of the cover **116** is removed to allow for illustration of the engine **110**). The engine **110** may include any suitable engine **110** within the scope of the present disclosure. For example, the engine **110** may include a four-stroke engine of about 10-15 horsepower. Or, the engine **110** may include a larger engine of about 20 horsepower or more. That said, it should be appreciated that, more generally, any suitable engine may be used with the vehicle **100**.
[0036] With additional reference to FIG. **4**, the forward wheel assemblies **104**, **106** of the vehicle **100** are located toward a forward end of the frame **102**, adjacent a bucket assembly **118** of the vehicle **100**, and include a first wheel assembly **104** and a second wheel assembly **106**. The first and second forward wheel assemblies **104**, **106** are spaced apart from each other, and are generally aligned along a forward axis **120** of the vehicle **100**, where the forward axis **120** is then oriented generally perpendicular to a longitudinal axis **122** of the frame **102**. In connection therewith, the first forward wheel assembly **104** is located toward a left side (or first side) of the frame **102** (as viewed in FIG. **3**). And, the second forward wheel assembly **106** is located toward a right side (or second side) of the frame **102** (as viewed in FIG. **3**).
[0037] In addition, each of the first and second forward wheel assemblies **104**, **106** includes two tires (each indicated by reference number **124**) located generally outside of (e.g., lateral of, etc.) the frame **102**. The two tires **124** of each of the forward wheel assemblies **104**, **106** are then positioned adjacent each other, and slightly separated (e.g., by a spacer, etc.). The tires **124** of each of the first and second forward wheel assemblies **104**, **106** are further interconnected by (e.g., held together by, supported by, etc.) a respective axle **126**, **128** (or hub unit). In particular, the tires **124** of the first forward wheel assembly **104** are interconnected by a first axle **126** (or hub unit) and the tires **124** of the second forward wheel assembly **106** are interconnected by a second axle **128** (or hub unit). The

first and second axles **126**, **128**, in turn, are coupled to the frame **102** at a wheel mount **130** extending generally away from the frame **102** (e.g., by suitable bearings, etc.). And, the first and second axles **126**, **128** are generally oriented in alignment with the forward axis **120** of the vehicle **100**. The tires **124** of the first and second forward wheel assemblies **104**, **106** may be operated (e.g., rotated, etc.), as described more below, to cause movement of the vehicle **100**. That said, the tires **124** of the first and second forward wheel assemblies **104**, **106** may include any suitable tires (e.g., rubber wheeled tires, etc.) within the scope of the present disclosure.

[0038] The first and second forward wheel assemblies **104**, **106** also each include a wheel motor **132**, **134** configured to selectively rotate the tires **124** of the given assembly (see, e.g., FIG. **24**). In particular, a first wheel motor **132** (e.g., a hydraulic motor, etc.) is coupled to the first axle **126**, to selectively rotate the tires **124** of the first forward wheel assembly **104**. And, a second wheel motor **134** (e.g., a hydraulic motor, etc.) is coupled to the second axle **128** to selectively rotate the tires **124** of the second forward wheel assembly **106**. In this manner, the tires **124** of the first forward wheel assembly **104** are independently operable/moveable relative to the tires **124** of the second forward wheel assembly **106**, by way of the respective first and second wheel motors **132**, **134**, to thereby allow for added control of the vehicle **100** (whereby specific power and operation can be provided to each of the first and second forward wheel assemblies **104**, **106**, as desired, to help drive, move, direct the vehicle **100**, etc.). In one example embodiment, the first and second wheel motors **132**, **134** both include hydraulic motors coupled to a hydraulic reservoir (e.g., tank **226** which may be located in tank compartment **242**, etc.) (for providing fluid to the motors **132**, **134**) (e.g., located behind the engine **110** in FIGS. **3** and **8**, etc.) (see, e.g., also FIG. **25**, etc.). In connection therewith, in this example, the hydraulic motors are coupled to the reservoir in a generally open loop configuration so that fluid is provided (e.g., via pump **228**, etc.) to the motors in a manner that powers the forward wheel assemblies **104**, **106** on an on-demand basis (e.g., power goes to whichever wheel assembly needs it the most at the time, etc.).

[0039] The location and spacing of the tires **124** of the first and second forward wheel assemblies **104**, **106**, as described above, may provide a generally wider and more stable stance for the vehicle **100** (at a front of the vehicle **100**), as compared to vehicles having forward wheel assemblies with single tires and/or vehicles having single tracks, to resist (or inhibit) tipping when hauling and/or dumping material. The location and spacing of the two tires **124** of each of the first and second forward wheel assemblies **104**, **106** may also increase an area of contact between the tires **124** and the ground surface to thereby spread a weight of the vehicle **100** (and material hauled thereby) over a larger surface area, again as compared to vehicles having forward wheel assemblies with single tires and/or vehicles having single tracks, to resist (or inhibit) sinking of the vehicle **100** into the ground surface (or otherwise damaging the ground surface (e.g., cracking it, rutting it, etc.), etc.). That said, in the illustrated embodiment, as an example, a width of the vehicle **100**, as defined by a spacing of (or between) outer ones of the tires **124** of the first and second forward wheel assemblies **104**, **106** (e.g., as measured generally along the forward axis **120** from an outer portion of the outer tire **124** of the first forward wheel assembly **104** to an outer portion of the outer tire **124** of the second forward wheel assembly **106**, etc.), may be between about 35 inches and about 50 inches (e.g., about 45 inches, etc.).

