

April 30, 1963

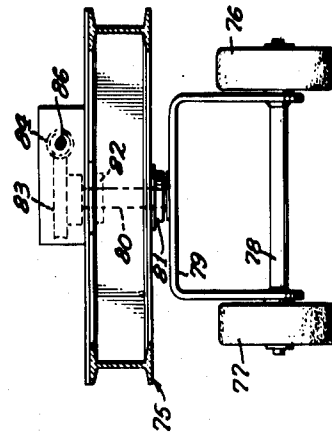
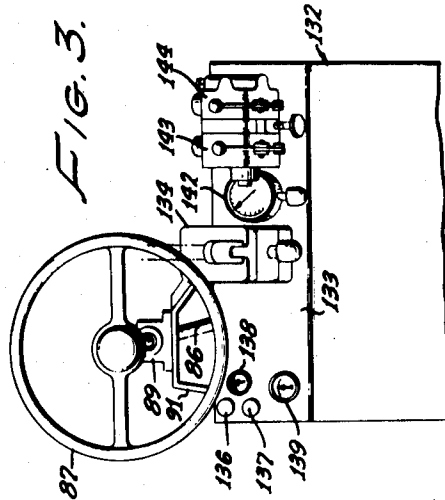
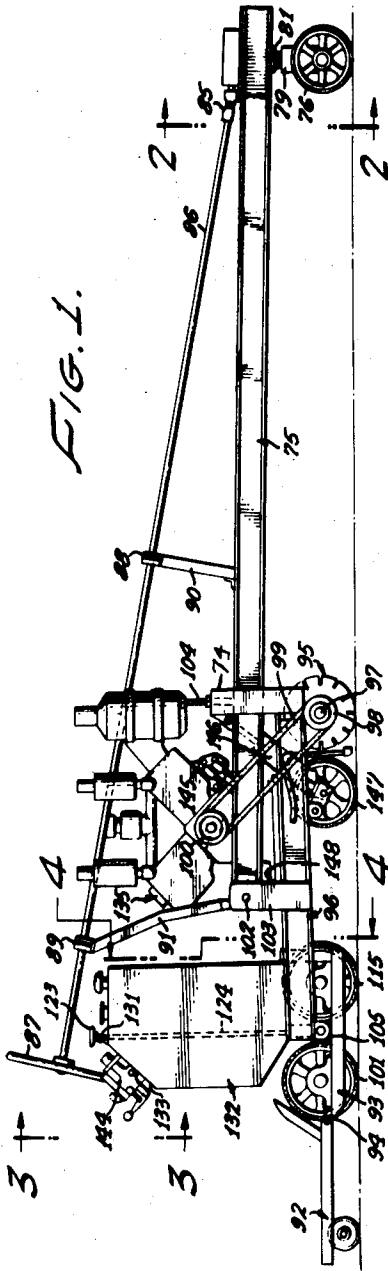
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STEERING CONTROL FOR SELF-POWERED CUTTING MACHINE

