

The present invention relates to a small, one or two-man, power vehicle for driving on snow. The instant vehicle has two wide endless tracks that extend substantially the length of the vehicle. The vehicle rides solely on the tracks without any other ground engaging element. Power is supplied to both of the tracks and steering is accomplished by braking one of the tracks and allowing the other track to be driven. Braking of the vehicle is accomplished by the braking of both endless tracks simultaneously. Since there are two tracks they can be wide spaced thereby providing stability and maneuverability that has not heretofore been available in the vehicle. The vehicle is supported on the treads by bogie wheels which are resiliently sprung from the vehicle chassis, thus producing a comfortable and less jarring ride than is presently available in these vehicles.

Figure 1 is a perspective view of the subject endless tread snow vehicle.

Figure 2 is a sectional view taken substantially along the line 2-2 of Figure 1.

20 Figure 3 is a sectional view taken substantially along the line 3-3 of Figure 2.

Figure 4 is a sectional view taken substantially along the line 4-4 of Figure 2.

Figure 5 is a sectional view taken substantially along the line 5-5 of Figure 3.

Figure 6 is a sectional view taken substantially along the line 6-6 of Figure 4.

Figure 7 is a perspective view of the steering and driving system of the vehicle.



Referring now to the drawings the reference numeral 10 generally designates the vehicle body and the numeral 12 designates the endless track assembly.

The chassis or main frame 16 of the vehicle comprises a lower frame assembly 17 and an upper frame assembly 18 which are fixed together to form an elongated generally box-type truss. The lower frame assembly has two main beams 19 which extend the entire length of the frame. Two secondary lower main beams 20 extend along the length of beams 19 thereabove and terminate near the front end thereof where they are each connected together by plates 22. A cross-brace 24 extends between the parallel pairs of rails 19, 20 on each side of the lower frame 17 and fits between them and is welded thereto which serves to space the parallel pairs of rails the proper width of the frame and further secure the rails 19, 20 on each side together. A pair of upwardly extending plates 25 with holes therein are mounted on cross-brace 24 in spaced relation, thereby providing a rear mount for a motor. A front motor mount assembly 26 is located in front of brace 24 and has two generally upwardly inclined members 27 with a center member 28 connecting the two members 27 and lying in a plane parallel to the brace 24. A suitable fastening member, depending on the type of motor used, is attached to the center member 28. The front motor mount thereby provides additional bracing between the longitudinal beams and the lower frame assembly.

A front spring crossbar 29 is mounted in perpendicular relationship to the parallel pairs of rails and extends between and beyond the rails on each side and is fixed thereto, thus providing additional support between the rails on each side and

spacing for the parallel pairs of rails. To provide further connection between the rails on each side of the lower frame, plates 30 are welded therebetween just forward of the brace 24. At the rear of the lower frame assembly are lower and upper cross-braces, 32 and 34 respectively, attached between the main beams 19 and secondary beam 20 to space the beams and further brace them. Two plates 36 are attached between the beams 19 and 20 on each side of the lower frame to connect the beams and add further rigidity therebetween. The plates 36 have a hole 37 therethrough  
10 which opens into the space between the beams 19 and 20, whose function will be disclosed hereinafter. A rear spring crossbar 38 corresponding in size and length with front spring crossbar 29, extends between the beams 19 and 20 in parallel spaced relation to the bar 28 behind the brace 24. The bar 38 slides between the rails 19 and 20 and is guided therein by blocks 40, 40 and 42, 42 which are fixed to the bar 38 in front and back thereof, respectively, the space between beams 19 and 20. Plates 44, 44 are attached to the blocks 40 and 42 on each side of the frame on the outside of the beams 19 and 20 to prevent  
20 the bar 38 moving transversely of the frame. Elongated bolts 46 pass through the holes 37 in the plates 36 and engage a threaded opening 48 in the block 42 so that the bar 38 can be moved longitudinally of the frame assembly in fixed adjustment therewith.

