US 20260008508A1

(19) United States
(12) Patent Application Publication
Deselich et al.

(10) Pub. No.: US 2026/0008508 A1
(43) Pub. Date: Jan. 8, 2026

(54) **BELT IDLER ASSEMBLY FOR SNOWMOBILE**

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(21) Appl. No.: **18/763,529**

(22) Filed: **Jul. 3, 2024**

**Publication Classification**

(51) **Int. Cl.**

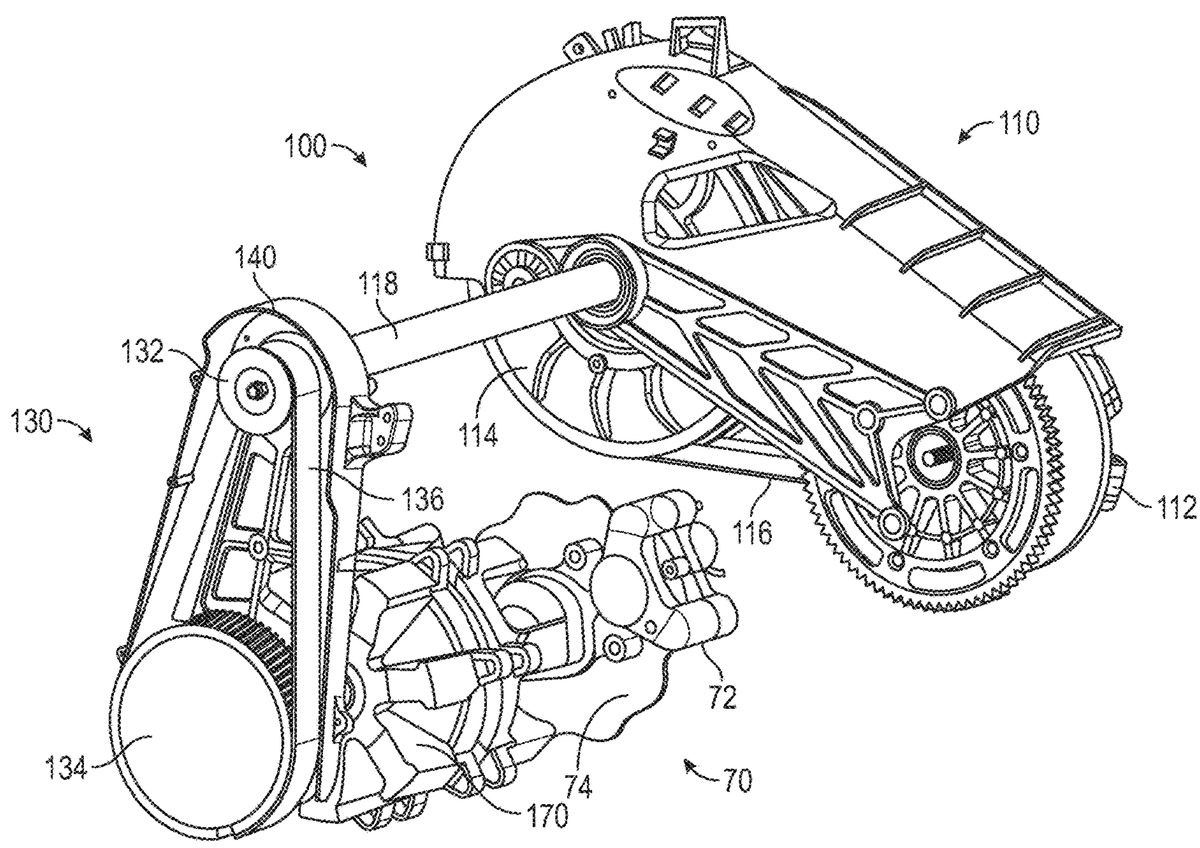
| | |
|---|---|
| ***B62D 55/30*** | (2006.01) |
| ***B62D 55/12*** | (2006.01) |
| ***B62M 27/02*** | (2006.01) |

(52) **U.S. Cl.**

CPC .......... ***B62D 55/305*** (2013.01); ***B62D 55/12*** (2013.01); ***B62M 27/02*** (2013.01)

(57) **ABSTRACT**

A belt idler assembly for changing a path length of a drive belt of a belt assembly of a snowmobile includes an idler bracket configured to couple to a belt housing of a belt assembly, a post configured to be positioned between the idler bracket and the belt housing, and a bearing coupled to the post. The idler bracket includes a first bracket portion, a plurality of second bracket portions extending from opposing ends of the first bracket portion, and a plurality of third bracket portions extending from each of the second bracket portions. A first of the third bracket portions is configured to engage with a first interface of the housing and a second of the third bracket portions is configured to engage with a second interface of the housing. The bearing defines a bearing surface configured to engage the drive belt.



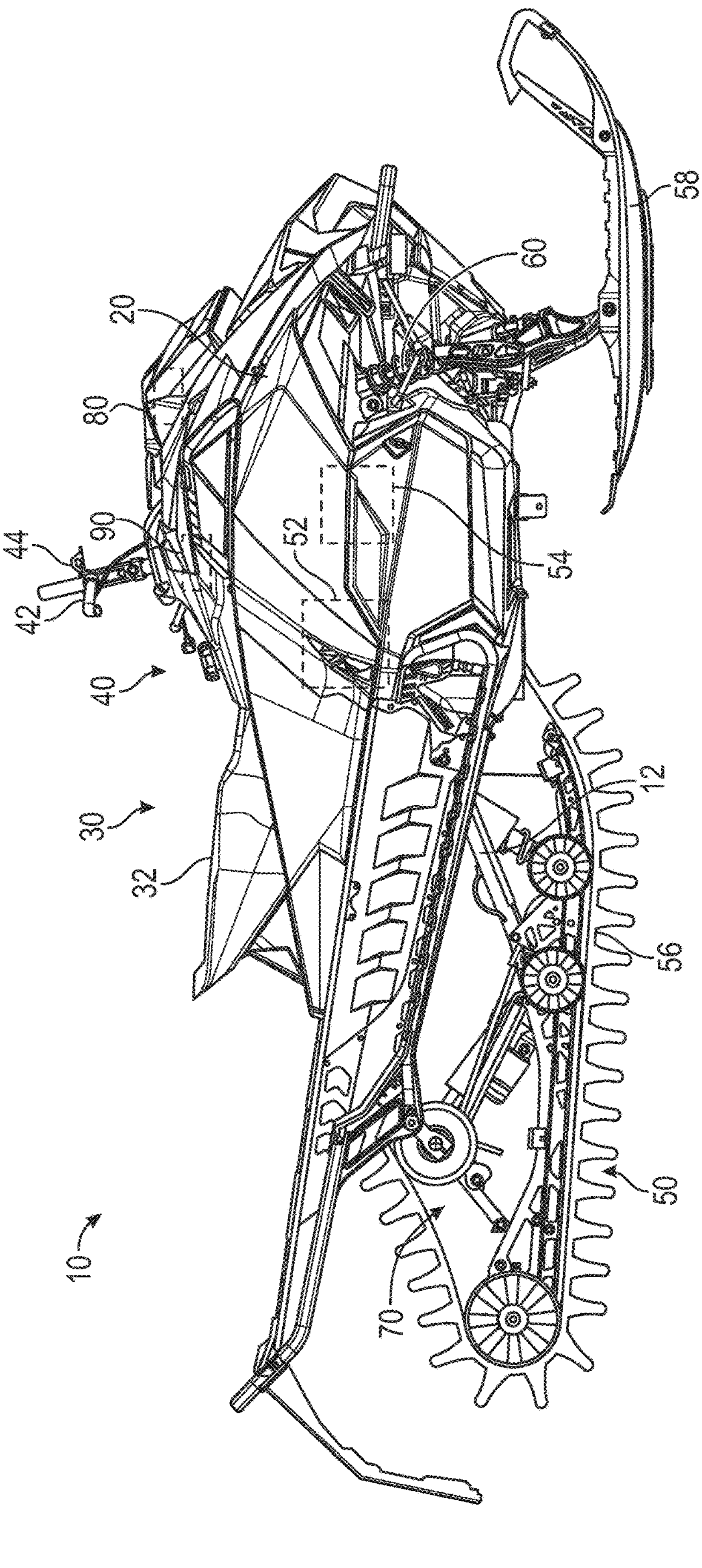
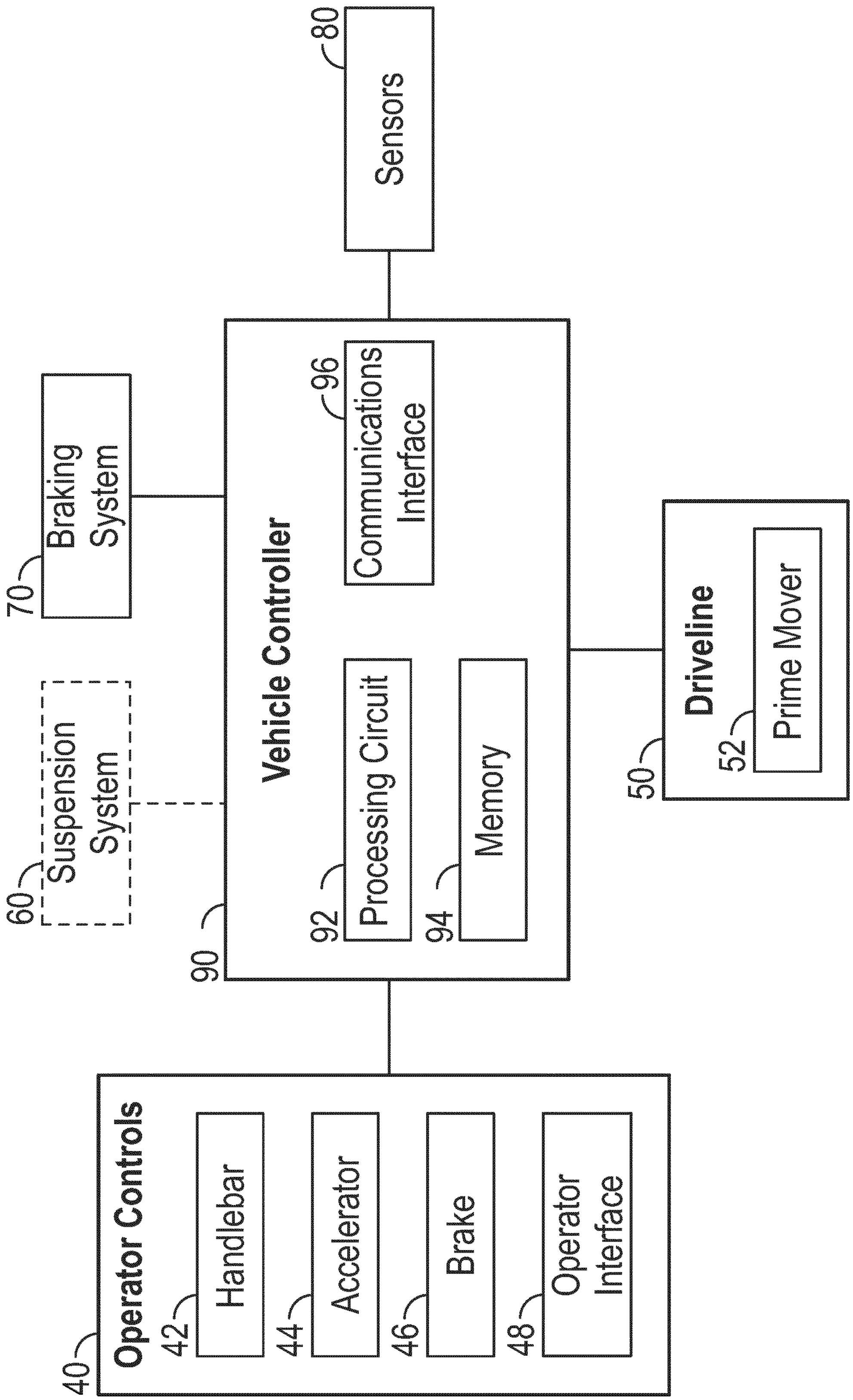



FIG. 1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Sensors
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Braking System
96
Communications Interface
Vehicle Controller
60
Suspension System
92
Processing Circuit
94
Memory
90
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Driveline
52
Prime Mover
40
Operator Controls
42
Handlebar
44
Accelerator
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Brake
48
Operator Interface