[0040] Referring still to FIGS. **1-4**, the rearward wheel assembly **108** (or steering/control wheel assembly) of the vehicle **100** is located toward a rearward end of the frame **102**, adjacent the engine **110**, and includes two spaced apart tires (each indicated by reference number **136**). A first of the tires **136** is located toward the left side (or first side) of the frame **102** and a second of the tires **136** is located toward the right side (or second side) of the frame **102** (as viewed in FIG. **3**). The first and second tires **136** are spaced apart from each other along a rearward axis **138**, that is generally perpendicular to the longitudinal axis **122** of the frame **102** (and that is generally parallel to the forward axis **120** of the vehicle **100**). In addition in the illustrated embodiment, the first one of the tires **136** (the left tire **136** as viewed in FIG. **3**, etc.) is generally aligned with an inner tire **124** of

the first forward wheel assembly **104** and the second one of the tires **136** (the right tire **136** as viewed in FIG. **3**, etc.) is generally aligned with an inner tire **124** of the second forward wheel assembly **106**. In connection therewith, the rearward axis **138** may be spaced apart from the forward axis **120** by a distance of between about 40 inches and about 60 inches. In one particular implementation, the rearward axis **138** may be spaced apart from the forward axis **120** by a distance of between about 45 inches and about 55 inches (e.g., about 50 inches, etc.).

[0041] As described for the forward wheel assemblies **104**, **106**, this positioning/spacing of the tires **136** of the rearward wheel assembly **108**, along the rearward axis **138**, may provide a generally wider and more stable stance for the vehicle **100**, at the rearward end of the frame **102**, to further resist (or inhibit) tipping of the vehicle **100** when hauling (e.g., moving, etc.) and/or dumping material (alone or in combination with the location and/or spacing of the tires **124** of the forward wheel assemblies **104**, **106**). That said, in the illustrated embodiment, a width of the vehicle **100**, as defined by a spacing of the tires **136** of the rearward wheel assembly **108** (e.g., as measured generally along the rearward axis **138** from an outer portion of the first one of the tires **136** to an outer portion of the second one of the tires **136**, etc.), may be between about 12 inches and about 40 inches. And, in one particular implementation, the width of the vehicle **100**, as defined by the first and second tires **136** of the rearward wheel assembly **108**, is between about 25 inches and about 36 inches (e.g., about 33 inches, etc.).

[0042] The first and second tires **136** of the rearward wheel assembly **108** are controllable by a steering assembly **140** to thereby allow for directing (or steering) a movement of the vehicle **100** (broadly, for controlling directional movement of the vehicle **100**). In connection therewith, the tires **136** are connected by a steering linkage **142** (FIG. **4**) of the steering assembly **140**. And, a handle **144** of the steering assembly **140** is coupled to the steering linkage **142**, by way of a power steering unit **220**. Together, then, the handle **144**, the power steering unit **220**, and the steering linkage **142** are configured to control movement (e.g., turning, rotating, etc.) of the tires **136** of the rearward wheel assembly **108**. In particular, an operator can manipulate (e.g., turn, etc.) the handle **144** of the steering assembly **140** to actuate, via the power steering unit **220**, an arm **146** of the steering linkage **142** (coupled to the handle **144**) and thereby move the two tires **136** of the rearward wheel assembly **108** (via a mount **148** coupled to a center link **150** interconnecting the tires **136**) to allow for steering the vehicle **100** as the vehicle **100** moves. Such steering of the vehicle **100** may be done alone by the rearward wheel assembly **108** (by way of the steering assembly **140**), or it may be in combination with selective operation of the wheel motors **132**, **134** of the forward wheel assemblies **104**, **106**. That said, the tires **136** of the rearward wheel assembly **108** may include any suitable tires (e.g., rubber wheeled tires, etc.) within the scope of the present disclosure.

[0043] In the illustrated embodiment, the handle **144** generally includes a T-shaped handle (e.g., the handle **144** does not include a circular wheel, etc.). In connection therewith, in the illustrated embodiment, the handle **144** is configured with limited rotation (or limited travel) for controlling movement (e.g., turning, rotating, steering, etc.) of the tires **136** of the rearward wheel assembly **108**. For instance, the handle **144** may be configured to rotate only about **270** degrees or less (e.g., about **135** degrees to the left of center (e.g., to the left of the axis **122**, etc.) and about **135** degrees to the right of center (e.g., to the right of the axis **122**, etc.), etc.) (e.g., less than a full rotation/revolution of the handle **144**, less than 360 degrees, etc.) for controlling the tires **136** and steering the vehicle **100**.