Original Filed Dec. 30, 1957

2 Sheets-Sheet 1



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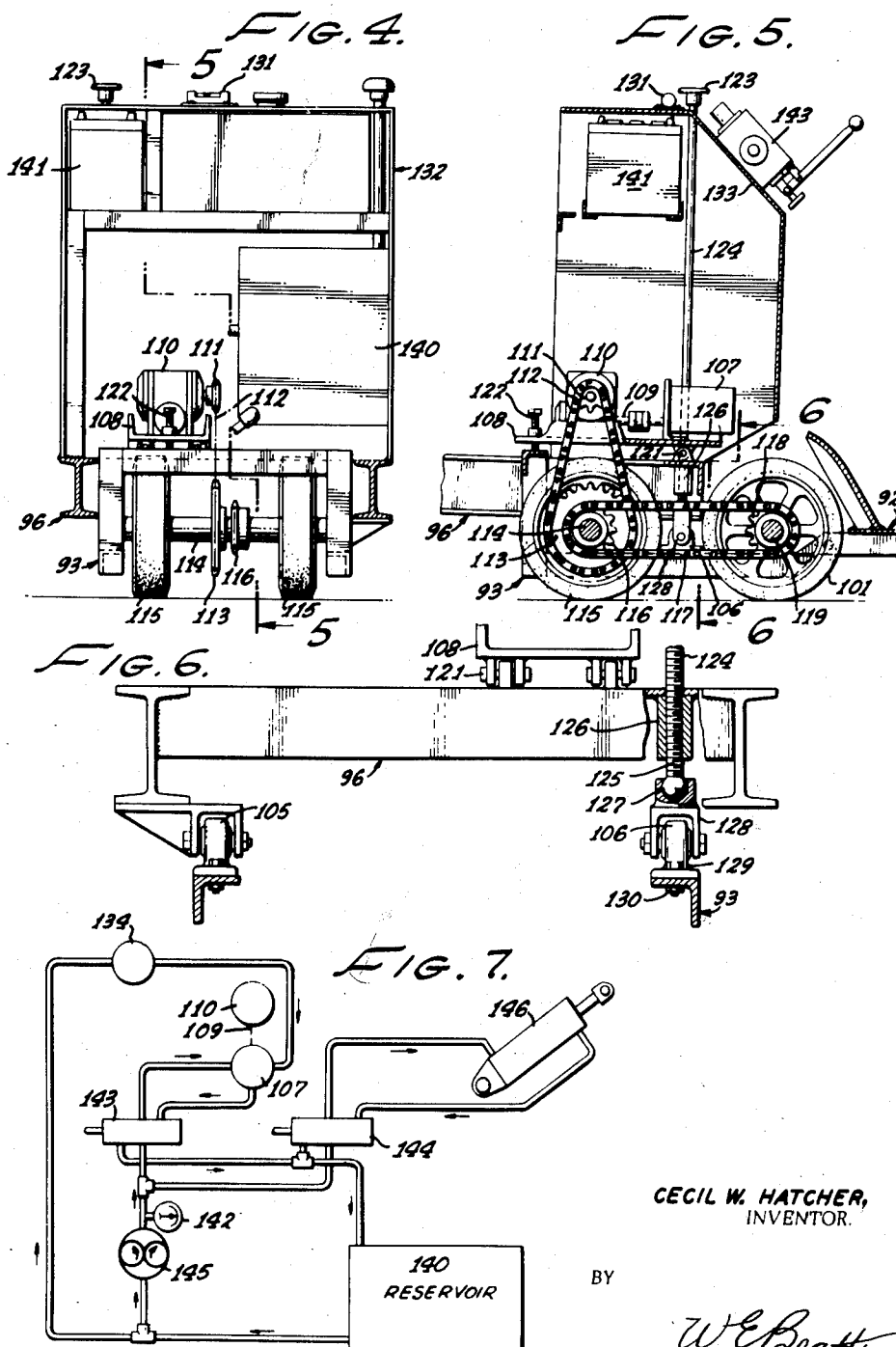
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STEERING CONTROL FOR SELF-POWERED CUTTING MACHINE

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Original application Dec. 30, 1957, Ser. No. 706,138, now Patent No. 3,037,755, dated June 5, 1962. Divided and this application Aug. 17, 1961, Ser. No. 132,183 4 Claims. (Cl. 262-20)

The invention relates to a steering control for self-powered cutting machine and more particularly to a self-propelled vehicle having rotatable abrasive wheels for removing bumps from concrete paving such as aircraft landing fields, floors and the like.

As disclosed and claimed in S.N. 615,937, Patent Number 3,007,687 November 7, 1961, the sensitivity of the machine is reduced to relatively minor irregularities of the surface of the paving by supporting the cutter, for height adjustment, on an elongated frame having a wheel support at a longer distance from the cutter than its vehicle support, whereby the variation in the height of the cutter is only a fraction of the variation in the height of the outer end of such elongated frame as its front wheel rides over the paving.

An object of the invention is to provide an improved steering control for the type of machine described above.

For further details of the invention reference may be made to the drawings wherein:

FIG. 1 is a view in side elevation of an improved form of the invention.