The upper frame assembly 18 has two main longitudinal beams 50, 50 that align at the rear thereof, with the ends of beams 19 and 20 of the lower assembly. The beams 50, 50 terminate at the front thereof and are fixed to a cross-brace 52 which spaces the beams 50, 50 the same width as the lower frame

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assembly beams. A cross-brace 54 extends across and beyond the rear of the beams 50, 50 and is fixed thereto for maintaining the rear of the beams 50, 50 in parallel relation. Two side beams 56, 56 are fixed to the ends of the cross-brace 54 and extend forwardly of the frame in parallel spaced relation to beams 50, 50 where they terminate and are slightly shorter than the beams 50, 50. Two connecting braces 58, 58 are fixed at one end to the forward free ends of the side beams 56 and at the other end to the junction of the beams 50 and 52. A second upper  
10 cross-brace 60 is located to the rear of brace 52 in parallel spaced relation thereto, adding further rigidity to the upper frame assembly. The upper frame assembly 18 is attached to and spaced from the lower frame assembly 17 in parallel spaced relation thereto by six upright braces 62 which are fixed between the beams 20, 20 on the lower frame and beams 50, 50 on the upper frame. The upright braces are placed at the intersection of main beams 50, 50 with cross-braces 52, 54 and 60 and extend perpendicularly downward and, as aforementioned, are fixed to the beams 20, 20. In addition to upright braces 62, there are two  
20 more braces 64 to be connected on either side of the frame at one end to the intersection of beam 50 and brace 60 and angled rearwardly and downwardly where the other end is fixed to beam 20. To complete the rigid box of the frame a longitudinal frame 66 is attached to the middle of brace 52 and extends forward, in parallel relation to the beams 50, 50 where it terminates and is fixed to a cylindrical collar 68 whose lower edge is slightly below the lower edge of the upper frame assembly members, and the opening 70 therethrough defines a perpendicular axis. An elongated U-shaped brace 72 has the free ends thereof fixed

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to the collar 68 so that the lower edge thereof is coplanar with the lower edge of brace 66 and the other elements of the upper frame assembly. The front bracing member 74 ties in the front end of the upper and lower frame assemblies and provides a mounting platform for the steering and driving assemblies. The brace 74 is generally U-shaped and its two wide side plates 76 are attached to beams 19, 19 and the elongated center section 78 thereof extends across the frame and is fixed to the lower edge of brace 72. Thus, an integral, rigid, truss-like frame  
10 assembly is formed which will not twist or deform under the loads generated by such a vehicle.

The suspension of the vehicle consists of four pairs of spring suspended bogie wheels 80, mounted on the ends of bars 28 and 38. A bogie wheel 80 comprises an elongated cylinder 82 with a spider hub 84 mounted at each end to close the cylinder and add rigidity thereto. The hubs have a bearing 86 in the center thereof whose openings define the axis of rotation for the bogie wheels. The bogie wheel 80 is then coated with rubber to keep the snow from adhering thereto and packing, and an  
20 annular rubber ring 88 is fixed to the center of the bogie wheel on the outside thereof. One bogie wheel 80 having been described it is understood that the eight bogie wheels of the vehicle are identical. The bogie wheels are suspended from the bars 28 and 38 by semi-elliptic springs 90 which are fixed to the bars 28 and 38 at the mid-point thereof by bolts 92. The ends of the leaf springs 90 terminate in eyes 94 with a sleeve mounted therein whose opening 96 defines a horizontal axis. The springs 90, being mounted in spaced pairs to receive the bogie wheels therebetween, the openings 96 define horizontal axes of rotation

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with a shaft 98 received therethrough on which the bogie wheels are journaled for rotation. While one spring installation has been described it is understood that the four installations on the ends of the bars 28 and 38 are identical, and thus can be seen the unique resilient suspension afforded thereby.