[0044] With additional reference to FIGS. **5-10**, the power steering unit **220** of the steering assembly **140** is located generally below (or within) the frame **102** of the vehicle **100** (e.g., generally below the engine **110**, generally below a floor support **234** of the vehicle **100**, generally coupled to an underside of the floor support **234** of the vehicle **100** via fasteners **244** (FIGS. **8** and **9**), etc.). In this position, the power steering unit **220** is coupled/located/spliced between the handle **144** and the steering linkage **142**. In particular, an input shaft **222** (e.g., a steering shaft, etc.)

extends from the handle **144** downward through the cover **116** (via a locking collar **240** (and associated bearing) coupled to the cover **116**) (adjacent the engine **110**), through the frame **102** (and through the floor support **234** of the frame **102**), and into the power steering unit **220**, thereby coupling the handle **144** (and the input shaft **222** thereof) to the power steering unit **220**. And, an output shaft **224** then extends from the power steering unit **220** to the steering linkage **142** (through support **236** and steering bearing **238** coupled to the frame **102**), thereby coupling the steering linkage **142** and the rearward wheel assembly **108** to the power steering unit **220**.

[0045] In the illustrated embodiment, the steering linkage **142** connecting the first and second tires **136** of the rearward wheel assembly **108** includes the center link **150** interconnecting the first and second tires **136**, the mount **148** coupled to the center link **150**, and the arm **146** coupled between the mount **148** and the output shaft **224** (via a base member **152**). In addition in the illustrated embodiment, the handle **144** is located or positioned generally above (e.g., in generally vertical alignment with, etc.) the rearward wheel assembly **108** (e.g., the tires **136** of the rearward wheel assembly **108**, the center link **150** of the rearward wheel assembly **108**, etc.). This generally "stacked" arrangement of the steering assembly **140** and the rearward wheel assembly **108** in the illustrated vehicle **100** accommodates control of the vehicle by an operator standing on operator stand **164**.

[0046] In connection therewith, as the handle **144** rotates for steering (e.g., an amount less than about **270** degrees, etc.), it correspondingly rotates the input shaft **222** at the power steering unit **220**. The power steering unit **220** recognizes the movement of the input shaft **222** (e.g., via a sensor, via movement of a through shaft of the power steering unit **220**, etc.) and provides assisted force to rotate the output shaft **224** in a corresponding manner to the rotation of the input shaft **222** (and handle **144**). The output shaft **224** (as rotated with assistance from the power steering unit **220**) then pushes or pulls on the arm **146** of the steering linkage **142** (via the base member **152**). In turn, the arm **146** pushes or pulls on the mount **148**, which causes movement of the center link **150**. And, the center link **150** then causes the first and second tires **136** of the rearward wheel assembly **108** to rotate via pivots **154**. In this arrangement, the handle **144** is not rigidly/directly coupled to the first and second tires **136**, whereby less stress is imposed on the handle **144** during operation of the vehicle **100**. Similarly, in response to unexpected rotating movement of the first and second tires **136**, for example, when moving the vehicle **100** across rough or uneven terrain, the power steering unit **220** may absorb at least some of the rotating/pivoting/turning movement of the output shaft **224** (caused by turning movement of the first and second tires **136**) so that the handle **144** (via corresponding rotation of the input shaft **222**) does not abruptly turn and strike the operator, etc. (e.g., provides bump control for the vehicle **100**, inhibits or minimizes impact of the driving surface on the first and second tires **136** from transferring back up to the handle **144** (and operator) and potentially causing injuries, etc.). It should be appreciated that a different steering linkage **142** and/or steering assembly **140** in general may be used in other embodiments to allow for moving the tires **136** of the rearward wheel assembly **108**, for steering the vehicle **100**, including, for example, a rack and pinion steering mechanism, etc.

[0047] The power steering unit **222** may include a suitable power steering unit within the scope of the present disclosure. For instance, in one example, the power steering unit **222** includes a hydraulic power steering system, in which an actuator (e.g., a hydraulic cylinder of a servo system, etc.) directly interacts with the input shaft **220** and the output shaft **222** to provide steering ability to the rearward wheel assembly **108**. In one particular example, the power steering unit **222** may include a torque generator or an orbital valve. In another example, the power steering unit **222** includes an electric power steering system, in which an electric motor interacts with the input shaft **220** and the output shaft **222** to provide steering ability to the rearward wheel assembly **108**.

[0048] The illustrated vehicle **100** also includes a pivot **250** associated with the rearward wheel assembly **108**. In particular, as best shown in FIGS. **9** and **10**, the pivot **250** couples the center link **150** of the steering linkage **142** to the frame **102** of the vehicle **100**. The pivot **250**, then, includes a

bushing that allows for rotation of the center link **150** (and thus, the first and second tires **136** of the rearward wheel assembly **108**) relative to the frame **102** (e.g., pivoting movement in a generally vertical direction of the frame **102** (e.g., rotationally about the axis **122**, etc.), etc.). In connection therewith, the frame **102** includes angled stops **252** to limit the pivoting movement of the center link **150** (via engagement of the center link **150** with the stops **252**, etc.). In this way, additional ride control is provided to the vehicle **100**, for example, allowing the first and second tires **136** to move/accommodate uneven portions of a ground surface to help maintain contact of the tires **136** with the ground surface, etc. (e.g., the first and second tires **136** are not rigidly connected to the frame **102** of the vehicle **100**, etc.).