FIG. 2

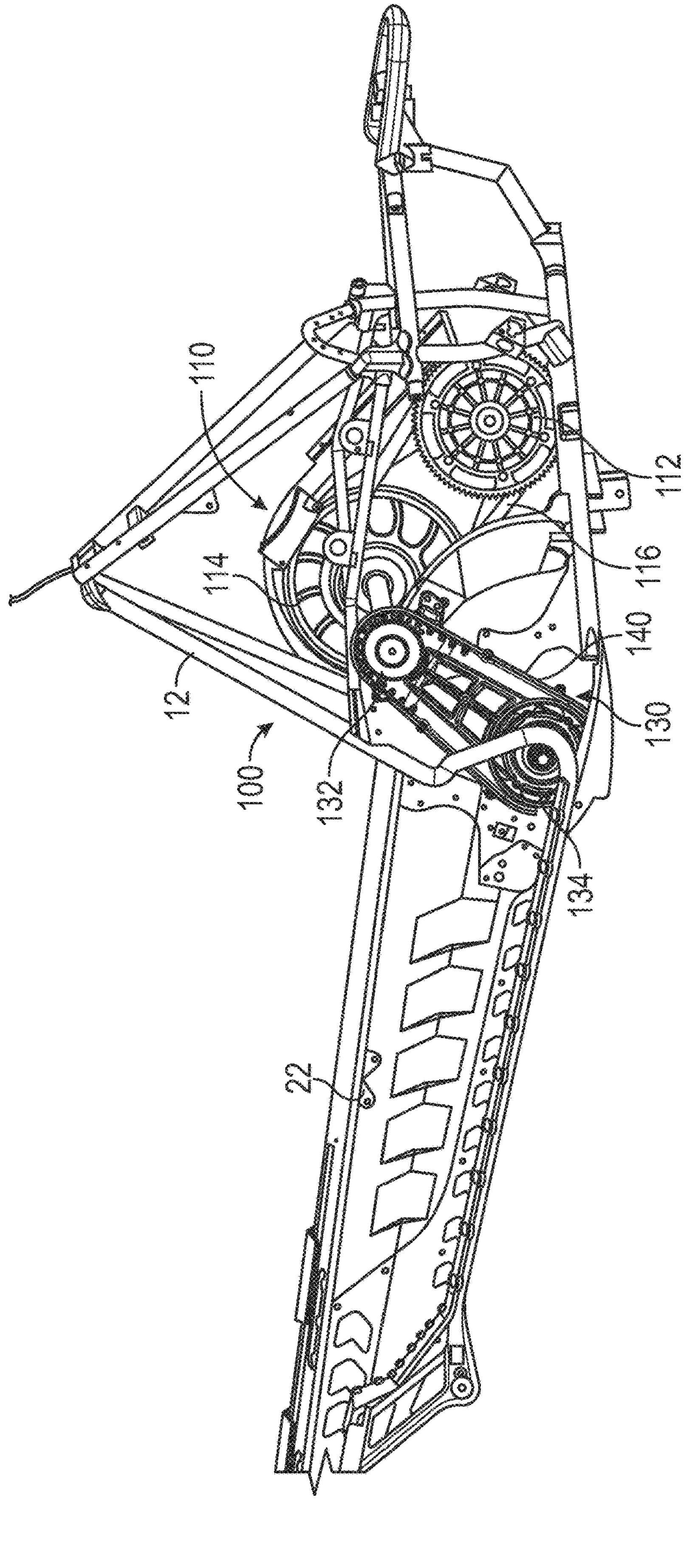


FIG. 3

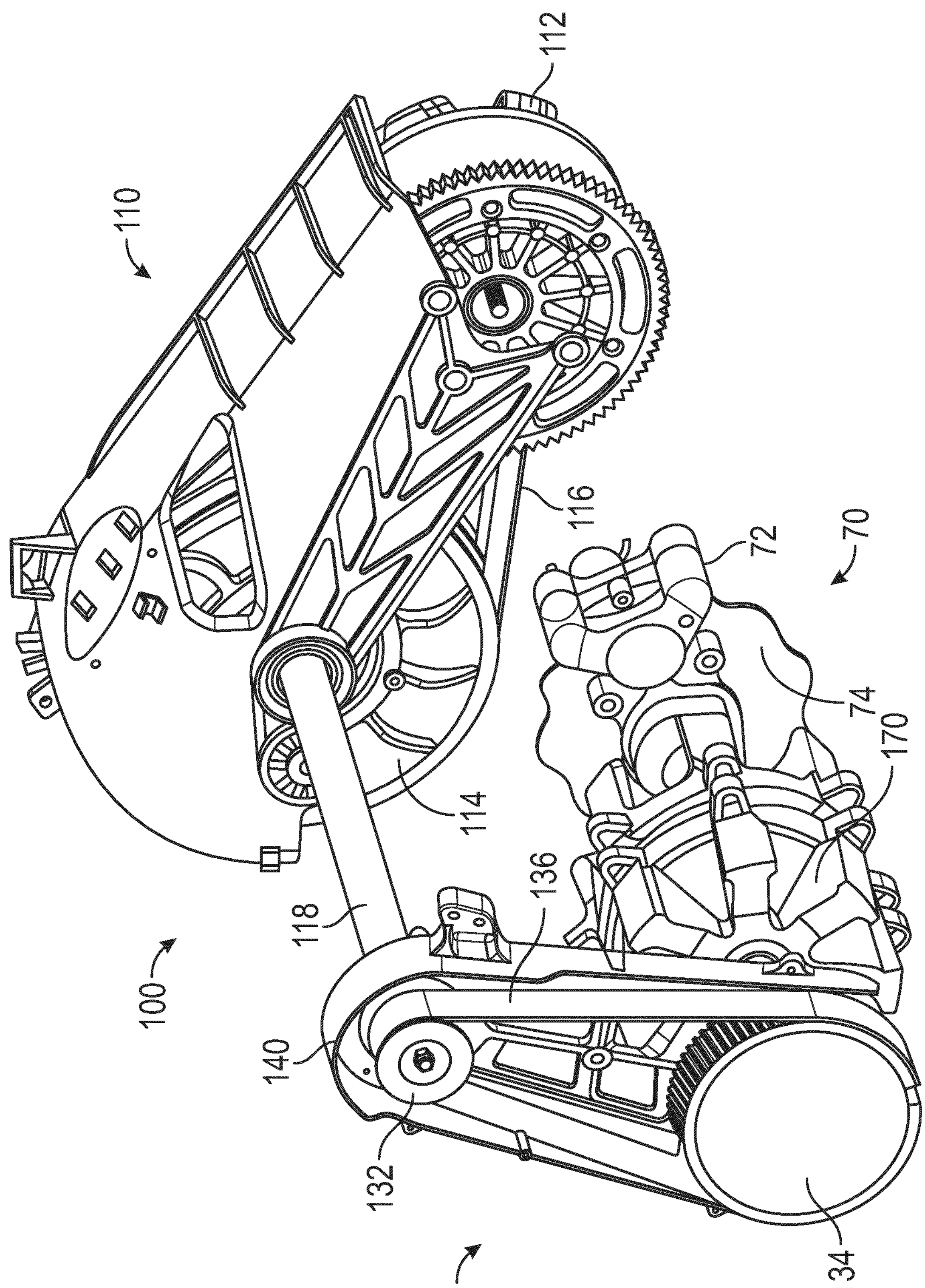


FIG. 4

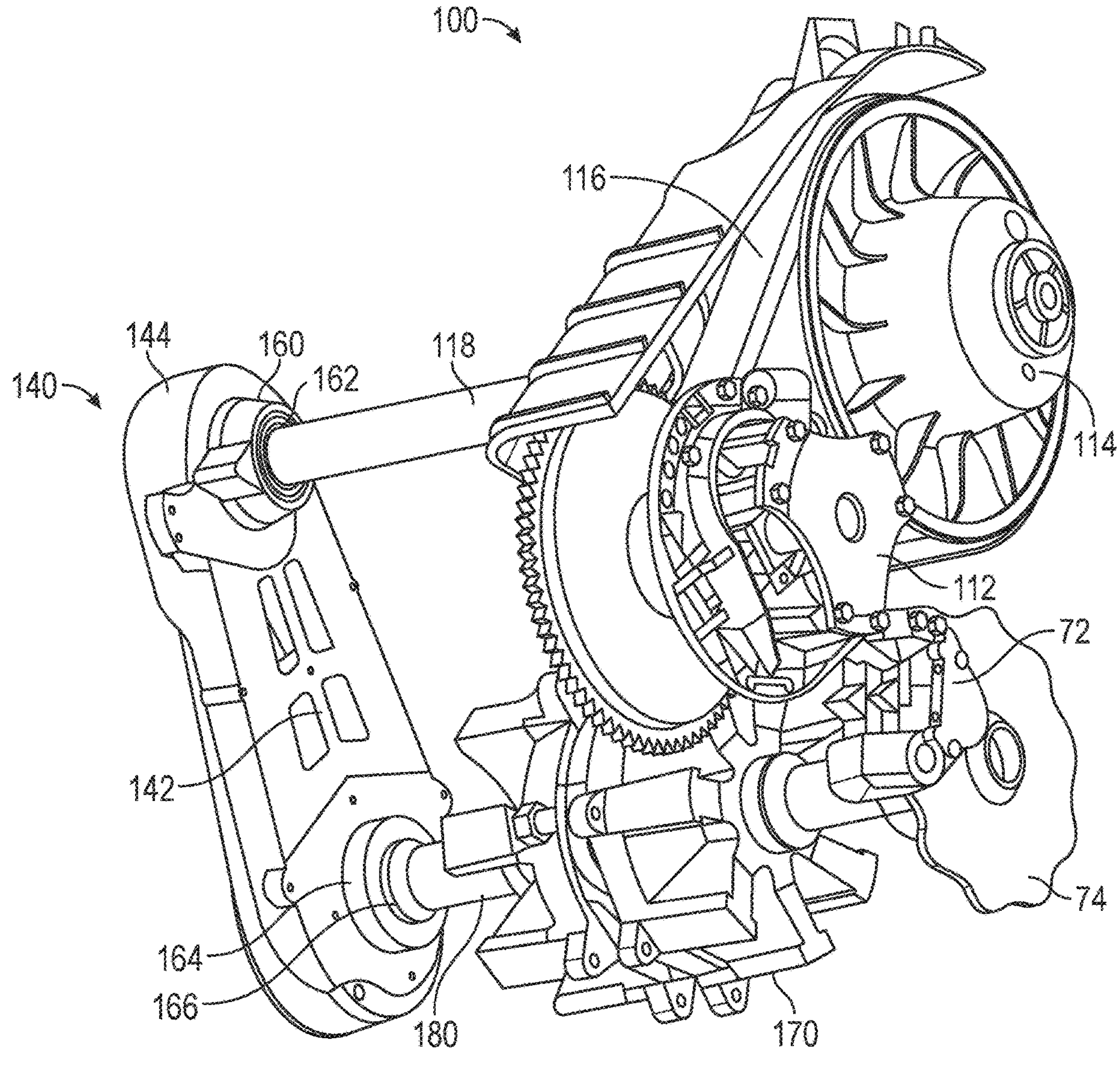


FIG. 5

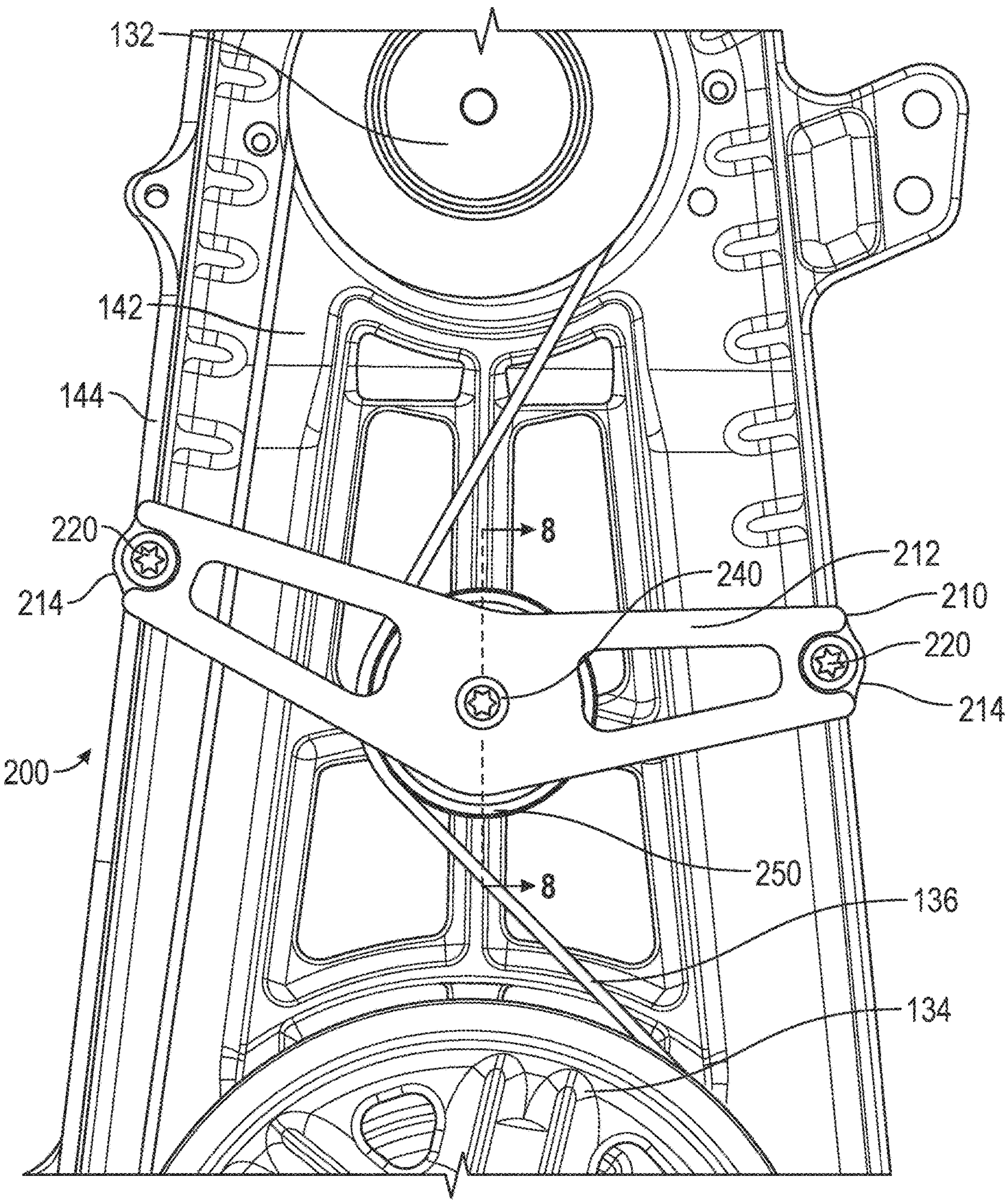


FIG. 6

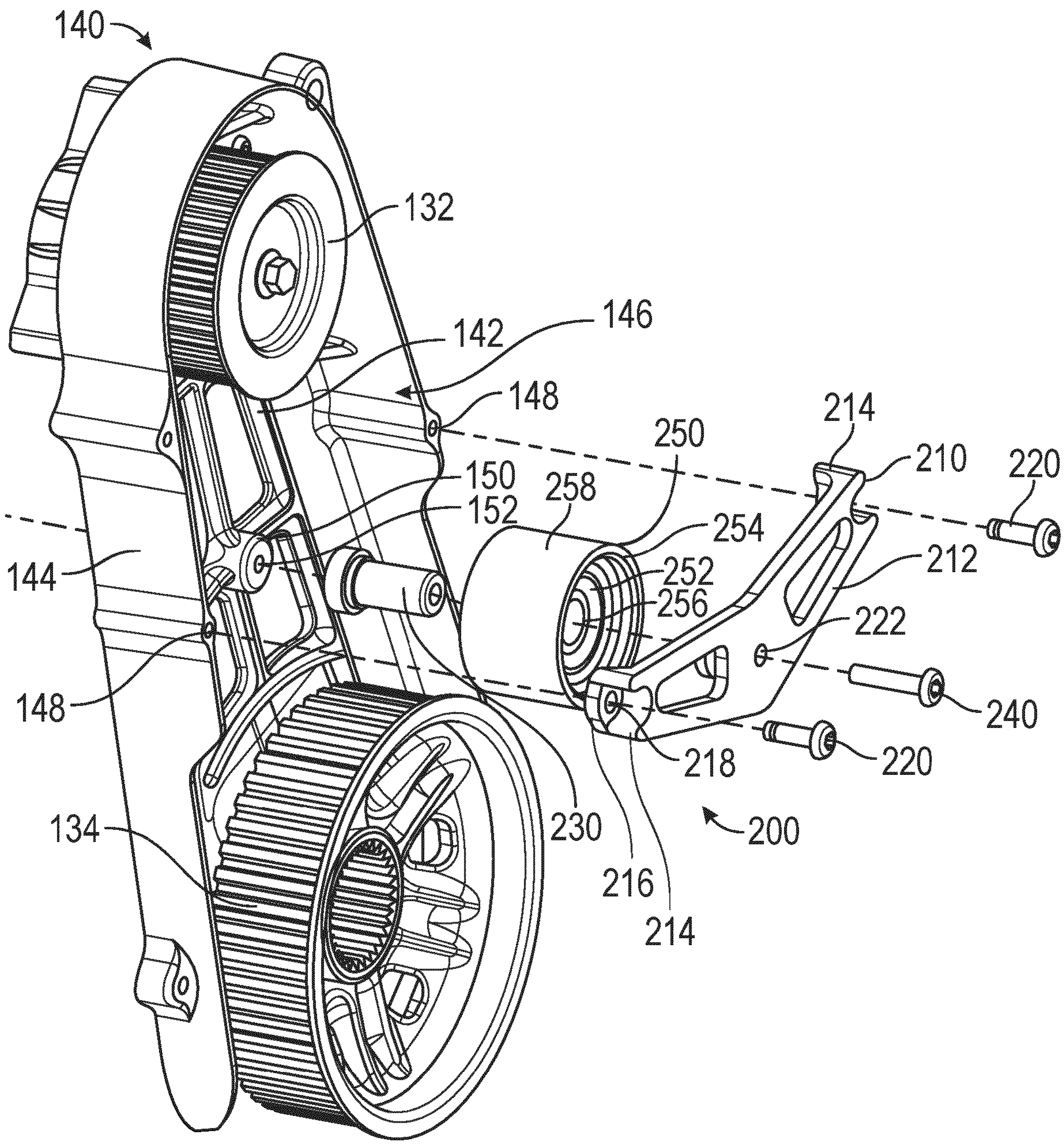
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FIG. 7

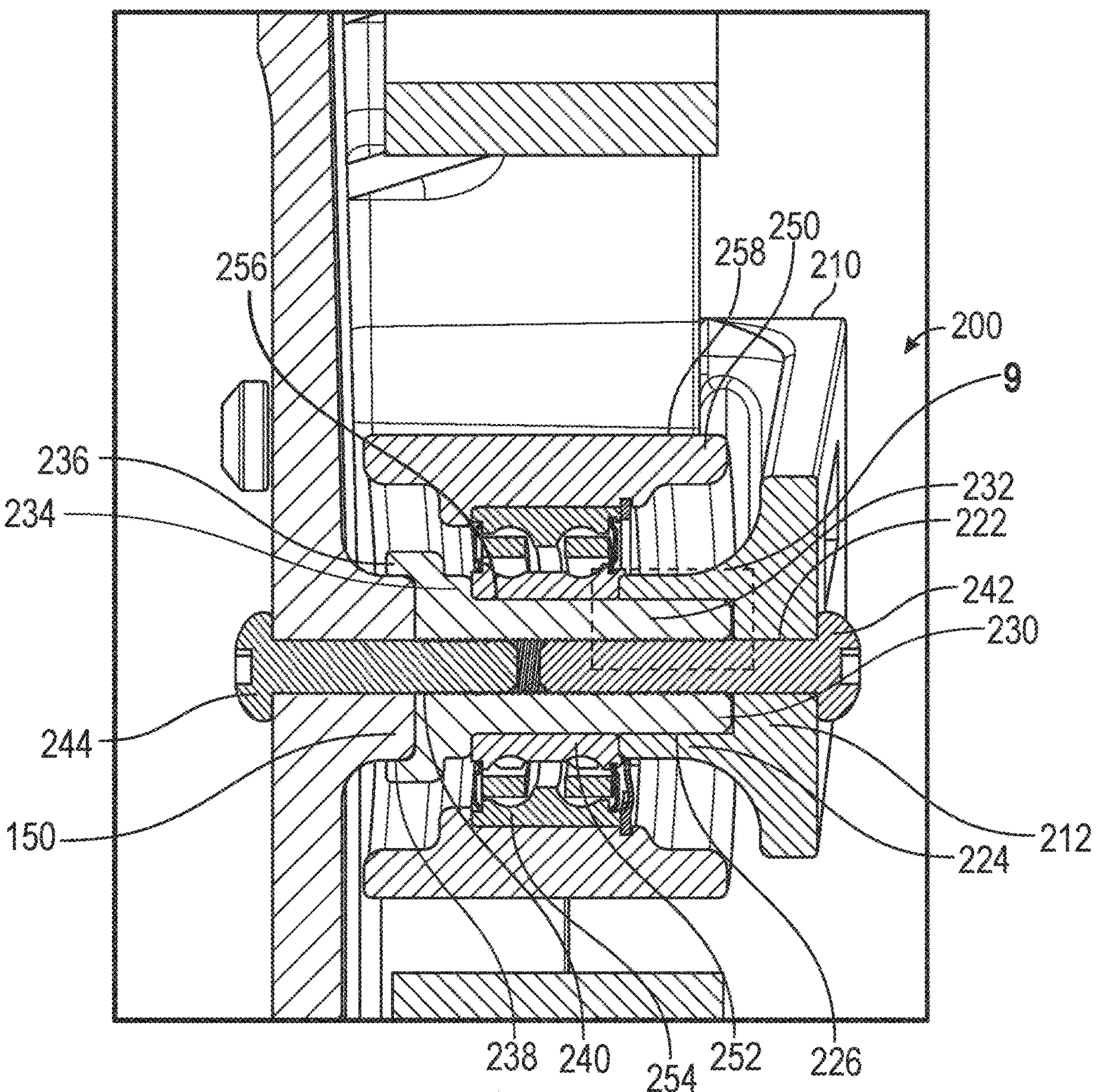
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FIG. 8

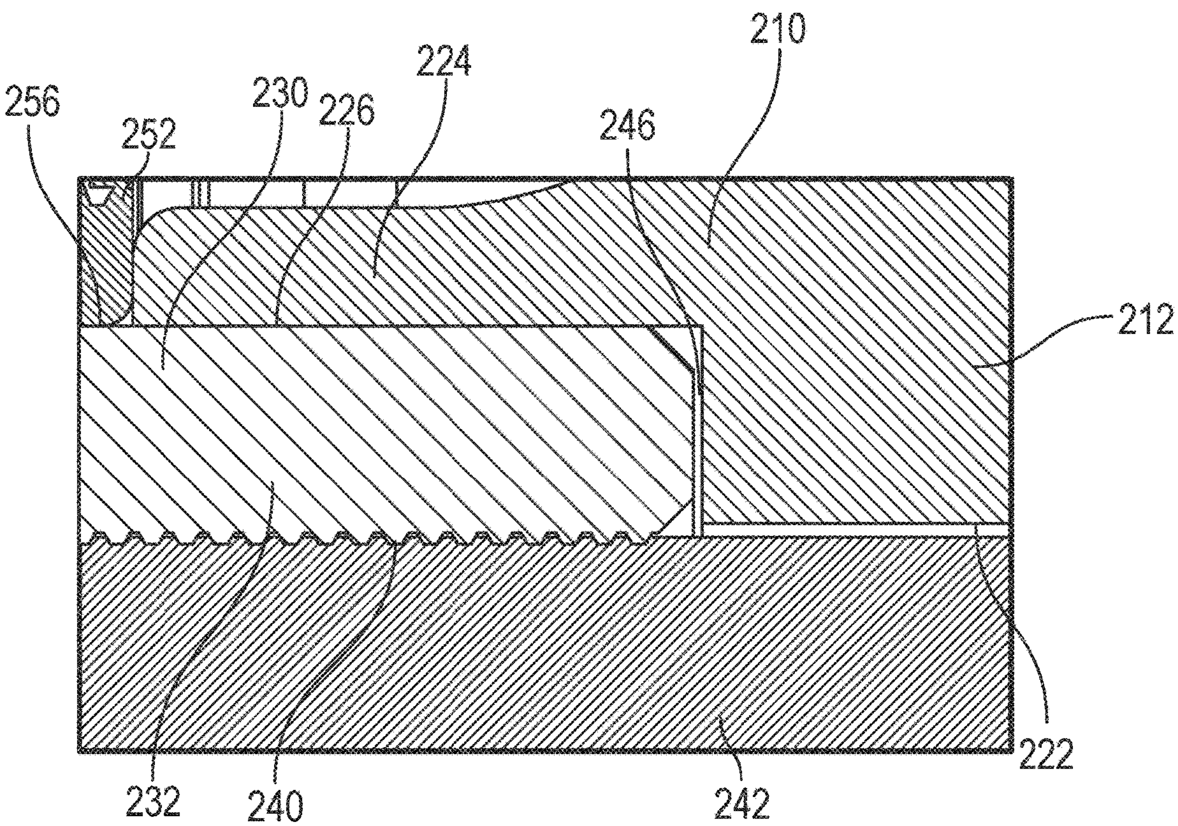