The drive or sprocket wheels 100 are mounted forward of and raised above the bogie wheel assemblies. The drive wheels are similar to the bogie wheels and comprise an elongated cylinder 102 with a spider hub 104 mounted at each end to close  
10 the cylinder and add rigidity thereto. The hubs have an opening 106 through the center thereof to define the axis of rotation of the wheel. A keyway 108 is cut into the circumference of the openings 106 to transmit the power from a shaft to the wheel. An annular flange 110 is fixed to the circumference of the drive wheel at the center thereof. Notches 112 are cut into the circumference of the flange 110 to provide a sprocket to engage and drive the endless track. The drive wheel is also coated with rubber to prevent the adherence of snow and the packing thereon of the snow. The drive wheel is mounted on  
20 a half axle 114 which has a key 116 to positively engage the hubs on the drive wheel and thereby transmit the driving force thereto. The drive wheel is also fastened to the axle by pins 118 extending therethrough to prevent relative movement therebetween. The half-axle is journaled for rotation on the chassis by a bearing block and mount 120 fixed to the plate 76 with the half-axle extending therethrough. While one drive wheel and half-axle have been described, it is understood that the two are identical such units with the free ends of the half-axle meeting in the center of the chassis to be joined together by

a differential unit 122. The differential unit has a sprocket 124 affixed thereto to be driven by a chain connected to a motor, with the differential delivering the power received thereby to one or both of the driven wheels. A disk-brake unit 126 has a caliper unit 128 thereof mounted on the inside of plate 76 to cooperate with a disk 130 fixed on the half-axle 114 for rotation therewith. The hydraulic pressure to actuate the disk brake unit is provided by a master cylinder unit 132 mounted on the top of center section 78 and connected to the caliper unit 128 by a hydraulic line 134. The master cylinder unit is actuated by a steering assembly 136 which comprises a handle bar 138 mounted on a vertical shaft 140 by a neck 142. The vertical shaft is journalled for rotation in opening 70 of collar 68 and extends therethrough to the bottom of the collar and has attached thereon a triangular shaped yoke 144. The yoke 144 has holes 146 on the ends thereof with cables 148 having one end attached therethrough and the other end attached to the master cylinder unit. Thus, when the handle bar 138 is turned, the shaft 148 rotates the yoke and pulls on a cable 148 in the direction of the turn which activates the corresponding master cylinder unit. The master cylinder unit then actuates the disk brake unit and brakes one of the half-axles which stops the drive wheel on the inside of the turn with the other drive wheel continuing to drive through the differential unit thereby turning the vehicle around.

A main drive shaft 150 is journalled for rotation, at the rear end of the chassis between the motor mounts 24 and 26, in bearing blocks 152 which are attached to the plates 30 fixed between the lower frame members 19 and 20. The drive shaft

150 has a sprocket 154 fixed thereon in longitudinal alignment with the sprocket 124 on the differential to receive the drive chain 156 therearound and transmit the power from the drive shaft to the differential and then through the half-axles to the drive wheels. A spring urged idler wheel 158 is mounted on a lever 160 biased by a coil spring 162 acting between cross-brace 60 and lever 160 to urge the idler wheel into engagement with the chain and thereby take up any slack therein. A disk brake unit 162 acts on the drive shaft 150, thereby providing braking  
10 for both drive wheels simultaneously and thereby stopping the vehicle. The brake unit has a caliper 164 mounted on a bracket 166 fixed to the rail 19 on the lower frame assembly to cooperate with a disk 166 fixed on the drive shaft 150. The caliper is cable operated by a brake cable 168 that is attached at one end to the caliper unit and at the other end to a lever handle 170 mounted on the handle bar.