[0049] In addition in the illustrated embodiment, the handle **144** of the steering assembly **140** includes left and right grips **156**, **158** (as viewed in FIG. **3**) (e.g., on left and right end portions of the T-shape of the handle **144**, etc.). Various operations of the vehicle **100** may be controlled at or near the grips **156**, **158**, such that an operator may control (and operate) the vehicle **100** while holding (and/or while near) the handle **144**. For instance, a speed of the vehicle **100** and braking of the vehicle **100** may be controlled by manipulating the right grip **158** (e.g., rotating the grip **158**, etc.) and/or an actuator **160** associated with the right grip **158**. And, dumping operation of the vehicle **100** may be controlled by manipulating one or more of the actuators (each indicated by reference number **162**) mounted on the handle **144** adjacent the right and left grips **156**, **158**. That said, it should be appreciated that the steering assembly **140** may include handles and/or grips having other configurations and/or arrangements, and/or having other configurations and/or arrangements of controls, actuators, etc. in other embodiments.

[0050] With reference to FIGS. **11-12**, the vehicle **100** also includes the operator stand **164** (or platform) located toward the rearward end of the frame **102**. The stand **164** is configured to permit an operator to step (and stand) on the stand **164** and ride on the vehicle **100**, for example, while operating the vehicle **100** (e.g., while holding the handle **144**, etc.). In the illustrated embodiment, the stand **164** is configured to move between an operating position (FIGS. **11** and **12**) for supporting the operator, and a stored position in which the stand **164** is folded generally upwardly and inwardly toward the handle **144** (e.g., for transporting the vehicle **100**, for allowing the operator to walk behind the vehicle **100**, etc.). In connection therewith, the stand **164** is pivotally mounted to the frame **102** via support arms (each indicated by reference number **166**) extending from the frame **102**, to allow for the movement of the stand **164** between the operating position and the stored position. Locking pins (each indicated by reference number **168**), then, are provided to secure the stand **164** in either the operating position or the stored position (e.g., via alignment of openings in the support arms and/or stand with the locking pins **168**, etc.).

[0051] Referring now to FIGS. **13-21**, the vehicle **100** includes the bucket assembly **118**, which is supported by the frame **102** toward the forward end of the frame **102**. The bucket assembly **118** is disposed adjacent the forward wheel assemblies **104**, **106**. In general, the bucket assembly **118** is configured to pivot about a first axis **170** (FIG. **13**) of the bucket assembly **118** (e.g., a horizontal axis, etc.) to dump material from the vehicle **100**. In addition, the bucket assembly **118** is also configured to rotate about a second axis **172** (FIG. **14**) of the bucket assembly **118** (e.g., a vertical axis of the bucket assembly **118** or of the frame **102**, etc.) to move the bucket assembly **118** in generally a radial direction about the frame **102** (and relative to the frame **102**) to a desired angle. This will be described in more detail next.

[0052] The bucket assembly **118** includes a platform **174** mounted on the frame **102**, and a bucket **176** coupled to the platform **174**. The bucket **176** is coupled to the platform **174** adjacent a forward wall **178** of the bucket **176** (FIGS. **13** and **14**). The bucket **176** includes a pivot **180** (broadly, a mount) (e.g., a bar, a tube, etc.) coupled to the forward wall **178** (generally where the forward wall **178** intersects with a bottom wall **182** of the bucket **176** (e.g., along the horizontal axis **170** of the bucket assembly **118**, etc.) and configured to fit within corresponding mounts **184** (e.g., openings, rings, etc.) of the platform **174**. And, a hydraulic cylinder **186** or piston (broadly, an actuator) (FIG.

13) is positioned generally between the bucket **176** and the platform **174**, with a cylinder portion of the cylinder **186** coupled to a mount **188** of the platform **174** and a rod portion of the cylinder **186** coupled to a bracket **190** of bucket **176**. The cylinder **186** is then configured to actuate the bucket **176**, by way of a hydraulic pump **192** (e.g., a hydrostatic pump, etc.) (see, FIG. **24**), as powered by the engine **110** of the vehicle **100**, to cause the bucket **176** to pivot relative to the platform **174** via the pivot **180** (e.g., to rotate, tilt, etc.) and selectively dump material from the bucket **176**, etc. In the illustrated embodiment, the bucket **176** is configured to pivot about 90 degrees relative to the platform **174**, but may pivot more or less in some implementations (e.g., about 45 degrees, about 100 degrees, etc.).