FIG. 9

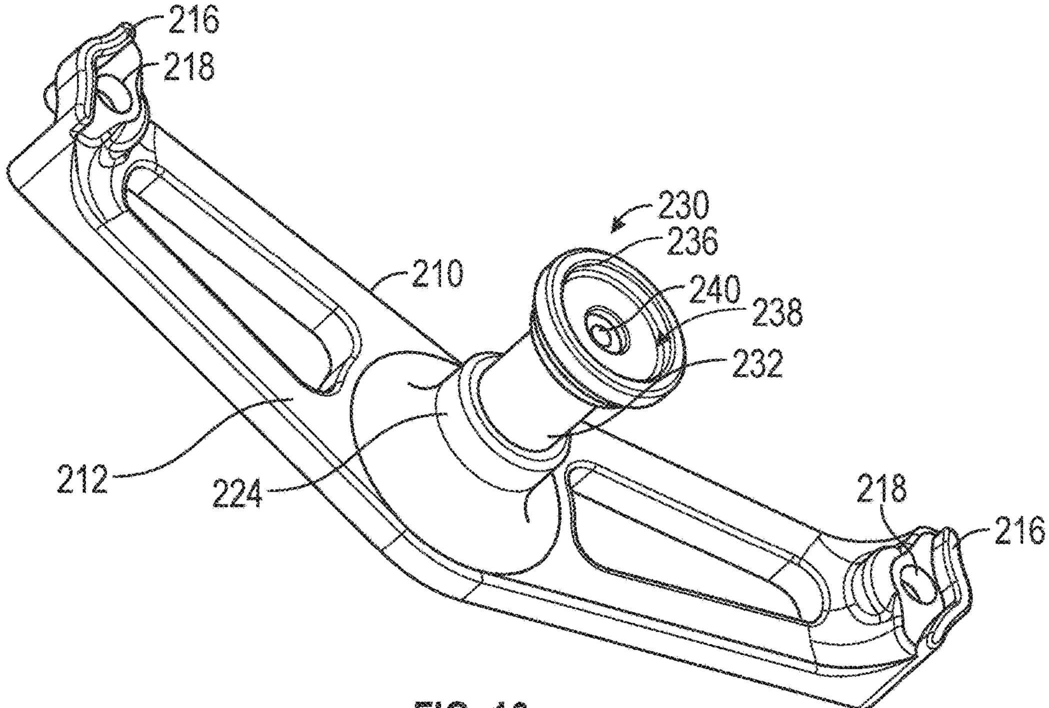
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FIG. 10

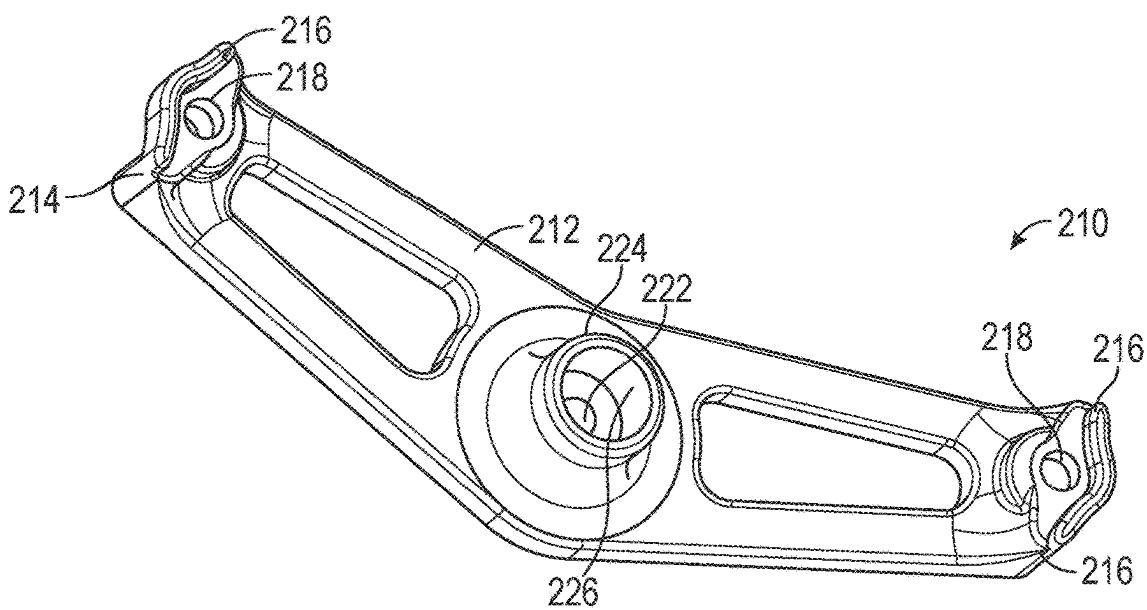
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FIG. 11

# BELT IDLER ASSEMBLY FOR SNOWMOBILE

## BACKGROUND

**[0001]** The present application relates to a drive system of a vehicle. More specifically, the present application relates to a belt drive system of a snowmobile.