The power for the vehicle is a motor 172 mounted in the rear of the chassis on the mounts 25 and 26. The motor 172 can be any readily available unit with a clutch and transmission  
20 assembly 174, such as that found on a motorcycle. A shift lever 176, located on top of the frame behind the handle bar, is connected to and actuates the transmission, and the clutch is actuated by a lever handle 178 mounted on the handle bar, while the throttle is controlled by a twist grip 180 on the handle bar adjacent the brake lever. The motor shaft 182 has a sprocket 184 thereon which is in alignment with a similar sprocket 186 fixed on the drive shaft 150 to receive a chain 188 therearound and transmit the power from the motor assembly to the drive shaft. A battery pack 190 is mounted from the rear cross-brace

54 where it is near the engine assembly for simplicity of installation.

10 The endless tracks 12 of the vehicle are made of two reinforced rubber belts 192 of equal width which are connected together by bars 194 of U-shaped cross-sectional area. The belts are fixed to the base of the U-shaped bar 194 so that the legs thereof protrude perpendicularly from the surface of the belts and form an efficient snow engaging surface. The space between the belts, when fixed to the bars, is slightly greater than the width of the ridge 88 on the bogie wheels and the thickness of the sprocket flange 110 on the drive wheels so that when the track is mounted thereon, and extends there-around, the ridges in the bogie wheels will extend into the gap between the belts and maintain the belts in position, and the sprocket flange 110 will extend through and beyond the belts and the bars 194 will engage the notches 112 in the sprocket 110 to thereby drive the track. With the longitudinal adjustment of the bar 38, the rear bogie assembly can be adjusted to compensate for stretching of the track assembly and also to facilitate the mounting or replacing of the tracks on the vehicle.

20 The streamlined body 10 is mounted on the vehicle to conceal and protect the components and to provide for receiving the passengers. The body has a lower body section 196 which surrounds the chassis assembly, and a nose section 198 which connects with the front portion of the lower body section and completes the enclosure of the steering and drive wheel mechanisms. The main body section has a flat area 200 which overlies the front portion of the frame assembly and provides a place for the driver's feet and his manipulation of the shift 176, and has

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a raised rear portion 202 to enclose the engine and accessory equipment with a hinged seat section 204 on the top thereof to provide access. Side extensions 206 on the body are supported on the frame members 54, 56 and 58 and provide a foot rest for passengers and protection from the moving tracks and flying snow therefrom. A combined bumper and tow bar 208 is mounted on the rear of the frame and extends beyond the body.

10 The operation of the vehicle and its performance provide all the features of a large endless track vehicle in a small sport size vehicle. The steering system is simple and dependable, the rotation of the steering shaft 140 actuating a master cylinder which in turn brakes one of the endless tracks, the remaining track continues to be driven through the differential to turn the vehicle around the braked track. This system allows the use of two wide spaced track assemblies, without the need for steering skis, which gives great stability and allows for resilient suspension of the vehicle. The vehicle thus provided is unique among vehicles of this type and has none of the limitations usually imposed thereon.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An endless track snow vehicle, comprising: a frame assembly, a first endless track assembly mounted on one side of the frame, and a second endless track assembly mounted on the other side of the frame, means to drive said assemblies, and means to selectively brake one of said assemblies while permitting the other of said assemblies to be driven, thereby turning said vehicle, said means to drive said assemblies including a motor mounted on said frame assembly and operatively connected to a differential to drive first and second half-axles connected thereto, said half-axles having first and second drive wheels, respectively, mounted thereon to engage and drive said first and second track assemblies, said means to selectively brake includes first and second disk brake units acting on each half-axle between the differential and the drive wheel thereon, said disk brake units each including a master hydraulic cylinder to activate the brake unit, and a steering assembly for said vehicle mounted on said frame assembly and connected with said master cylinders for activating the brake units in response to movement of the steering assembly when directionally controlling the vehicle, each of said track assemblies including a pair of spaced parallel flexible belts, a plurality of bars connecting said belts with a space therebetween, each of said drive wheels including an outer cylindrical surface of a width substantially the same as the width of each of said belt pairs, an annular sprocket ridge around each of said drive wheels received in the space between the belts to maintain the track assembly in proper alignment on said drive wheels and to engage said bars to drive the track assemblies.