[0053] With additional reference to FIGS. **22** and **23**, the platform **174** of the bucket assembly **118** is mounted on the frame **102** of the vehicle **100** at a bucket mount **194**. A drive device **196** (broadly, an actuator) of the platform **174** is positioned at the bucket mount **194** and is configured to rotate the platform **174** (and bucket **176** coupled thereto) relative to the frame **102** (by way of a platform motor **198**, as powered by the engine **110**) (e.g., between the positions illustrated in FIGS. **2**, **14**, and **18**; etc.). As such, the bucket **176** of the present disclosure is configured to rotate about the vertical axis **172** of the bucket assembly **118** between a plurality of different radial positions (relative to the frame **102** of the vehicle **100**). Such rotation may be done while the bucket **176** is in a hauling position (e.g., FIGS. **14** and **18**, etc.) or while the bucket **176** is in a dumping position (e.g., FIGS. **15** and **19**, etc.). In this way, the vehicle **100** is able to dump material from the bucket **176** generally straight forward of the vehicle **100** (in a forward dumping position) (FIG. **13**), or to a left side of the vehicle **100** (in a left-side dumping position) (e.g., FIGS. **14-17**, etc.), or to a right side of the vehicle **100** (in a right-side dumping position) (e.g., FIGS. **18-21**, etc.). That said, in the illustrated embodiment the drive device **196** includes a slew ring drive coupled between the bucket mount **194** of the frame **102** and the platform **174** and configured to cause rotation of the platform **174** and bucket **176**. In connection therewith, the platform motor **198** is configured to turn a worm shaft **202**, which is coupled to a wheel **204** disposed on the platform **174** (and which is configured to fit within the bucket mount **194**). As the worm shaft **202** turns, then, it actuates the wheel **204**, which correspondingly rotates the platform **174** (and bucket **176**). However, in other embodiments, the drive device **196** (or actuator) may include another drive mechanism, for example, a rack and pinion drive, a cylinder (or multi-cylinder) drive, etc. configured to similarly rotate the platform **174** (and bucket **176**) relative to the frame **102**.

[0054] In the illustrated embodiment, the bucket **176** may be configured to rotate, for example, from a hauling position (e.g., a first radial position, etc.), in which a longitudinal axis **206** (FIG. **11**) of the bucket **176** is generally parallel with the longitudinal axis **122** of the frame **102** of vehicle **100**, to a left-side position (e.g., a second radial position, etc.) in which the longitudinal axis **206** of the bucket **176** is generally perpendicular to the longitudinal axis **122** of the frame **102** (e.g., about **90** degrees to the left side of the vehicle **100**, etc.) (FIG. **14**). Similarly, the bucket **176** may be configured to rotate from the hauling position (e.g., the first radial position, etc.), in which the longitudinal axis **206** of the bucket **176** is generally parallel with the longitudinal axis **122** of the frame **102** of vehicle **100**, to a right-side position (e.g., a third radial position, etc.) in which the longitudinal axis **206** of the bucket **176** is generally perpendicular to the longitudinal axis **122** of the frame **102** (e.g., about 90 degrees to the right side of the vehicle **100**, etc.) (FIG. **18**). In both of the above examples, when the bucket **176** is in the left-side position or the right-side position, at least part of the pivot **180** is positioned over at least one of the tires **124** of the first forward wheel assembly **104** or over at least one of the tires **124** of the second forward wheel assembly **106** (FIGS. **16** and **20**). That said, it should be appreciated that the bucket **176** may also be configured to rotate to multiple other different radial positions (e.g., about 110 degrees to the lift side of the frame **102**, about 45 degrees to the left side of the frame **102**, about 45 degrees to the right side of the frame **102**, about 110 degrees to the right side of the frame **102**, etc.) in other examples. In addition, in some embodiments, the bucket **176** (and/or platform **174**) may be moveable in a

generally vertical direction relative to the vehicle **100** (e.g., in a direction generally parallel to the vertical axis **172** of the bucket **176**, etc.).

[0055] The bucket **176** of the bucket assembly **118** is configured to hold material being hauled by the vehicle **100**, and to subsequently dump the material as desired (e.g., straight forward of the vehicle **100**, to a side of the vehicle **100**, etc.). In addition, the bucket **176** may be constructed from suitable material (e.g., plastics, metals, combinations thereof, etc.) and may have any suitable and/or desired capacity. For instance, in some embodiments, the bucket **176** may be constructed from a plastic material and may have a capacity of at least about 10 cubic feet (e.g., about 10 cubic feet, about 15 cubic feet, about 16 cubic feet, about 21 cubic feet, etc.), and a payload of at least about 1000 pounds (e.g., about 1000 pounds, about 1500 pounds, about 2000 pounds, about 2500 pounds, about 3000 pounds, etc.). Further in the illustrated embodiment, the bucket **176** defines a generally rectangular shape. In connection therewith, the bucket **176** includes the bottom wall **182** (or floor), the forward wall **178** (coupled to the bottom wall), a rearward wall **208** adjacent the engine **110** (and coupled to the bottom wall **182**), and opposing side walls **210**, **212** (each coupled to the bottom wall) (FIG. **14**). The forward wall **178** is generally lower than the rearward wall **208** and is angled (or sloped) relative to the bottom wall **182** to facilitate dumping material from the bucket **176**. The side walls **210**, **212** are generally vertical and have a similar height to the forward wall **178**. And, the rearward wall **208** is sloped and is relatively higher than the forward wall **178** so as to increase carrying capacity of the bucket. It should be appreciated that the walls **178**, **182**, **208**, **210**, **212** of the bucket **176**, and more generally the bucket **176** itself, may have different configurations in other embodiments.