## SUMMARY

**[0002]** One embodiment relates to a belt idler assembly for changing a path length of a drive belt of a belt assembly of a snowmobile. The belt idler assembly includes an idler bracket configured to couple to a belt housing of the belt assembly, a plurality of fasteners, a post configured to be positioned between the idler bracket and the belt housing, and a bearing coupled to the post. The idler bracket includes a first bracket portion, a plurality of second bracket portions extending from opposing ends of the first bracket portion, and a plurality of third bracket portions extending from each of the second bracket portions. Each of the second bracket portions define a first aperture configured to align with a second aperture of the belt housing. A first of the third bracket portions is configured to engage with a first interface of the housing and a second of the third bracket portions is configured to engage with a second interface of the housing. The plurality of fasteners are configured to extend through the first apertures and the second apertures to couple the idler bracket to the belt housing. The bearing defines a bearing surface configured to engage the drive belt.

**[0003]** Another embodiment relates to a vehicle. The vehicle includes a frame, a tractive assembly coupled to the frame, a prime mover configured to provide power to the tractive assembly to drive the tractive assembly, a belt assembly configured to transfer the power from the prime mover to the tractive assembly, and a belt idler. The tractive assembly is configured to propel the vehicle. The belt assembly includes a housing, a first sprocket rotatably coupled to the housing and configured to receive the power from the prime mover, a second sprocket rotatably coupled to the housing and configured to provide the power to the tractive assembly, and a belt coupled to the first sprocket and the second sprocket. The belt is configured to transfer the power between the first sprocket and the second sprocket. The belt idler assembly includes an idler bracket coupled to the housing, a post positioned between the housing and the idler bracket, and a bearing coupled to the post and positioned between the first sprocket and the second sprocket. The belt wraps around at least a portion of the bearing such that a path length of the belt is greater than a direct path length of the belt when the belt extends directly between the first sprocket and the second sprocket.

**[0004]** Still another embodiment relates to a transmission assembly for transferring power between a prime mover and a tractive assembly of a snowmobile. The transmission assembly includes a belt assembly configured to transfer the power from the prime mover to the tractive assembly and a belt idler assembly. The belt assembly includes a housing comprising a first housing portion and a second housing portion extending from an edge of the first housing portion, a first sprocket rotatably coupled to the housing, a second sprocket rotatably coupled to the housing, and a belt coupled to the first sprocket and the second sprocket. The first sprocket and the second sprocket are positioned within the housing cavity. The belt is configured to transfer the power between the first sprocket and the second sprocket. The belt idler assembly includes an idler bracket coupled to (i) a first portion of the second housing portion on a first side of the housing cavity and (ii) a second portion of the second housing portion on a second opposing side of the housing cavity, a post positioned between the housing and the idler bracket, and a bearing coupled to the post. The belt wraps around at least a portion of the bearing such that a path length of the belt is greater than a direct path length of the belt when the belt extends directly between the first sprocket and the second sprocket.

**[0005]** 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.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0006]** FIG. **1** is a side view of a vehicle, according to an exemplary embodiment.

**[0007]** FIG. **2** is a schematic block diagram of the vehicle of FIG. **1**, according to an exemplary embodiment.

**[0008]** FIG. **3** is a side view of a transmission assembly of the vehicle of FIG. **1**, according to an exemplary embodiment.

**[0009]** FIG. **4** is a front perspective view of the transmission assembly of FIG. **3**, according to an exemplary embodiment.

**[0010]** FIG. **5** is a rear perspective view of the transmission assembly of FIG. **3**, according to an exemplary embodiment.

**[0011]** FIG. **6** is a side view of a portion of a belt assembly of the transmission assembly of FIG. **3**, according to an exemplary embodiment.

**[0012]** FIG. **7** is an exploded perspective view of the belt assembly of FIG. **6**, according to an exemplary embodiment.

**[0013]** FIG. **8** is a cross-section view of a portion of the belt assembly of FIG. **6**, according to an exemplary embodiment.

**[0014]** FIG. **9** is a detailed view of a portion of the belt assembly of FIG. **8**, according to an exemplary embodiment.

**[0015]** FIG. **10** is a perspective view of a portion of a belt idler assembly of the belt assembly of FIG. **6**, according to an exemplary embodiment.

**[0016]** FIG. **11** is a perspective view of a bracket of the belt idler assembly of FIG. **10**, according to an exemplary embodiment.

## DETAILED DESCRIPTION

**[0017]** 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.

**[0018]** According to an exemplary embodiment, a vehicle of the present disclosure includes a transmission configured to facilitate selectively changing a gear ratio of a belt assembly configured to transfer power between a tractive assembly of the vehicle and a prime mover of the vehicle configured to provide power to the tractive assembly to drive the tractive assembly. The belt assembly includes a belt housing including a first housing portion and a second housing portion extending from edges of the first housing portion, a first sprocket rotatably coupled to the belt housing and configured to receive the power from the prime mover, a second sprocket rotatably coupled to the belt housing and configured to provide the power to the tractive assembly, and a belt coupled to the first sprocket and the second sprocket and configured to transfer the power between the first sprocket and the second sprocket. The first housing portion and the second housing portion collectively define a housing cavity that receives the first sprocket, the second sprocket, and the belt. The transmission also includes a belt idler assembly coupled to the belt housing of the belt assembly and configured to allow for additional configurations of first sprockets, second sprockets, and belts to be installed in the belt assembly that result in different gear ratios of the belt assembly when transferring the power between the prime mover and the tractive assembly.

**[0019]** The belt idler assembly includes an idler bracket coupled to the housing of belt assembly, a post coupled between the belt bracket and the housing, and a bearing coupled to the post and configured to engage the belt. The idler bracket includes a first bracket portion extending across the housing cavity, second bracket portions extending from opposing ends of the first bracket portion and coupled to the second housing portion, and third bracket portions extending from each of the second bracket portions and engaging the second housing portion to prevent movement of the idler bracket relative to the belt housing. When the belt is at least partially wrapped around the bearing of the belt idler assembly, a path length of the belt through the belt assembly may be greater than a direct path length of the belt through the belt assembly if the belt were to extend directly between the first sprocket and the second sprocket. Due to the belt idler assembly, the belt assembly may accommodate belts of varying lengths, as the path length of the belts through the belt assembly may be changed by at least partially wrapping the belts around the bearing. By changing the path lengths of the belts through the belt assembly, the belts may remain engaged with the first sprocket and the second sprocket despite the belts having varying lengths. Additionally, due to the belt idler assembly, the belt assembly may include first sprockets and/or second sprockets of varying sizes, as the changing the path length of the belts by at least partially wrapping the belts around the bearing may allow for the belts to remain engaged with the first sprockets and/or the second sprockets despites the first sprockets and/or the second sprockets having varying sizes. As a result, the belt idler assembly may allow for combinations of the first sprocket, the second sprocket and the belt to be included in the belt assembly that typically require distances other than a first distance between the first sprocket and the second sprocket defined by the belt housing. Additionally, when the belt is at least partially wrapped around the bearing of the belt idler assembly, engagement lengths between the belt and the first sprocket and/or the second sprocket may be increased compared to if the belt were to extend directly between the first sprocket and the second sprocket, decreasing loads on elements of the first sprocket and/or the second sprocket and elements of the belt configured to transfer loads between the first sprocket and the belt and/or the second socket and the belt.

Overall Vehicle

**[0020]** 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 **80**; and a vehicle control system, shown as vehicle controller **90**, coupled to the operator controls **40**, the driveline **50**, the suspension system **60**, the braking system **70**, and the sensors **80**. In some embodiments, the vehicle **10** includes more or fewer components. As shown in FIG. **3**, the body **20** include a tunnel assembly, shown as tunnel **22**, configured to receive at least a portion of the driveline **50** to prevent the portion of the driveline **50** from transferring material (e.g., snow, rocks, etc.) into the occupant seating area **30**.

**[0021]** According to an exemplary embodiment, the vehicle **10** is a tracked, winter-focused off-road machine or vehicle configured to be operated on a snowy and/or icy surface (e.g., operated in snow, on ice, etc.). In some embodiments, the tracked, winter-focused off-road machine or vehicle is a lightweight or recreational machine or vehicle such as a snowmobile, a snow bike, a snow scooter, a snow all-terrain vehicle ("ATV"), a snow utility task vehicle ("UTV"), a snow plow machine, and/or another type of lightweight or recreational machine configured to be operated on a snowy and/or icy surface. In other embodiments, the tracked, snow-focused off-road machine or vehicle is a large machine or vehicle such as a snowcat, a snow groomer, a snow plow machine, a tractor, and/or another type of large machine or vehicle configured to be operated on a snowy and/or icy surface. In still other embodiments, the vehicle **10** is a non-tracked, off-road machine or vehicle such as an ATV, a UTV, a dirt bike, and/or another type of non-tracked, off-road machine or vehicle.

**[0022]** According to the exemplary embodiment shown in FIG. **1**, the occupant seating area **30** includes a first seat, shown as operator seat **32**, configured to support an operator of the vehicle **10**. In some embodiments, the occupant seating area **30** includes a double seat configured to support the operator of the vehicle **10** and a passenger of the vehicle **10** behind the operator, or a triple seat configured to support the operator of the vehicle **10** and two passengers of the vehicle **10** behind the operator. In some embodiments, the occupant seating area **30** includes a second seat positioned rearward of or to the side of the operator seat **32**. The second seat may be configured to support passengers of the vehicle **10**. In some embodiments, in addition to or in place of the second seat, the vehicle **10** includes one or more rear accessories. Such rear accessories may include a ski rack, a bed, a cargo body (e.g., for a storage, etc.), and/or other rear accessories.

**[0023]** 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 handlebar, a steering column, a handlebar assembly, joystick(s), a steering wheel, etc.), shown as handlebar **42**, an accelerator interface (e.g., a pedal, a throttle, a throttle lever, etc.), shown as accelerator **44**, a braking interface (e.g., a brake pedal, a brake lever, a brake arm, etc.), shown as brake interface **46**, and one or more additional interfaces (e.g., a light control interface, an operational mode interface, etc.), shown as operator interfaces **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, an 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.

**[0024]** 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., tracks, treads, axles, differentials, etc.), shown as rear tractive assembly **56**, and a second tractive assembly (e.g., skis, runners, slides, 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.

**[0025]** According to the exemplary embodiment shown in FIG. **1**, the rear tractive assembly **56** includes a rear tractive element that is configured as a track and the front tractive assembly **58** includes front tractive elements configured as skis. For example, the rear tractive element may be configured as a track configured to engage a snowy surface in order to drive the vehicle **10** and the front skis may be configured to slide or glide along the snowy surface. In some embodiments, the rear tractive assembly **56** includes a plurality of the rear tractive elements configured as tracks. In some embodiments, the rear tractive assembly **56** is at least partially disposed within the tunnel **22**. By way of example, a top portion of the rear tractive assembly **56** may be disposed within the tunnel **22** to prevent the rear tractive assembly **56** from transferring snow into the occupant seating area **30**. In some embodiments, the front tractive assembly **58** includes front tractive elements that are configured as tracks. In other embodiments, the front tractive assembly **58** and the rear tractive assembly **56** include tractive elements that are configured as wheels.

**[0026]** According to an exemplary embodiment, the prime mover **52** is configured to provide power to drive the rear tractive assembly **56** (e.g., to provide rear-track drive, etc.). In some embodiments, 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-track drive, to provide all-track drive, etc.). In some embodiments, the driveline **50** includes a transmission device (e.g., a gearbox, a continuous variable transmission ("CVT"), the transmission assembly **100**, etc.) positioned between (a) the prime mover **52** and (b) the rear tractive assembly **56**. In a non-track arrangement, the rear tractive assembly **56** may include a drive shaft, a differential, and/or an axle. In such non-track arrangement, the rear tractive assembly **56** includes two axles or a tandem axle arrangement. According to an exemplary embodiment, the front tractive assembly **58** is steerable (e.g., using the handlebar **42**). In some embodiments, the rear tractive assembly **56** is additionally or alternatively steerable. 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).

**[0027]** In some embodiments, the driveline **50** includes a plurality of prime movers **52**. By way of example, the driveline **50** may include a first of the prime movers **52** that drives a first one of the rear tractive elements and a second of the prime movers **52** that drives a second one of the rear tractive elements when the rear tractive assembly **56** includes two rear tractive elements.

**[0028]** 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**.

**[0029]** 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 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 (e.g., embodiments with two rear tractive elements), the one or more rear braking components include two rear braking components, one positioned to facilitate braking each of the rear tractive elements. As shown in FIGS. **4** and **5**, the braking system **70** includes a brake assembly (e.g., a braking element, etc.), shown as brake **72**, coupled to the frame **12** and/or the body **20**, and a brake disk, shown as brake disk **74**, coupled to a rotating component of the driveline **50**. The brake **72** is configured to selectively engage the brake disk **74** to facilitate braking the rotating component of the driveline **50** (e.g., via friction, the transmission assembly **100**, etc.).