2. The device of claim 1 wherein each of said track assemblies includes a plurality of bogie wheels supported on said frame assembly, each having an annular ridge therearound

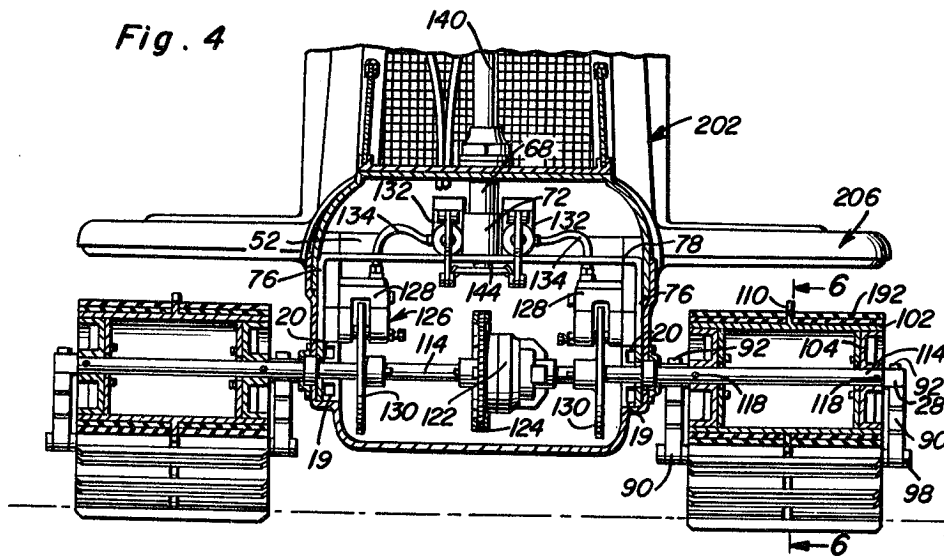
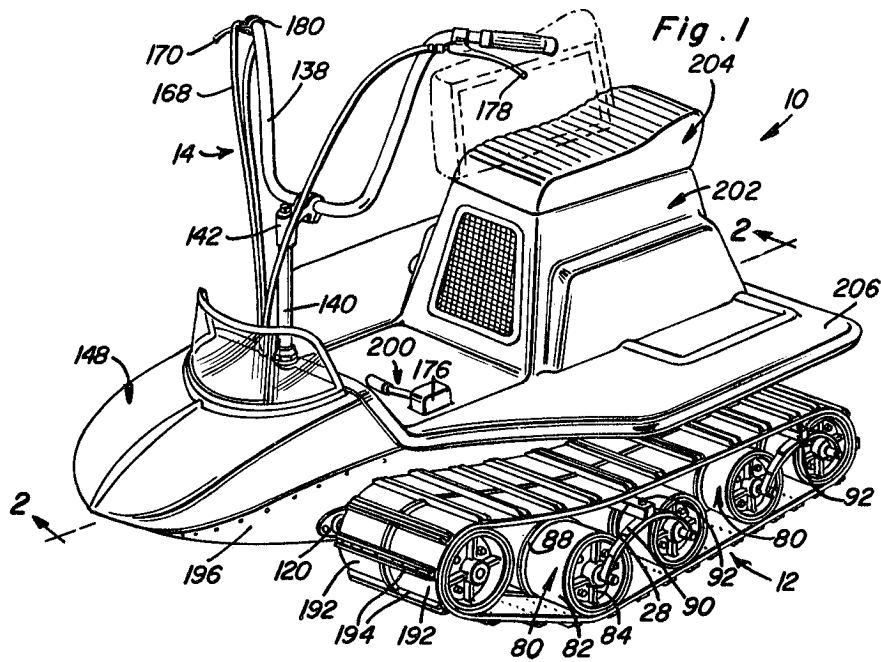
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to receive the space between said belts thereby maintaining the track assemblies in proper alignment on the bogie wheels.