[0056] FIG. **24** schematically illustrates the vehicle **100**, and a configuration of the engine **110** of the vehicle **100** as mounted on the frame **102**. As shown, and as described above, the engine **110** is generally located between the forward wheel assemblies **104**, **106** and the rearward wheel assembly **108** (and generally closer to the rearward wheel assembly **108**). And, the engine **110** is configured to provide power to the different parts and/or components of the vehicle **100** to move the vehicle **100** and operate the bucket assembly **118**.

[0057] For instance, the engine **110** is coupled (as indicated by the dashed lines in FIG. **24**) to the first and second wheel motors **132**, **134**, to thereby selectively power the wheel motors **132**, **134** (via the grip(s) **156**, **158** of the handle **144** of the steering assembly **140** (FIG. **3**)) to rotate the tires **124** of the first and second forward wheel assemblies **104**, **106** to move the vehicle **100** forward or backward. In addition, the tires **124** of the first and second forward wheel assemblies **104**, **106** are independently operable/moveable, by way of the respective first and second wheel motors **132**, **134**, to thereby allow for added control of the vehicle **100** (whereby specific power and operation can be provided to each of the first and second wheel assemblies **104**, **106**, as desired, to help direct the vehicle **100**, etc.).

[0058] In addition, the engine **110** is coupled (as also indicated by the dashed lines in FIG. **24**) to the platform motor **198** of the bucket assembly **118** to thereby power the motor **198** to selectively operate the drive device **196** to rotate the platform **174** (and bucket **176** coupled thereto), relative to the frame **102**. In connection therewith, the vehicle **100** is able to dump material from the bucket **176** generally straight forward (or straight ahead) of the vehicle **100**, or to a left side of the vehicle **100** or a right side of the vehicle **100**. Further, the engine **110** is also coupled (as indicated by the dashed lines in FIG. **24**) to the hydraulic pump **192** associated with the cylinder **186** of the bucket assembly **118** to thereby cause the bucket **176** to pivot relative to the platform **174** to dump material from the bucket **176**. This may be done while the bucket **176** is in a hauling position (FIGS. **2**, **14**, and **18**) or in a dumping position (FIGS. **13**, **15**, and **19**).

[0059] FIG. **25** schematically illustrates the vehicle **100**, and an example configuration of the steering assembly **140** as included in the vehicle **100** (e.g., as mounted on the frame **102** of the vehicle **100** via the support **236**, etc.). As shown, and as described above, the steering assembly **140** is associated with the rearward wheel assembly **108** of the vehicle **100** and is generally located

adjacent the engine **110** (see, FIGS. **2** and **3**) (e.g., generally aligned/stacked over the rearward wheel assembly **108** (e.g., generally over the center link **150**, etc.), etc.).

[0060] The input shaft **222** (or steering shaft) extends from the handle **144** to the power steering unit **220**. And, the output shaft **224** then extends from the power steering unit **220** to the base member **152** of the steering linkage **142**. In this example, the power steering unit **220** includes a torque generator having a through-shaft therein (to which the input shaft **222** and the output shaft **224** connect). As such, in this example, the power steering unit **220** is fluidly coupled to tank **226** (e.g., located adjacent the engine **110** in tank compartment **242** (FIG. **8**), etc.) configured to hold hydraulic fluid for use in the power steering unit **220**, and to pump **228** configured to circulate the hydraulic fluid between the tank **226** and the power steering unit **220** (via supply and return lines **230**, **232**) (e.g., providing a pressure of hydraulic fluid at the power steering unit **220** of about 300 psi or more or less, etc.). In connection therewith, as the handle **144** rotates for steering, it correspondingly rotates the input shaft **222** at the power steering unit **220**. The power steering unit **220** recognizes the movement of the input shaft **222** (e.g., via the through-shaft thereof, etc.) and provides assisted force (via the through-shaft) to rotate the output shaft **224** in a corresponding manner, for example, via operation of the hydraulic fluid, an actuator, etc. on the through-shaft. The output shaft **224** (as rotated with assistance from the power steering unit, for example) then pushes or pulls on the steering linkage **142** (via the base member **152**). In turn, the steering linkage **142** causes the first and second tires **136** of the rearward wheel assembly **108** to rotate/turn as desired.

[0061] In this example, the tank **226** and pump **228** are configured to provide hydraulic fluid to all parts of the vehicle, including the power steering unit **220**, the wheel motors **132**, **134** of the first and second forward wheel assemblies **104**, **106**, and the bucket assembly **118**. However, this is not required in all embodiments (whereby separate tanks and/or pumps may be provided/used for different components of the vehicle **100**).

[0062] In various embodiments, the power steering unit **220** may provide at least about 20% fluid assistance to the steering assembly **140** of the vehicle **100**. In addition, in various embodiments, operation of the steering assembly **140** is maintained even if operation of the power steering unit **220** fails (e.g., via the linkage of the input shaft **222** and the output shaft **224** to the through-shaft of the power steering unit **220**, etc.). In other words, the vehicle **100** may still be operated/controlled by the handle **144** of the steering assembly **140** even if operation of the power steering unit **220** fails or faulters.