**[0030]** The sensors **80** 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 **80** may include an accelerometer, a gyroscope, a compass, a position sensor (e.g., a GPS sensor, etc.), suspension sensor(s), wheel/track 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 **80** 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 **10** vehicle, suspension travel of components of the suspension system **60**, and/or other vehicle telemetry data.

**[0031]** The vehicle controller **90** 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 controller **90** includes a processing circuit **92**, a memory **94**, and a communications interface **96**. The processing circuit **92** 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 **92** is configured to execute computer code stored in the memory **94** to facilitate the activities described herein. The memory **94** 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 **94** includes computer code modules (e.g., executable code, object code, source code, script code, machine code, etc.) configured for execution by the processing circuit **92**. In some embodiments, the vehicle controller **90** may represent a collection of processing devices. In such cases, the processing circuit **92** represents the collective processors of the devices, and the memory **94** represents the collective storage devices of the devices.

**[0032]** In one embodiment, the vehicle controller **90** is configured to selectively engage, selectively disengage, control, or otherwise communicate with components of the vehicle **10** (e.g., via the communications interface **96**, a controller area network ("CAN") bus, etc.). According to an exemplary embodiment, the vehicle controller **90** is coupled to (e.g., communicably coupled to) components of the operator controls **40** (e.g., the handlebar **42**, the accelerator **44**, the brake interface **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 **80**. By way of example, the vehicle controller **90** 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 **80**, and/or remote systems or devices (via the communications interface **96** as described in greater detail herein).

Transmission Assembly

**[0033]** As shown in FIGS. **3-5**, the driveline **50** includes a transmission (e.g., a drivetrain, a transmission system, a power transfer assembly, etc.), shown as transmission assembly **100**, coupled between the prime mover **52** and the rear tractive assembly **56**. According to an exemplary embodiment, the transmission assembly **100** is configured to transfer power (e.g., motive power, torque, etc.) between the prime mover **52** and the rear tractive assembly **56**. In some embodiments, the transmission assembly **100** is additionally or alternatively configured to transfer power between the prime mover **52** and the front tractive assembly **58** (e.g., in embodiments where the front tractive assembly **58** includes tracks or wheels). According to an exemplary embodiment, the transmission assembly **100** is configured to manipulate (e.g., reduce, increase, etc.) an input (e.g., a torque, speed, power, etc.) provided by the prime mover **52** to the front tractive assembly **58** and/or the rear tractive assembly **56** when the transmission assembly **100** transfers the power between (i) the prime mover **52** and (ii) the front tractive assembly **58** and/or the rear tractive assembly **56**.

**[0034]** As shown in FIGS. **3** and **4**, the transmission assembly **100** includes a first or transmission input assembly (e.g., a continuous variable transmission clutch, etc.), shown as clutch assembly **110**, coupled to the prime mover **52** and configured to receive the power provided by the prime mover **52**; a second or transmission output assembly (e.g., torque transfer system, etc.), shown as belt assembly **130**, coupled to the clutch assembly **110** and configured to receive power from the clutch assembly **110**; and a third or tractive output assembly (e.g., a drive cog, a drive gear, a drive wheel, a track sprocket, etc.), shown as drive sprocket **170**, configured to engage the rear tractive assembly **56** and provide power to the rear tractive assembly **56** to drive the rear tractive assembly **56**; and a shaft (e.g., a torque shaft, etc.), shown as drive shaft **180**, (a) coupled to the belt assembly **130** and configured to receive power from the belt assembly **130**, (b) coupled to the drive sprocket **170** and configured to provide power to the drive sprocket **170**, and (c) coupled to the brake disk **74** and configured to receive braking power from the brake **72** via the brake disk **74** to brake the driveline **50**. In some embodiments, the drive sprocket **170** and/or the belt assembly **130** are additionally or alternatively coupled to the front tractive assembly **58**. By way of example, the prime mover **52** may generate power for driving the rear tractive assembly **56** and provide the power to the clutch assembly **110**, the clutch assembly **110** may provide the power to the belt assembly **130**, the belt assembly **130** may provide the power to the drive shaft **180**, and the drive shaft **180** may provide the power to the drive sprocket **170**, which uses the power to drive the rear tractive assembly **56**. In other embodiments, the transmission assembly **100** includes a different configuration of components configured to transfer the power provided by the prime mover **52** to the front tractive assembly **58** and/or the rear tractive assembly **56**. By way of example, the transmission assembly **100** may not include the clutch assembly **110** and the prime mover **52** may directly provide the power to the belt assembly **130**.

**[0035]** As shown in FIGS. **4** and **5**, the clutch assembly **110** includes a primary clutch assembly (e.g., a first clutch wheel, etc.), shown as primary clutch **112**, coupled to the prime mover **52** and configure to be driven by the prime mover **52**, a secondary clutch assembly (e.g., a second clutch wheel, etc.), shown as secondary clutch **114**, a first belt (e.g., a first torque transfer belt, etc.), shown as clutch belt **116**, engaged with the primary clutch **112** and the secondary clutch **114** and configured to be driven by the rotation of the primary clutch **112** to rotate the secondary clutch **114**, and a first shaft (e.g., a power shaft, etc.), shown as jack shaft **118**, coupled to the secondary clutch **114** and configured to rotate with the secondary clutch **114**. As the prime mover **52** drives the primary clutch **112**, the power provided by the prime mover **52** is transferred through the clutch assembly **110** to the jack shaft **118** through the rotation of the primary clutch **112** and the secondary clutch **114**. In some embodiments, the clutch assembly **110** is configured as a continuous variable transmission clutch (e.g., a CVT system, etc.). By way of example, the primary clutch **112** and the secondary clutch **114** may each include a stationary sheave and moveable sheave. As a rotational speed of the primary clutch **112** and the secondary clutch **114** increase (e.g., based on a speed of the prime mover **52** increasing, etc.), the moveable sheaves of the primary clutch **112** and the secondary clutch **114** are actuated toward or away from the stationary sheave of the primary clutch **112** and the secondary clutch **114**. As the moveable sheaves are actuated toward or away from the stationary sheaves, the clutch belt **116** may move between different diameters of the primary clutch **112** and the secondary clutch **114** to change an effective gear ratio of the clutch assembly **110**. The clutch assembly **110** may allow for smooth and continuous delivery of the power provided by the prime mover **52** via the jack shaft **118** through the rotation of the jack shaft **118**.

**[0036]** As shown in FIG. **4**, the belt assembly **130** includes a first sprocket (e.g., first drive sprocket, etc.), shown as top drive sprocket **132**, coupled to the jack shaft **118** and configured to rotate with the jack shaft **118**, a second sprocket (e.g., a second drive sprocket, etc.), shown as bottom drive sprocket **134**, coupled to the drive shaft **180** and configured to rotate with the drive shaft **180**, and a second belt (e.g., belt system belt, etc.), shown as drive belt **136**, engaged with the top drive sprocket **132** and the bottom drive sprocket **134** and configured to be driven by the top drive sprocket **132** to drive the bottom drive sprocket **134**, and a housing (e.g., a belt bracket, a belt frame, etc.), shown as belt housing **140**, coupled to the frame **12** and/or the body **20** and configured to house the top drive sprocket **132**, the bottom drive sprocket **134**, and/or drive belt **136**. By way of example, as the top drive sprocket **132** is rotated by the jack shaft **118**, the power provided by the jack shaft **118** to the top drive sprocket **132** is transferred through the drive belt **136** to the bottom drive sprocket **134** through the drive belt **136**. By transferring the power from the top drive sprocket **132** to the bottom drive sprocket **134** via the drive belt **136**, the belt assembly **130** may offset the rotation associated with the power received from the clutch assembly **110** from a first axis extending along the jack shaft **118** (e.g., the first axis defined by the jack shaft **118**, the first axis extending along a length of the jack shaft **118**, etc.) to a second axis extending along the drive shaft **180** (e.g., the first axis defined by the drive shaft **180**, the first axis extending along a length of the drive shaft **180**, etc.). By offsetting the rotation from the first axis extending along the jack shaft **118** to the second axis extending along the drive shaft **180** the drive sprocket **170** may be positioned below the clutch assembly **110**, allowing for the transmission assembly **100** to have a smaller footprint.

**[0037]** As shown in FIGS. **5-7**, the belt housing **140** includes a base portion (e.g., a base, a base plate, a first portion, a first housing portion, etc.), shown as housing base portion **142**, and walls (e.g., wall plates, a second housing portion, a second portion, etc.), shown as housing walls **144** coupled to the housing base portion **142** and extending outward from edges of the housing base portion **142**. In some embodiments, the housing base portion **142** defines a first aperture (e.g., a jack shaft aperture, etc.) extending through the housing base portion **142** and configured to align with the jack shaft **118** to receive the jack shaft **118** and/or a second aperture (e.g., a drive shaft aperture, etc.) extending through the housing base portion **142** and configured to align with the drive shaft **180** to receive the drive shaft **180**. In some embodiments, the housing walls **144** extend perpendicularly from the edges of the housing base portion **142**. As shown in FIG. **7**, the housing base portion **142** and the housing walls **144** collectively define a cavity (e.g., an opening, a housing cavity, etc.), shown as housing opening **146**, configured to receive the top drive sprocket **132**, the bottom drive sprocket **134**, and the drive belt **136**. When the top drive sprocket **132**, the bottom drive sprocket **134**, and the drive belt **136** are positioned within the housing opening **146**, the housing base portion **142** and/or the housing walls **144** may protect the top drive sprocket **132**, the bottom drive sprocket **134**, and/or the drive belt **136** (e.g., protect from contaminants, protect from projectiles, etc.). According to an exemplary embodiment, the housing base portion **142** and the housing walls **144** are integrally formed (e.g., form a single weldment, welded, etc.). In other embodiments, the housing base portion **142** and the housing walls **144** are otherwise coupled together (e.g., fastened, etc.).

**[0038]** The configuration of the belt assembly **130** may depend on positions of the drive sprocket **170** and the front tractive assembly **58** and/or the rear tractive assembly **56**. By way of example, the top drive sprocket **132** may be driven by the jack shaft **118** to rotate about the first axis extending along the length of the jack shaft **118** and the drive belt **136** may drive the bottom drive sprocket **134** to rotate about the second axis extending along the length of the drive shaft **180**. In other embodiments, the belt assembly **130** includes other systems configured to transfer the power from the top drive sprocket **132** to the bottom drive sprocket **134** (e.g., other than using the drive belt **136**, etc.). By way of example, the belt assembly **130** may include a chain engaged with the top drive sprocket **132** and the bottom drive sprocket **134** and configured to be driven by the rotation of the top drive sprocket **132** to rotate the bottom drive sprocket **134** to transfer the power from the top drive sprocket **132** to the bottom drive sprocket **134**. By way of another example, the belt assembly **130** may include at least one gear engaged with the top drive sprocket **132** and the bottom drive sprocket **134** and configured to be driven by the rotation of the top drive sprocket **132** to rotate the bottom drive sprocket **134** to transfer the power from the top drive sprocket **132** to the bottom drive sprocket **134**.

**[0039]** In some embodiments, the belt assembly **130** is configured as a spline engaged belt assembly where the top drive sprocket **132** defines a first spline pattern (e.g., a first tooth pattern, a first serration pattern, etc.) around a first outer diameter of the top drive sprocket **132**, the bottom drive sprocket **134** defines a second spline pattern (e.g., a second tooth pattern, a second serration pattern, etc.) around a second outer diameter of the bottom drive sprocket **134**, and the drive belt **136** defines a belt spline pattern (e.g., a belt tooth pattern, a belt serration pattern, etc.) configured to engage the first spline pattern of the top drive sprocket **132** and the second spline pattern of the bottom drive sprocket **134** to transfer the power from the top drive sprocket **132** to the bottom drive sprocket **134**. The belt spline pattern of the drive belt **136** may be positioned on a first side of the drive belt **136** configured to engage the first spline pattern of the top drive sprocket **132** and the second spline pattern of the bottom drive sprocket **134**.

**[0040]** In some embodiments, a configuration of the top drive sprocket **132**, the bottom drive sprocket **134**, and/or the drive belt **136** varies based on a desired gear ratio of the belt assembly **130**. By way of example, the desired gear ratio of the belt assembly **130** may vary depending on a desired use of the vehicle **10** (e.g., a 1:3 ratio may be provided when the first spline pattern of the top drive sprocket **132** includes ten teeth (e.g., ten teeth, etc.) and the second spline pattern of bottom drive sprocket **134** includes thirty teeth, when the top drive sprocket **132** has a first diameter and the bottom drive sprocket **34** has a second diameter that is three times the first diameter, etc.). A length of the drive belt **136** may be determined based on the first spline pattern of the top drive sprocket **132**, the second spline pattern of the bottom drive sprocket **134**, and an engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** (e.g., a distance between a first central axis of the top drive sprocket **132** and a second central axis of the bottom drive sprocket **134**, a distance between the first axis of the jack shaft **118** and the second axis of the drive shaft **180**, distance, etc.). The engagement distance is a distance between the top drive sprocket **132** and the bottom drive sprocket **134** that allows for the drive belt **136** to engage the top drive sprocket **132** and the bottom drive sprocket **134** to transfer power between the top drive sprocket **132** and the bottom drive sprocket **134** when the drive belt **136** extends directly between the bottom drive sprocket **134** and top drive sprocket **132**. The engagement distance may depend on a length of the drive belt **136**, a first size (e.g., a first diameter, etc.) of the top drive sprocket **132**, a second size (e.g., a second diameter, etc.) of the bottom drive sprocket **134**, and/or a path length of the drive belt **136** through the belt assembly **130** (e.g., a length of a path of the drive belt **136** around the top drive sprocket **132** and the bottom drive sprocket **134**, etc.). Different gear ratios of the belt assembly **130** may be desired by the operator of the vehicle **10** in order to adjust the performance of the vehicle **10** (e.g., increase a torque provided by the prime mover **52** to the rear tractive assembly **56**, increase a speed of the rear tractive assembly **56** as the rear tractive assembly **56** is driven by the prime mover **52**, etc.).