3. The device of claim 2 wherein said frame assembly includes adjustable support means for the rear bogie wheels to adjust their position relative to the frame assembly thereby adjusting the tension of the belts.

4. The device of claim 1 wherein said steering assembly includes a steering shaft pivotally mounted on said frame assembly adjacent said master hydraulic cylinders, a yoke mounted on the lower portion of said shaft and having right and left portions extending transverse to said shaft, said right and left portions each being connected to a master hydraulic cylinder.





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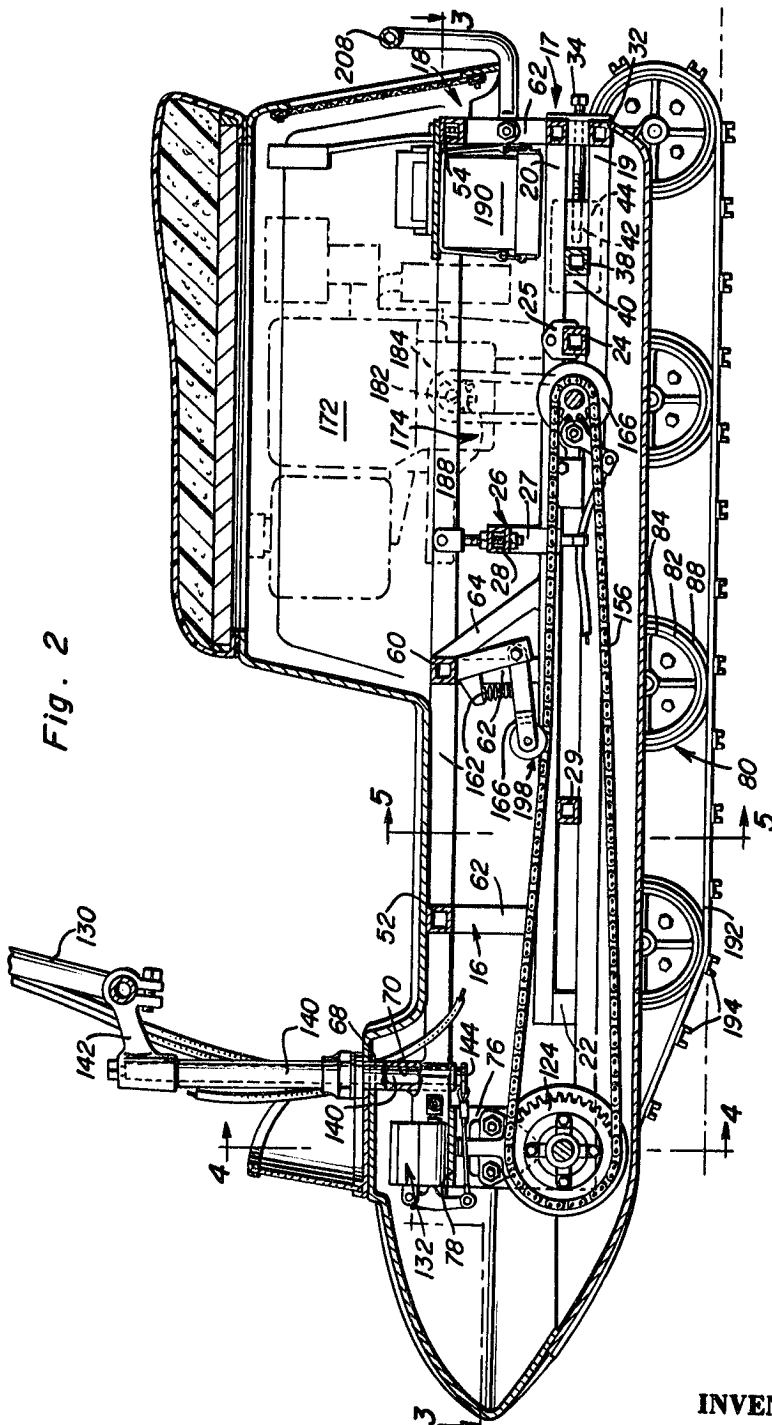