[0063] In various embodiments, the power steering unit **220** described herein may be installed (e.g., as a retrofit, etc.) to a steering shaft of a motorized vehicle, such as a power buggy. In doing so, the steering shaft may be cut at a location generally below a frame (and/or floor support **234**) thereof, and the power steering unit **220** then installed between the cut portions of the steering shaft.

[0064] The foregoing description of the embodiments has been provided for purposes of illustration and description. It is not intended to be exhaustive or to limit the present disclosure. Individual elements or features of a particular embodiment are generally not limited to that particular embodiment, but, where applicable, are interchangeable and can be used in a selected embodiment, even if not specifically shown or described. The same may also be varied in many ways. Such variations are not to be regarded as a departure from the present disclosure, and all such modifications are intended to be included within the scope of the present disclosure.

[0065] Example embodiments have been provided so that this disclosure will be thorough, and will fully convey the scope to those who are skilled in the art. Numerous specific details are set forth such as examples of specific components, assemblies, and methods, to provide a thorough understanding of embodiments of the present disclosure. It will be apparent to those skilled in the art that specific details need not be employed, that example embodiments may be embodied in many different forms and that neither should be construed to limit the scope of the disclosure. In some example embodiments, well-known processes, well-known device structures, and well-known technologies are not described in detail.

[0066] Specific dimensions, specific material(s), and/or specific shapes disclosed herein are example in nature and do not limit the scope of the present disclosure. The disclosure herein of particular values and particular ranges of values for given parameters are not exclusive of other values and ranges of values that may be useful in one or more of the examples disclosed herein. Moreover, it is envisioned that any two particular values for a specific parameter stated herein may define the endpoints of a range of values that may be suitable for the given parameter (i.e., the disclosure of a first value and a second value for a given parameter can be interpreted as disclosing that any value between the first and second values could also be employed for the given parameter). For example, if Parameter X is exemplified herein to have value A and also exemplified to have value Z, it is envisioned that parameter X may have a range of values from about A to about Z. Similarly, it is envisioned that disclosure of two or more ranges of values for a parameter (whether such ranges are nested, overlapping or distinct) subsume all possible combination of ranges for the value that might be claimed using endpoints of the disclosed ranges. For example, if parameter X is exemplified herein to have values in the range of 1-10, or 2-9, or 3-8, it is also envisioned that Parameter X may have other ranges of values including 1-9, 1-8, 1-3, 1-2, 2-10, 2-8, 2-3, 3-10, and 3-9.

[0067] The terminology used herein is for the purpose of describing particular example embodiments only and is not intended to be limiting. As used herein, the singular forms “a”, “an” and “the” may be intended to include the plural forms as well, unless the context clearly indicates otherwise. The terms “comprises,” “comprising,” “including,” and “having,” are inclusive and therefore specify the presence of stated features, integers, steps, operations, elements, components, and/or groups thereof, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof. The method steps, processes, and operations described herein are not to be construed as necessarily requiring their performance in the particular order discussed or illustrated, unless specifically identified as an order of performance. It is also to be understood that additional or alternative steps may be employed.

[0068] When an element or layer is referred to as being “on”, “engaged to”, “connected to” or “coupled to” another element or layer, it may be directly on, engaged, connected or coupled to the other element or layer, or intervening elements or layers may be present. In contrast, when an element is referred to as being “directly on,” “directly engaged to”, “directly connected to” or “directly coupled to” another element or layer, there may be no intervening elements or layers present. Other words used to describe the relationship between elements should be interpreted in a like fashion (e.g., “between” versus “directly between,” “adjacent” versus “directly adjacent,” etc.). As used herein, the term “and/or” and the phrase “at least one of” includes any and all combinations of one or more of the associated listed items.

[0069] Although the terms first, second, third, etc. may be used herein to describe various elements, components, seeds, members and/or sections, these elements, components, seeds, members and/or sections should not be limited by these terms. These terms may be only used to distinguish one element, component, seed, member or section from another element, component, seed, member or section. Terms such as “first,” “second,” and other numerical terms when used herein do not imply a sequence or order unless clearly indicated by the context. Thus, a first element, component, seed, member or section discussed below could be termed a second element, component, seed, member or section without departing from the teachings of the example embodiments.

[0070] Spatially relative terms, such as “inner,” “outer,” “beneath,” “below,” “lower,” “above,” “upper,” and the like, may be used herein for ease of description to describe one element or feature's relationship to another element(s) or feature(s) as illustrated in the figures. Spatially relative terms may be intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. For example, if the device in the figures is turned over, elements described as “below” or “beneath” other elements or features would then be

oriented “above” the other elements or features. Thus, the example term “below” can encompass both an orientation of above and below. The device may be otherwise oriented (rotated **90** degrees or at other orientations) and the spatially relative descriptors used herein interpreted accordingly.