**[0041]** According to an exemplary embodiment, the belt assembly **130** is modified in order to change the gear ratio of the belt assembly **130**. By being able to modify the belt assembly **130** to change the gear ratio of the belt assembly **130**, a transmission assembly gear ratio of the transmission assembly **100** may be modified without replacing the belt assembly **130**. By way of example, in order to change the gear ratio of the belt assembly **130** from a first gear ratio of 1:3 where a first of the top drive sprockets **132** includes ten teeth, a second of the bottom drive sprockets **134** includes thirty teeth, and a first of the drive belts **136** engages the top drive sprocket **132** and the bottom drive sprocket **134** to a second gear ratio of 2:3, the first of the top drive sprockets **132** may be exchanged for a second of the top drive sprockets **132** that includes twenty teeth and the first of the drive belts **136** may be exchanged for a second of the drive belts **136** due to the change of the first spline pattern from the first of the top drive sprockets **132** to the second of the top drive sprockets **132**. As another example, in order to change the gear ratio of the belt assembly **130** from the first gear ratio of 1:3 to a third gear ratio of 1:4, the first of the bottom drive sprockets **134** may be exchanged for a second of the bottom drive sprockets **134** that includes forty teeth and the first of the drive belts **136** may be exchanged for a third of the drive belts **136** due to the change of the second spline pattern from the first of the bottom drive sprockets **134** to the second of the bottom drive sprockets **134**.

**[0042]** In some embodiments, the belt assembly **130** is configured such that the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** may be adjusted (e.g., modified, changed, etc.). As a result, a tension of the drive belt **136** may be adjusted (e.g., the tension of the drive belt **136** may be increased or decreased, etc.) and/or different combinations of the top drive sprocket **132**, bottom drive sprocket **134**, and/or the drive belt **136** may be used without changing the belt housing **140** of the belt assembly **130**. By way of example, if a first combination of a first of the top drive sprockets **132**, a first of the bottom drive sprockets **134**, and a first of the drive belts **136** may require a first engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** to properly engage the first of the top drive sprockets **132** and the first of the bottom drive sprockets **134** and a second combination of a second of the top drive sprockets **132**, a second of the bottom drive sprockets **134**, and a second of the drive belts **136** may require a second engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** to properly engage the second of the top drive sprockets **132** and the second of the bottom drive sprockets **134**, the belt assembly **130** may be adjusted so that the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** is the first engagement distance when the belt assembly **130** includes the first combination and the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** is the second engagement distance when the belt assembly **130** includes the second combination.

**[0043]** As shown in FIG. **5**, the belt assembly **130** includes a first bearing retainer (e.g., first eccentric bearing retainer, jack shaft bearing retainer, etc.), shown as jack shaft adjustable bearing retainer **160**, configured to change the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134**. The jack shaft adjustable bearing retainer **160** is coupled to the belt housing **140** and configured to receive a first bearing (e.g., a first bushing, etc.), shown as jack shaft bearing **162**, coupled to the jack shaft **118**. The jack shaft bearing **162** is configured to rotatably support a portion of the jack shaft **118** positioned near the top drive sprocket **132** relative to the belt housing **140** via the jack shaft adjustable bearing retainer **160**. The jack shaft adjustable bearing retainer **160** is configured to adjust a position of the jack shaft bearing **162** relative to the belt housing **140** in order to adjust a position of the jack shaft **118** relative to the belt housing **140**, and thereby the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134**. By way of example, a first adjustment portion of the jack shaft adjustable bearing retainer **160** may be configured to rotate about a first central adjustment axis of the jack shaft adjustable bearing retainer **160** and the jack shaft bearing **162** may not be centered on the first central adjustment axis of the jack shaft adjustable bearing retainer **160** (e.g., a first rotational axis may be offset from the first bearing axis of the jack shaft adjustable bearing retainer **160**, etc.). As a result, as the first adjustment portion of the jack shaft adjustable bearing retainer **160** is rotated about the first central adjustment axis of the jack shaft adjustable bearing retainer **160**, a first bearing axis of the jack shaft bearing **162** is rotated around the first central adjustment axis of the jack shaft adjustable bearing retainer **160**, changing the position of the top drive sprocket **132** relative to the belt housing **140**, and thereby changing the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134**.

**[0044]** As shown in FIG. **5**, the belt assembly **130** includes a second bearing retainer (e.g., second eccentric bearing retainer, drive shaft bearing retainer, etc.), shown as drive shaft adjustable bearing retainer **164**, configured to change the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134**. The drive shaft adjustable bearing retainer **164** is coupled to the belt housing **140** and configured to receive a second bearing (e.g., a second bushing, etc.), shown as drive shaft bearing **166**, coupled to the drive shaft **180**. The drive shaft bearing **166** is configured to rotatably support a portion of the drive shaft **180** positioned near the bottom drive sprocket **134** relative to the belt housing **140** via the drive shaft adjustable bearing retainer **164**. The drive shaft adjustable bearing retainer **164** is configured to adjust a position of the drive shaft bearing **166** relative to the belt housing **140** in order to adjust a position of the drive shaft **180** relative to the belt housing **140**, and thereby the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134**. By way of example, a second adjustment portion of the drive shaft adjustable bearing retainer **164** may be configured to rotate about a second central adjustment axis of the drive shaft adjustable bearing retainer **164** and the drive shaft bearing **166** may not be centered on the second central adjustment axis of the drive shaft adjustable bearing retainer **164** (e.g., a second bearing axis of drive shaft bearing **166** may be offset from the second central adjustment axis of the drive shaft adjustable bearing retainer **164**, etc.). As a result, as the second adjustment portion of the drive shaft adjustable bearing retainer **164** is rotated about the second central adjustment axis of drive shaft adjustable bearing retainer **164**, a second bearing axis of the drive shaft bearing **166** is rotated around the second central adjustment axis of the drive shaft adjustable bearing retainer **164**, changing the position of the top drive sprocket **132** relative to the belt housing **140**, and thereby changing the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134**.

**[0045]** However, the belt assembly **130** may be limited in adjusting the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** based on the jack shaft bearing **162** and the drive shaft bearing **166**. By way of example, the belt assembly **130** may be limited in adjusting the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** between (a) a maximum engagement distance when the jack shaft adjustable bearing retainer **160** and the drive shaft adjustable bearing retainer **164** are in a first configuration that positions the jack shaft bearing **162** in a top position relative to the jack shaft adjustable bearing retainer **160** and the drive shaft bearing **166** in a bottom position relative to the drive shaft adjustable bearing retainer **164** and (b) a minimum engagement distance when the jack shaft adjustable bearing retainer **160** and the drive shaft adjustable bearing retainer **164** are in a second configuration that positions the jack shaft bearing **162** in a bottom position relative to the jack shaft adjustable bearing retainer **160** and the drive shaft bearing **166** in a top position relative to the drive shaft adjustable bearing retainer **164**. The limits of the belt assembly **130** related to adjusting the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** may limit the combinations of the top drive sprocket **132**, the bottom drive sprocket **134**, and the drive belt **136** that may be used in the belt assembly **130** to change the gear ratio of the belt assembly **130**. By way of example, if a combination of the top drive sprocket **132**, the bottom drive sprocket **134**, and the drive belt **136** require an engagement distance that is greater than the maximum engagement distance of the belt assembly **130**, the combination of the top drive sprocket **132**, the bottom drive sprocket **134**, and the drive belt **136** may not achieve an appropriate amount of engagement between the drive belt **136** and the top drive sprocket **132** and/or the bottom drive sprocket **134** when the drive belt **136** extends directly between the top drive sprocket **132** and the bottom drive sprocket **134**. As a result, an assembly that increases the possible combinations of the top drive sprocket **132**, the bottom drive sprocket **134**, and the drive belt **136** of the belt assembly **130** without requiring a change in the belt housing **140** may be desired, as described in greater detail herein.

Belt Idler Assembly

**[0046]** As shown in FIGS. **6-8**, the transmission assembly **100** includes an idler assembly (e.g., a tensioner assembly, a belt guide assembly, etc.), shown as belt idler assembly **200**, coupled to the belt housing **140** of the belt assembly **130** and configured to engage the drive belt **136** to change a path of the drive belt **136**. By way of example, the belt idler assembly **200** may engage the drive belt **136** in-between the top drive sprocket **132** and the bottom drive sprocket **134** to lengthen the path of the drive belt **136** between the top drive sprocket **132** and the bottom drive sprocket **134**. In some embodiment, the belt idler assembly **200** increases an engagement length (e.g., an amount of engagement, a length of a contact area, etc.) between (i) the drive belt **136** and (ii) the top drive sprocket **132** and/or the bottom drive sprocket **134**. By way of example, the belt idler assembly **200** may increase a wrap of the drive belt **136** around the top drive sprocket **132** and/or the bottom drive sprocket **134**. As a result, additional teeth of the belt spline pattern of the drive belt **136** may engage with additional teeth of the first spline pattern of the top drive sprocket **132** and/or the second spline pattern of the bottom drive sprocket **134**, increasing a distribution of the loads transferred between (i) the drive belt **136** and (ii) the top drive sprocket **132** and/or the bottom drive sprocket **134** to decrease loads applied on each of the teeth of the spline patterns and decreasing a possibility of the drive belt **136** slipping relative to the top drive sprocket **132** and/or the bottom drive sprocket **134**.

**[0047]** As shown in FIG. **7**, the belt housing **140** defines a plurality of first apertures, (e.g., coupling apertures, fastener apertures, etc.), shown as mounting apertures **148**, extending at least partially through the belt housing **140**. The mounting apertures **148** are configured to couple the belt idler assembly **200** to the belt housing **140** (e.g., via fasteners, etc.). According to the exemplary embodiment shown in FIG. **7**, the mounting apertures **148** are positioned on the housing walls **144** of the belt housing **140** and extend at least partially through a height of the housing walls **144**. By way of example, a first of the mounting apertures **148** may be positioned on a first portion of the housing walls **144** positioned on a first side of the belt housing **140** and a second of the mounting apertures **148** may be positioned on a second portion of the housing walls **144** positioned on a second opposing side of the belt housing **140**. In other embodiments, the mounting apertures **148** are positioned on the housing base portion **142** of the belt housing **140**. In still other embodiments, the belt housing **140** defines a single one of the mounting apertures **148**.

**[0048]** As shown in FIGS. **7** and **8**, the belt housing **140** includes a protrusion (e.g., an extension, a bump, a third portion, a third housing portion, etc.), shown as projection **150**, extending outward from the housing base portion **142**. The projection **150** extends outward from the housing base portion **142** in a same direction that the housing walls **144** extend from the edges of the housing base portion **142**. According to the exemplary embodiment shown in FIGS. **7** and **8**, the projection **150** has a circular cross-sectional shape as the projection **150** extends outward from the housing base portion **142**. In other embodiments, the projection **150** has a non-circular cross sectional shape (e.g., rectangular, square, hexagon, octagon, oval, etc.). As shown in FIG. **7**, the belt housing **140** defines a third aperture (e.g., a retainer aperture, etc.), shown as projection aperture **152**, extending through the projection **150** and the housing base portion **142** of the belt housing **140**. The projection aperture **152** may be centered on the projection **150** of the belt housing **140** (e.g., at a center of the projection **150**, etc.).

**[0049]** As shown in FIGS. **6-8**, the belt idler assembly **200** includes a bracket (e.g., a tensioner bracket, etc.), shown as idler bracket **210**, coupled to the belt housing **140**, a post (e.g., a tensioner post, etc.), shown as idler post **230**, positioned and/or coupled between the belt housing **140** and the idler bracket **210**, and a third bearing (e.g., a third bushing, etc.), shown as idler bearing **250**, coupled to the idler post **230** and configured to engage the drive belt **136** between the top drive sprocket **132** and the bottom drive sprocket **134**. The idler bracket **210** may extend across the housing opening **146** of the belt housing **140**. When the belt idler assembly **200** is coupled to the belt housing **140** and the idler bearing **250** engages the drive belt **136**, a path of the drive belt **136** between the top drive sprocket **132** and the bottom drive sprocket **134** is changed from a direct path (e.g., a straight path, etc.) from the top drive sprocket **132** to the bottom drive sprocket **134** that has a first path length to an indirect path (e.g., a skewed path, a non-straight path, etc.) from the top drive sprocket **132** to the bottom drive sprocket **134** that has a second path length that is greater than the first path length of the direct path. In some embodiments, the idler bearing **250** is positioned at least partially between the top drive sprocket **132** and the bottom drive sprocket **134**.

**[0050]** As shown in FIGS. **6-11**, the idler bracket **210** includes a base portion (e.g., a base, a base plate, a first bracket portion, etc.), shown as idler bracket base portion **212**, a plurality of extension portions (e.g., bracket legs, bracket arms, a second bracket portions, etc.), shown as bracket extension portions **214**, extending outward from opposing ends of the idler bracket base portion **212**, and a plurality of retainers (e.g., retaining portions, a third bracket portions, etc.), shown as bracket interlocks **216**. According to an exemplary embodiment, each of the bracket interlocks **216** extends from an end of one of the bracket extension portions **214** and is configured to interface with the housing walls **144** of the belt housing **140** to prevent lateral and/or vertical movement of the idler bracket **210** relative to the belt housing **140**. By way of example, a first of the bracket interlocks **216** may be configured to match a first profile of a first surface (e.g., a first inside surface, a first outside surface, etc.) of a first portion of the housing walls **144** positioned on a first side of the belt housing **140** and a second of the bracket interlocks **216** may be configured to match a second profile of a second surface (e.g., a second inside surface, a second inside surface, etc.) of a second portion of the housing walls **144** positioned on a second opposing side of the belt housing **140**. When the idler bracket **210** is coupled to the belt housing **140**, the first of the bracket interlock **216** engages the first surface of the first portion of the housing walls **144** to prevent movement of the idler bracket **210** relative to the belt housing **140** in at least one first direction and the second of the bracket interlock **216** engages the second surface of the second portion of the housing walls **144** to prevent movement of the idler bracket **210** relative to the belt housing **140** in at least one second opposing direction opposing the at least one first direction.