Fig. 2

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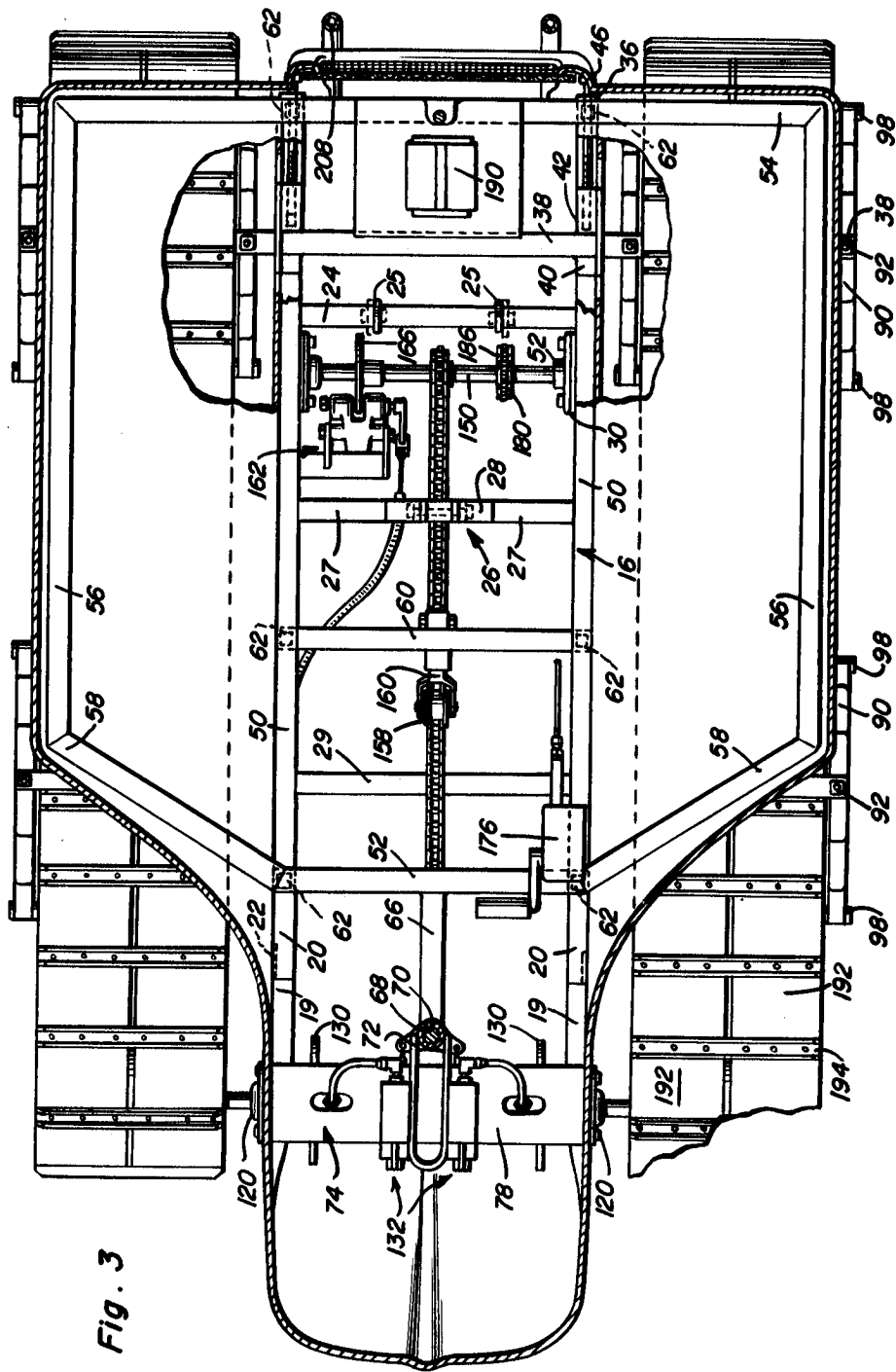