Claims

1. A motorized vehicle for transporting material, the motorized vehicle comprising: a frame having a longitudinal axis; first and second forward wheel assemblies, the first forward wheel assembly including at least one tire disposed toward a first side of the frame and the second forward wheel assembly including at least one tire disposed toward a second side of the frame, the at least one tire of the first forward wheel assembly spaced apart from the at least one tire of the second forward wheel assembly along a forward axis, the forward axis disposed generally perpendicular to the longitudinal axis of the frame; a rearward wheel assembly including a first tire disposed toward the first side portion of the frame and a second tire disposed toward the second side portion of the frame, the first tire of the rearward wheel assembly spaced apart from the second tire of the rearward wheel assembly along a rearward axis, the rearward axis disposed generally perpendicular to the longitudinal axis of the frame; an engine supported by the frame and configured to rotate the at least one tire of the first forward wheel assembly and the at least one tire of the second forward wheel assembly to thereby move the motorized vehicle; a steering assembly comprising a power steering unit, the steering assembly configured to move the first and second tires of the rearward wheel assembly, via the power steering unit, for steering the motorized vehicle; and a bucket assembly supported by the frame and configured to hold material on the motorized vehicle and selectively dump the material from the motorized vehicle, the bucket assembly disposed adjacent the first and second forward wheel assemblies.
2. The motorized vehicle of claim 1, wherein the steering assembly includes: a handle; an input shaft coupled between the handle and the power steering unit; a steering linkage coupled to the first and second tires of the rearward wheel assembly; and an output shaft coupled between the power steering unit and the steering linkage.
3. The motorized vehicle of claim 1, wherein the power steering unit is disposed below the frame.
4. The motorized vehicle of claim 1, wherein the power steering unit further includes a tank configured to hold fluid for use in the power steering unit, and a pump configured to circulate the fluid between the tank and the power steering unit.
5. The motorized vehicle of claim 1, wherein the first forward wheel assembly includes two tires, and wherein the second forward wheel assembly includes two tires.
6. The motorized vehicle of claim 5, wherein the two tires of the first forward wheel assembly are mounted on a first axle, and wherein the two tires of the second forward wheel assembly are mounted on a second axle separate from the first axle.
7. The motorized vehicle of claim 1, wherein the bucket assembly further includes: a first actuator configured to pivot the bucket about the horizontal axis of the bucket assembly; and a second actuator configured to rotate the platform about the vertical axis of the bucket assembly and move the bucket relative to the frame.
8. The motorized vehicle of claim 1, wherein the bucket assembly includes a mount configured to pivotally couple the bucket to the platform, the mount extending along the horizontal axis of the bucket assembly; and wherein the bucket includes a bottom wall and a forward wall arranged at an angle relative to the bottom wall, the mount disposed adjacent an intersection of the bottom wall and the forward wall of the bucket.
9. The motorized vehicle of claim 1, further comprising a pivot coupling the rearward wheel assembly to the frame, so that the rearward wheel assembly is configured to pivot relative to the frame via the pivot.
10. A motorized vehicle for transporting material, the motorized vehicle comprising: a frame

having a longitudinal axis; first and second forward wheel assemblies coupled to the frame, the first forward wheel assembly disposed toward a first side of the frame and the second forward wheel assembly disposed toward a second side of the frame; a rearward wheel assembly coupled to the frame; an engine supported by the frame and configured to rotate the first and second forward wheel assemblies to thereby move the motorized vehicle; a steering assembly comprising a power steering unit, the steering assembly configured to move the rearward wheel assembly, via the power steering unit, to steer the motorized vehicle; and a bucket supported by the frame adjacent the first and second forward wheel assemblies, the bucket configured to hold material on the motorized vehicle and selectively dump the material from the motorized vehicle.

11. The motorized vehicle of claim 10, wherein the steering assembly includes: a handle; an input shaft coupled between the handle and the power steering unit; a steering linkage coupled to the first and second tires of the rearward wheel assembly; and an output shaft coupled between the power steering unit and the steering linkage.

12. The motorized vehicle of claim 11, wherein the power steering unit is disposed below the frame.

13. The motorized vehicle of claim 12, wherein the power steering unit further includes a tank configured to hold fluid for use in the power steering unit, and a pump configured to circulate the fluid between the tank and the power steering unit.

14. The motorized vehicle of claim 13, further comprising a platform coupled to the frame and configured to rotate about a vertical axis to rotate the bucket at least between the first radial position and the second radial position.

15. The motorized vehicle of claim 14, wherein the bucket is configured to rotate about a vertical axis at least between a first radial position in which a longitudinal axis of the bucket is generally parallel with the longitudinal axis of the frame and a second radial position in which the longitude axis of the bucket is oriented generally perpendicular to the longitudinal axis of the frame.

16. The motorized vehicle of claim 13, wherein the first forward wheel assembly includes at least one tire, and wherein the second forward wheel assembly includes at least one tire; and wherein the rearward wheel assembly includes a first tire and a second tire, the first tire of the rearward wheel assembly generally aligned with the at least one tire of the first forward wheel assembly and the second tire of the rearward wheel assembly generally aligned with the at least one tire of the second forward wheel assembly.

17. The motorized vehicle of claim 10, further comprising a pivot coupling the rearward wheel assembly to the frame, so that the rearward wheel assembly is configured to pivot relative to the frame via the pivot.