**[0051]** In some embodiments, the bracket extension portions **214** extends perpendicularly from the opposing ends of the idler bracket base portion **212** and/or the bracket interlocks **216** may extend perpendicularly from the ends of the bracket extension portions **214**. According to an exemplary embodiment, the idler bracket base portion **212**, the bracket extension portions **214**, and the bracket interlocks **216** are integrally formed. In other embodiments, the idler bracket base portion **212**, the bracket extension portions **214**, and/or the bracket interlocks **216** are otherwise coupled together. According to an exemplary embodiment, the bracket extension portions **214** and the bracket interlock portions **216** cooperatively define a recess or cavity (e.g., a keyed recess, a specifically shaped recess, etc.) that corresponds with the shape of the housing walls **144** surrounding the mounting apertures **148** (e.g., cylindrical, rectangular, a bracket interface, etc.). By way of example, the portions or interfaces of the housing walls **144** surrounding the mounting apertures **148** may protrude outwards/inwards from the housing walls **114**. The recesses of the idler bracket **210** may interface with the shape of or interfaces of the housing walls **144** surrounding the mounting apertures **148** to guide the positioning of the idler bracket **210** and secure it horizontally and/or vertically in place.

**[0052]** As shown in FIGS. **7**, **10**, and **11**, the idler bracket **210** defines a plurality of second apertures, shown as bracket apertures **218**, extending through the idler bracket **210**. The bracket apertures **218** are configured to align with the mounting apertures **148** of the belt housing **140** to selectively receive a plurality of fasteners (e.g., bolts, screws, rivets, nails, anchors, etc.), shown as bracket fasteners **220**, to removably couple the idler bracket **210** to the belt housing **140**. According to the exemplary embodiment shown in FIGS. **7**, **10**, and **11**, the bracket apertures **218** extend through the bracket extension portions **214** of the idler bracket **210** to align with mounting apertures **148** of the belt housing **140**. By way of example, the bracket fasteners **220**

may extend through the bracket extension portions **214** of the idler bracket **210** when removably coupling the idler bracket **210** to the belt housing **140**. In other embodiments, the bracket apertures **218** extend through the idler bracket base portion **212** and/or the bracket extension portions **214** of the idler bracket **210** to align with the mounting apertures **148** of the belt housing **140**.

**[0053]** As shown in FIGS. **7-9**, and **11**, the idler bracket **210** defines a fourth aperture, shown as axle aperture **222**, extending through the idler bracket **210** (e.g., at or proximate a center thereof). In some embodiments, the axle aperture **222** is configured to couple the idler post **230** to the idler bracket **210** (e.g., via fasteners, etc.). The axle aperture **222** extends through the idler bracket base portion **212** of the idler bracket **210**. According to an exemplary embodiment, the axle aperture **222** aligns with the projection aperture **152** of the belt housing **140** when the idler bracket **210** is coupled to the belt housing **140**. In other embodiments, the idler bracket **210** does not define the axle aperture **222** (e.g., when the idler bracket **210** is not coupled to the idler post **230**, etc.).

**[0054]** As shown in FIGS. **8-11**, the idler bracket **210** includes an extrusion portion (e.g., a raised portion, a protruded portion, etc.), shown as bracket extrusion **224**, extending from the idler bracket base portion **212** of the idler bracket **210**. The bracket extrusion **224** may extend from the idler bracket base portion **212** in the same direction that the bracket extension portions **214** extend from the idler bracket base portion **212** and/or the same direction that the bracket interlocks **216** extend from the bracket extension portions **214**. As shown in FIG. **11**, the bracket extrusion **224** aligns with the axle aperture **222**. As shown in FIGS. **8**, **9**, and **11**, the bracket extrusion **224** defines a first opening (e.g., post receiving opening, etc.), shown as bracket opening **226**, configured to receive a second portion of the idler post **230**. According to the exemplary embodiment shown in FIGS. **8**, **9**, and **11**, the bracket opening **226** has a circular cross-sectional shape. In other embodiments, the bracket opening **226** has a non-circular cross-sectional shape (e.g., rectangular, square, hexagon, octagon, oval, etc.). In various embodiments, the bracket opening **226** extends through the bracket extrusion **224** and/or at least partially through the idler bracket base portion **212**.

**[0055]** As shown in FIGS. **8-10**, the idler post **230** includes a post body (e.g., a cylindrical portion, etc.), shown as post portion **232**, positioned at a first end of the idler post **230** and configured to align with and be received by the bracket opening **226**, a shoulder body (e.g., a bearing shoulder, etc.), shown as post shoulder portion **234**, extending outward from an outside surface of the post portion **232** (e.g., having a larger diameter than the post portion **232**, etc.) and configured to support the idler bearing **250**, and a protrusion receiving body, shown as protrusion receiving portion **236**, extending from an opposing second end of the idler post **230**. According to an exemplary embodiment, the post portion **232** has a cross-sectional shape that corresponds with the cross-sectional shape of the bracket opening **226**. According to the exemplary embodiment shown in FIGS. **8-11**, the post portion **232**, the post shoulder portion **234**, and the protrusion receiving portion **236** have circular cross-sectional shapes. In other embodiments, the post portion **232**, the post shoulder portion **234**, and/or the protrusion receiving portion **236** have a non-circular cross-sectional shape (e.g., rectangular, square, hexagon, octagon, oval, etc.). According to an exemplary embodiment, the post portion **232**, the post shoulder portion **234**, and the protrusion receiving portion **236** are integrally formed. In other embodiments, the post portion **232**, the post shoulder portion **234**, and/or the protrusion receiving portion **236** are otherwise coupled together.

**[0056]** As shown in FIGS. **8** and **10**, the protrusion receiving portion **236** defines a second opening or recess, shown as projection opening **238**, configured to align with the projection **150** of the belt housing **140** to receive the projection **150**. According to an exemplary embodiment, the projection opening **238** has a cross-sectional shape that corresponds with the projection **150** of the belt housing **140**. According to the exemplary embodiment shown in FIGS. **8** and **10**, the projection opening **238** has a circular cross-sectional shape. In other embodiments, the projection opening **238** has a non-circular cross-sectional shape. When the projection opening **238** receives the projection **150** of the belt housing **140** and the post portion **232** is received by the bracket opening **226** of the idler bracket **210**, the idler post **230** may be contained between the belt housing **140** and the idler bracket **210** to couple the idler post **230** between the belt housing **140** and the idler bracket **210**. By way of example, when the belt idler assembly **200** is coupled to the belt housing **140**, the projection opening **238** of the idler post **230** may first receive the projection **150** of the belt housing **140**, then the bracket opening **226** of the idler bracket **210** may receive the post portion **232** of the idler post **230** when the idler bracket **210** is placed over the idler post **230** to contain (e.g., trap, couple, etc.) the idler post **230** between the belt housing **140** and the idler bracket **210**.

**[0057]** According to the exemplary embodiment shown in FIGS. **8-10**, the idler post **120** defines a fifth aperture, shown as post aperture **240**, extending through the post portion **232** and the post shoulder portion **234**. The post aperture **240** is configured to (i) align with the axle aperture **222** of the idler bracket **210** to selectively receive a first fastener (e.g., a bolt, a screw, a rivet, a nail, an anchor, etc.), shown as post fastener **242**, to removably couple the idler post **230** to the idler bracket **210** and (ii) align with the with the projection aperture **152** to selectively receive a second fastener, shown as housing fastener **244**, to removably couple the idler post **230** to the belt housing **140**. In other embodiments, the post aperture **240** does not receive the post fastener **242** and the idler post **230** is coupled to the idler bracket **210** by the post portion **232** being received by the bracket opening **226**. In other embodiments, the post aperture **240** does not receive the housing fastener **244** and the idler post **230** is coupled to the projection **150** via a compression fit.

**[0058]** In various embodiments, the post aperture **240** does not receive the housing fastener **244** and the idler post **230** is coupled to the belt housing **140** by the projection opening **238** receiving the projection **150**. When the idler post **230** is coupled to the belt housing **140** through the other means, the belt idler assembly **200** may be coupled to the belt housing **140** without accessing a backside of the belt housing **140** (e.g., a side of the belt housing **140** opposing the housing opening **146**, while only accessing a single side of the belt housing **140**, etc.). By way of example, when the idler post **230** is coupled to the belt housing **140** through the other means, the idler post **230** and the idler bearing **250** may be inserted into the housing opening **146** from a front side of the belt housing **140**, the post fastener **242** may be inserted through the axle aperture **222** into the post aperture **240** to couple the idler bracket **210** to the idler post **230** from the front side of the belt housing **140**, and the bracket fasteners **220** may be inserted through the bracket apertures **218** into the mounting apertures **148** to couple the idler bracket **210** to the belt housing **140** from the front side of the belt housing **140**. As result, the belt idler assembly **200** may be coupled to the belt housing **140** when another component of the vehicle **10** blocks access to the back side of the belt housing **140**. By way of example, the belt idler assembly **200** may be coupled to the belt housing **140** where the tunnel **22** of the body **20** blocks access to the back side of the belt housing **140**.

**[0059]** As shown in FIGS. **7-9**, the idler bearing **250** include an inner portion, shown as inner bearing portion **252**, coupled to the idler post **230**, and an outer portion, shown as outer bearing portion **254**, rotatably coupled to the inner bearing portion **252** and configured to engage the drive belt **136**. The outer bearing portion **254** may be configured to rotate relative to the inner bearing portion **252** with relatively little friction between the outer bearing portion **254** and the inner bearing portion **252**. By way of example, the idler bearing **250** may be configured as a ball style bearing with greased ball bearings positioned between the inner bearing portion **252** and the outer bearing portion **254** to reduce the friction between the inner bearing portion **252** and the outer bearing portion **254**.

**[0060]** As shown in FIGS. **7-9**, the inner bearing portion **252** defines a sixth aperture, shown as bearing aperture **256**, extending through the inner bearing portion **252**. The bearing aperture **256** is configured to align with the post portion **232** of the idler post **230** to receive the post portion **232** to couple the idler bearing **250** to the idler post **230**. When the post portion **232** is received by the bearing aperture **256**, the inner bearing portion **252** of the idler bearing **250** may be positioned between the post shoulder portion **234** of the idler post **230** and the bracket extrusion **224** of the idler bracket **210**. By way of example, when the post fastener **242** extends through the axle aperture **222** into the post aperture **240** to couple the idler bracket **210** to the idler post **230**, the post fastener **242** may engage threads defined by the post aperture **240** and draw the idler post **230** towards the idler bracket **210**. As the idler post **230** is drawn towards the idler bracket **210**, the inner bearing portion **252** may be clamped between the bracket extrusion **224** of the idler bracket **210** and the post shoulder portion **234** of the idler post **230** to prevent rotation of the inner bearing portion **252** relative to the idler post **230** or the idler bracket **210**. As another example, when the bracket fasteners **220** couple the idler bracket **210** to the belt housing **140**, the bracket extrusion **224** of the idler bracket **210** may provide a clamp force on the inner bearing portion **252** of the idler bearing **250** to clamp the inner bearing portion **252** between the post shoulder portion **234** of the idler post **230** and the bracket extrusion **224** of the idler bracket **210** to prevent rotation of the inner bearing portion **252** relative to the idler post **230** or the idler bracket **210**.

**[0061]** According to the exemplary embodiment shown in FIG. **9**, a length of the idler post **230** of the idler post **230** and/or a depth of the bracket opening **226** is configured such that a gap, shown as post gap **246**, is defined between an end of a portion of the post portion **232** received by the bracket opening **226** and a bottom surface (e.g., a bottom, etc.) of the bracket opening **226**. As a result of the post gap **246** being positioned between the end of the portion of the post portion **232** received by the bracket opening **226** and a bottom of the bracket opening **226**, the inner bearing portion **252** may be clamped between the bracket extrusion **224** of the idler bracket **210** and post shoulder portion **234** of the idler post **230** without the post portion **232** bottoming out on the bottom surface of the bracket opening **226**.

**[0062]** As shown in FIGS. **7** and **8**, the outer bearing portion **254** defines a surface, shown as bearing surface **258**, configured to engage (e.g., contact, etc.) the drive belt **136**. According to the exemplary embodiment shown in FIGS. **7** and **8**, the bearing surface **258** is a smooth surface that contacts the drive belt **136** and the outer bearing portion **254** is rotated by the drive belt **136** via friction between the outer bearing portion **254** and a smooth surface of the drive belt **136** on an opposing side of the drive belt **136** from the belt spline pattern of the drive belt **136**. In other embodiments, the bearing surface **258** defines a bearing spline pattern configured to engage the belt spline pattern of the drive belt **136** and the outer bearing portion **254** is rotated by engagement between the bearing spline pattern of the bearing surface **258** and the belt spline pattern of the drive belt **136**.