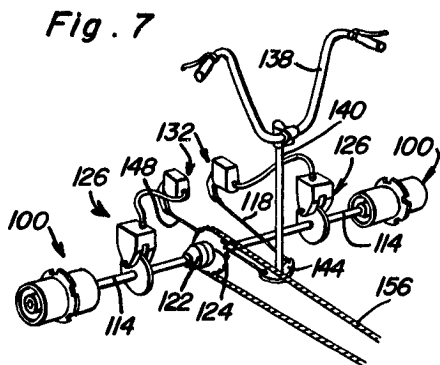
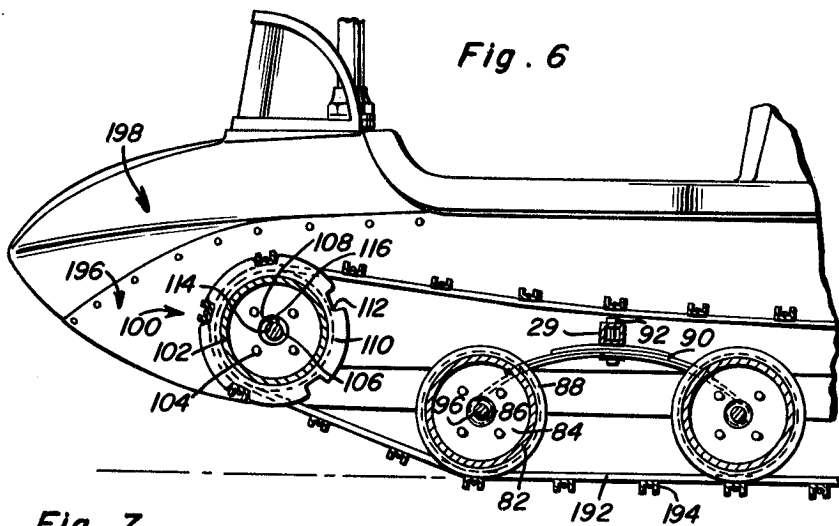
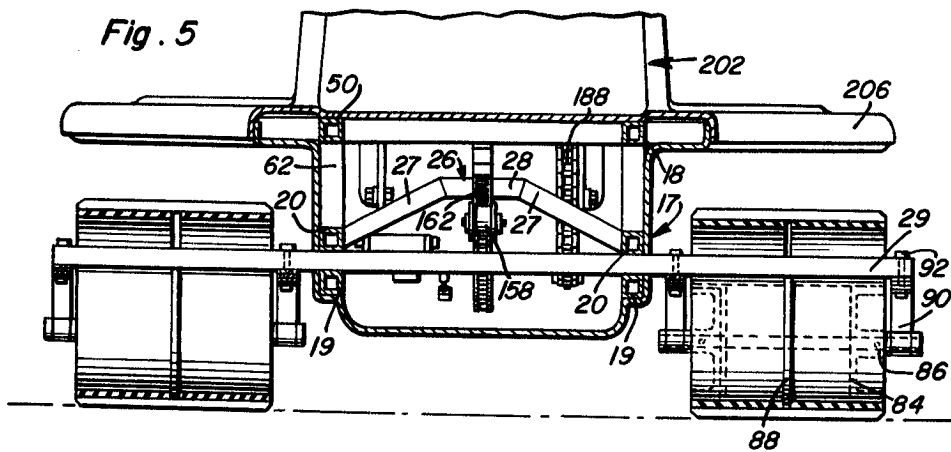
Fig. 3

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