**[0063]** According to the exemplary embodiment shown in FIG. **6**, a path length of the drive belt **136** through the belt assembly **130** is greater than a direct path length of the drive belt **136** wrapped around the top drive sprocket **132** and the bottom drive sprocket **134** and extending directly between the top drive sprocket **132** and the bottom drive sprocket **134** when a first portion of the drive belt **136** extending from the top drive sprocket **132** to the bottom drive sprocket **134** in a direction of travel of the drive belt **136** is at least partially wrapped around the bearing surface **258** of the idler bearing **250** of the belt idler assembly **200**. By allowing for the path length of the drive belt **136** to be greater than the direct path length of the drive belt **136**, the belt idler assembly **200** may allow for configurations of the top drive sprocket **132**, the bottom drive sprocket **134**, and the drive belt **136** to be included in the belt assembly **130** that typically would not fit within the housing opening **146** of the belt housing **140**. By way of example, a combination of the top drive sprocket **132**, the bottom drive sprocket **134**, and the drive belt **136** may typically have an engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** when the drive belt **136** extends directly between the top drive sprocket **132** and the bottom drive sprocket **134** based on the length of the drive belt **136**. If the engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** is greater than the maximum distance available between the top drive sprocket **132** and the bottom drive sprocket **134** when the top drive sprocket **132** and the bottom drive sprocket **134** are positioned in the housing opening **146**, the combination may not fit into the belt assembly **130** when the drive belt **136** extends directly between the top drive sprocket **132** and the bottom drive sprocket **134**. However, when the drive belt **136** is wrapped at least partially around the idler bearing **250**, the top drive sprocket **132**, the bottom drive sprocket **134**, and the drive belt **136** may have a modified engagement distance between the top drive sprocket **132** and the bottom drive sprocket **134** that is less than the engagement distance due to the drive belt **136** being wrapped around the idler bearing **250**. When the modified engagement distance is between the maximum distance and the minimum distance between the top drive sprocket **132** and the bottom drive sprocket **134** of the belt assembly **130**, the combination of the top drive sprocket

132, the bottom drive sprocket **134**, and the drive belt **136** may fit in the housing opening **146** of the belt assembly **130** while allowing for engagement between the top drive sprocket **132**, the bottom drive sprocket **134**, and the drive belt **136**, and thus can be used with the belt assembly **130** to transfer the power through the belt assembly **130**. In other embodiments, the path length of the drive belt **136** through the belt assembly **130** is greater than the direct path length of the drive belt **136** wrapped around the top drive sprocket **132** and the bottom drive sprocket **134** and extending directly between the top drive sprocket **132** and the bottom drive sprocket **134** when a second portion of the drive belt **136** extending from the bottom drive sprocket **134** to the top drive sprocket **132** in the direction of travel of the drive belt **136** is at least partially wrapped around the bearing surface **258** of the idler bearing **250** of the belt idler assembly **200**.

**[0064]** Once the drive belt **136** has been wrapped around the top drive sprocket **132**, the bottom drive sprocket **134** and the bearing surface **258** of the idler bearing **250**, the operator may further adjust the jack shaft adjustable bearing retainer **160** and/or the drive shaft adjustable bearing retainer **164** to increase or decrease a tension in the drive belt **136**. By way of example, wrapping the drive belt **136** around the bearing surface **258** of the idler bearing **250** may provide macro adjustments to the path length of the drive belt **136** wrapped around the top drive sprocket **132** and the bottom drive sprocket **134** and adjusting the jack shaft adjustable bearing retainer **160** and/or the drive shaft adjustable bearing retainer **164** may provide micro adjustments to the path length of the drive belt **136**.

**[0065]** According to the exemplary embodiment shown in FIG. **6**, wrapping the drive belt **136** around the idler bearing **250** additionally increases a first engagement length between the first spline pattern of the top drive sprocket **132** and the belt spline pattern of the drive belt **136** and increase a second engagement length between the second spline pattern of the bottom drive sprocket **134** and the belt spine pattern of the drive belt **136**. By way of example, when the drive belt **136** is wrapped around the idler bearing **250**, the idler bearing **250** may pull the drive belt **136** in a direction towards a center of the top drive sprocket **132** and/or the bottom drive sprocket **134**. As a result, the drive belt **136** may be wrapped further around the top drive sprocket **132** and/or the bottom drive sprocket **134** than if the drive belt **136** extended directly between the bottom drive sprocket **134** and the top drive sprocket **132**. By increasing the first engagement length and/or the second engagement length, the belt idler assembly **200** may distribute the loads transferred along the first engagement length and/or the second engagement length to decrease loads applied on each of the teeth of the spline patterns and decreasing a possibility of the drive belt **136** slipping relative to the top drive sprocket **132** and/or the bottom drive sprocket **134**.

**[0066]** In some embodiments, the path length of the drive belt **136** wrapped around the idler bearing **250** is further changed by modifying an outer diameter of the bearing surface **258** of the idler bearing **250**. By way of example, the path length of the drive belt **136** may be increased by changing a first of the idler bearings **250** with the bearing surface **258** having a first outer diameter to a second of the idler bearings **250** with the bearing surface **258** having a second outer diameter that is greater than the first outer diameter. As another example, the path length of the drive belt **136** may be decreased by changing the second of the idler bearings **250** with the bearing surface **258** having the first outer diameter to a third of the idler bearings **250** with the bearing surface **258** having a third outer diameter that is less than the first outer diameter.

Retrofit Belt Idler Assembly

**[0067]** According to an exemplary embodiment, the belt idler assembly **200** is manufactured as a modular kit configured to provide a retrofit solution for increasing a number of gear ratios available to a belt assembly. In some embodiments, the belt idler assembly **200** is manufactured as a modular kit configured to provide a retrofit solution for converting a belt assembly without a belt idler to a belt assembly with a belt idler. Accordingly, various different belt idler assemblies **200** can be designed and manufactured to integrate into various different belt assemblies without belt idlers. Therefore, installing the belt idler assembly **200** into an existing belt assembly of a vehicle may provide additional available gear ratios to the belt assembly (e.g., by swapping other components of the belt assembly, etc.) without requiring a purchase of a new belt assembly and/or a purchase of a new belt housing of a belt assembly.

**[0068]** In some embodiments, the modular kit of the belt idler assembly **200** includes multiple configurations of the idler bearing **250**, the top drive sprocket **132**, the bottom drive sprocket **134**, and/or the drive belt **136** to allow for adjustment of the gear ratio of the belt assembly **130** based on a use of the belt assembly **130**. In some embodiments, the modular kit includes a first combination of the belt idler assembly **200**, a first of the top drive sprocket **132**, a first of the bottom drive sprocket **134**, and a first of the drive belt **136**, where the first of the top drive sprocket **132**, the first of the bottom drive sprocket **134**, and the first of the drive belt **136** are not normally compatible in the belt assembly **130** without the belt idler assembly **200**. In some embodiments the modular kit includes several of the idler bearings **250** with different outside diameters to allow for the path of the drive belt **136** between the top drive sprocket **132** and the bottom drive sprocket **134** to be changed by different amounts based which of the idler bearings **250** are used with the belt idler assembly **200**. In various embodiments, the modular kit includes any number of idler bearings **250**, top drive sprockets **132**, bottom drive sprockets **134**, and/or drive belts **136** to allow for various gear ratios of the belt assembly **130**.

**[0069]** As utilized herein with respect to numerical ranges, the terms "approximately," "about," "substantially," and similar terms generally mean+/−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.

**[0070]** 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).

**[0071]** 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.

**[0072]** 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.

**[0073]** 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.

**[0074]** 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.

**[0075]** 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.

**[0076]** 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 **80**, the vehicle controller **90**, etc.) 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.

**1**. A belt idler assembly for changing a path length of a drive belt of a belt assembly of a snowmobile, the belt idler assembly comprising:

an idler bracket configured to couple to a belt housing of the belt assembly, the idler bracket comprising:

a first bracket portion,

a plurality of second bracket portions extending from opposing ends of the first bracket portion, each of the second bracket portions defining a first aperture configured to align with a second aperture of the belt housing, and a plurality of third bracket portions extending from each of the second bracket portions, a first of the third bracket portions configured to engage with a first interface of the housing and a second of the third bracket portions configured to engage with a second interface of the housing;

a plurality of fasteners configured to extend through the first apertures and the second apertures to couple the idler bracket to the belt housing;

a post configured to be positioned between the idler bracket and the belt housing; and

a bearing coupled to the post, the bearing defining a bearing surface configured to engage the drive belt.

**2**. The belt idler assembly of claim **1**, wherein:

the first bracket portion of the idler bracket further defines a third aperture;

the post defines a fourth aperture, the fourth aperture positioned to align with the third aperture; and

the belt idler assembly further comprises a fastener extending through the third aperture and the fourth aperture.

**3**. The belt idler assembly of claim **2**, wherein the idler bracket defines a first opening positioned to align with the post to receive a first end of the post.

**4**. The belt idler assembly of claim **3**, wherein:

the bearing comprises:

an inner bearing portion coupled to the post, and

an outer bearing portion rotatably coupled to the inner bearing portion, the outer bearing portion configured to engage the drive belt;

the post comprises a shoulder positioned at an opposing second end of the post; and

a first end of the inner bearing portion contacts the shoulder of the post and a second end of the inner bearing portion contacts the idler bracket.

**5**. The belt idler assembly of claim **4**, wherein a gap is present between the first end of the post and a bottom surface of the first opening.

**6**. The belt idler assembly of claim **1**, wherein the post defines an opening configured to receive a protruded portion of the belt housing when the idler bracket is coupled to the belt housing.

**7**. The belt idler assembly of claim **1**, wherein the first of the third bracket portions is configured to prevent movement of the idler bracket relative to the belt housing in a first direction and the second of the third bracket portions is configured to prevent movement of the idler bracket relative to the belt housing in a second opposing direction.

**8**. A vehicle comprising:

a frame;

a tractive assembly coupled to the frame, the tractive assembly configured to propel the vehicle;

a prime mover configured to provide power to the tractive assembly to drive the tractive assembly;

a belt assembly configured to transfer the power from the prime mover to the tractive assembly, the belt assembly comprising:

a housing,

a first sprocket rotatably coupled to the housing and configured to receive the power from the prime mover,

a second sprocket rotatably coupled to the housing and configured to provide the power to the tractive assembly, and

a belt coupled to the first sprocket and the second sprocket, the belt configured to transfer the power between the first sprocket and the second sprocket; and

a belt idler assembly comprising:

an idler bracket coupled to the housing,

a post positioned between the housing and the idler bracket, and

a bearing coupled to the post and positioned between the first sprocket and the second sprocket;

wherein the belt wraps around at least a portion of the bearing such that a path length of the belt is greater than a direct path length of the belt when the belt extends directly between the first sprocket and the second sprocket.

**9**. The vehicle of claim **8**, wherein:

the housing comprises a first housing portion and a second housing portion extending from an edge of the first housing portion, the second housing portion defining two or more first apertures;

the idler bracket comprises:

a first bracket portion, and

a plurality of second bracket portions extending from opposing ends of the first bracket portion, each of the second bracket portions defining a second aperture, the second aperture positioned to align with one of the first apertures of the belt housing; and

the vehicle further comprises two or more fasteners extending through the two or more first apertures and the second apertures.

**10**. The vehicle of claim **9**, wherein:

the idler bracket further comprises:

a plurality of third bracket portions extending from each of the second bracket portions, a first of the third bracket portions engaging a first interface of the second housing portion of the housing and a second of the third bracket portions engaging a second interface of the second housing portion of the housing.

**11**. The vehicle of claim **8**, wherein:

the housing comprises a first housing portion and a second housing portion extending from the first housing portion;

the post defines a first opening positioned at a first end of the post, the first opening receiving the second housing portion to couple the post to the housing; and

the idler bracket defines a second opening that receives a second opposing end of the post to couple the post to the idler bracket such that the post is coupled between the housing and the idler bracket.

**12**. The vehicle of claim **11**, wherein:

the post defines a first aperture;

the idler bracket defines a second aperture, the second aperture positioned to align with the first aperture; and

the belt idler assembly further comprises a fastener extending through the first aperture and the second aperture.

**13**. The vehicle of claim **12**, wherein:

the bearing comprises:

an inner bearing portion coupled to the post, and

an outer bearing portion rotatably coupled to the inner bearing portion, the outer bearing portion contacting the belt;

the post comprises a shoulder positioned at the first end of the post; and

a first end of the inner bearing portion contacts the shoulder of the post and a second end of the inner bearing portion contacts the idler bracket.

**14**. The vehicle of claim **13**, wherein the fastener engages the second aperture to pull the post toward the idler bracket to clamp the inner bearing portion between the shoulder of the post and the idler bracket.

**15**. The vehicle of claim **12**, wherein:

wherein a gap is present between the first end of the post and a bottom surface of the second opening.

**16**. A transmission assembly for transferring power between a prime mover and a tractive assembly of a snowmobile, the transmission assembly comprising:

a belt assembly configured to transfer the power from the prime mover to the tractive assembly, the belt assembly comprising:

a housing comprising a first housing portion and a second housing portion extending from an edge of the first housing portion, the first housing portion and the second housing portion defining a housing cavity;

a first sprocket rotatably coupled to the housing, the first sprocket positioned within the housing cavity,

a second sprocket rotatably coupled to the housing, the first sprocket positioned within the housing cavity, and

a belt coupled to the first sprocket and the second sprocket, the belt configured to transfer the power between the first sprocket and the second sprocket; and

a belt idler assembly comprising:

an idler bracket coupled to (i) a first portion of the second housing portion on a first side of the housing cavity and (ii) a second portion of the second housing portion on a second opposing side of the housing cavity,

a post positioned between the housing and the idler bracket, and

a bearing coupled to the post;

wherein the belt wraps around at least a portion of the bearing such that a path length of the belt is greater than a direct path length of the belt when the belt extends directly between the first sprocket and the second sprocket.

**17**. The transmission assembly of claim **16**, wherein:

the housing further comprises a third housing portion extending from the first housing portion;

the post defines a first opening positioned at a first end of the post, the first opening receiving the third housing portion to couple the post to the housing; and

the idler bracket defines a second opening that receives a second opposing end of the post to couple the post to the idler bracket such that the post is coupled between the housing and the idler bracket.

**18**. The transmission assembly of claim **17**, wherein:

wherein a gap is present between the second opposing end of the post and a bottom surface of the second opening.

**19**. The transmission assembly of claim **16**, wherein:

the bearing comprises:

an inner bearing portion coupled to the post, and

an outer bearing portion rotatably coupled to the inner bearing portion, the outer bearing portion contacting the belt;

the post comprises a shoulder positioned at an opposing second end of the post; and

a first end of the inner bearing portion contacts the shoulder of the post and a second end of the inner bearing portion contacts the idler bracket.

**20**. The transmission assembly of claim **16**, wherein:

the post defines a first aperture;

the idler bracket defines a second aperture, the second aperture positioned to align with the first aperture; and

the belt idler assembly further comprises a fastener extending through the first aperture and the second aperture.

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