FIGS. 2, 3 and 4 are sectional views on lines of the corresponding numbers in FIG. 1.

FIG. 5 is a vertical sectional view on line 5-5 of FIG. 4.

FIG. 6 is an enlarged sectional view on line 6-6 of FIG. 5.

All views are in the direction of the respective arrows.

FIG. 7 is a flow diagram of the hydraulic control mechanism employed in connection with the invention.

The bump cutter is a self-propelled vehicle having a frame which may have sections of channel iron welded together. The front of the frame 96 has fixed thereto bearings like 3 and 4, see Fig. 7 of S.N. 615,937 and S.N. 706,138 Patent Number 3,037,755 June 5, 1962, for a cutter shaft 97, having operatively mounted thereon a series of closely spaced circular saws indicated at 50, as shown in Fig. 7 of S.N. 615,937 and S.N. 706,138 and indicated herein as cutter head 95. The direction of rotation of the cutter head 95 is counter-clockwise as the machine moves ahead to the right.

The front of frame 96 has front wheels 147, behind cutter head 95, and the rear of frame 96, as shown in FIGS. 1 and 6 has a hinge connection in the form of bearings 105 and 106 with the intermediate portion of truck frame 93, the latter having front wheels 115 and rear wheels 101. Extension frame 75 has front wheels 76, 77 and its rear end has a hinge connection 102 with a post 103 which arises from an intermediate portion of frame 96.

Provision is made for positive steering by controlling the angular turning movement of the front wheels 76, 77. Wheels 76, 77 are carried by an axle 78 mounted on an inverted U-shaped frame 79 having an upright post 80, FIG. 2, rotatably mounted in self aligning bearings 81 and 82 carried by the extension frame 75. The post 80 is fixed to a worm wheel 83 which meshes with a worm 84 having a flexible coupling 85 with a steering rod 86 having a steering wheel 87 mounted thereon. The rod or shaft 86 is rotatably carried in suitable spaced bearings 88, 89 at the top of the brackets 90 and 91 respectively carried by the extension frame 75. The steering wheel

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87, as well as the various controls indicated in FIG. 3, are accessible to the operator who can stand on the trailer 92 suitably connected to the truck frame 93 by a hinged coupling 94. Thus, a remote steering control is provided.

The length of the series of cutters in the cutter head indicated at 95 is greater than the axial length of the front and rear wheels, whereby the machine cuts its own level path.

The saw blades are cooled and the cuttings removed by a spray of water from an elongated nozzle like 55, Figs. 6 and 10 of S.N. 615,937 and S.N. 706,138. The nozzle is suitably mounted on the frame and has a hose and valve connected to a suitable supply of water, on a separate tank vehicle or the like, as described in connection with elements 46, 47 and 56 in S.N. 615,937.

In order to reduce the effect of minor bumps, the front end of the frame 96 has a bracket 74 which is U-shaped and which overlies the removable extension frame 75. Frame 75 has a removable hinge connection indicated at 102 with upright posts 103 on the frame 96, while the front end of extension frame 75 has wheels 76, 77 which are spaced about four times as far, such as 10 feet, in front of the cutter head 95 as the distance between the front and rear wheels 147 and 115, 101. The cutter head 95 is supported by the truck wheels 115 and 101 and the front wheels 76 and 77 at whatever height is chosen by adjusting the stop screws like 104 as shown and described in connection with Figs. 1, 2, 6 and 8 of S.N. 615,937 and in S.N. 706,138. These screws are locked in an adjusted position by lock nuts 68 and 69 as shown in Fig. 7 of S.N. 615,937 and S.N. 706,138. In this way, up and down movement of cutter head 95 due to bumps encountered by front wheels 76 and 77, with the dimensions assumed above is only about 1/4 what it would be if the cutter head 95 were supported by the front and rear wheels 147 and 101, 115, the reduction being in proportion to the ratio of the lever arms involved.

The cutter head 95 includes a shaft 97 rotatably journaled in bearings on the main or rear frame 96. The shaft 97 is drivingly connected to the engine driving shaft by means of pulleys 98 and 100 which are connected by a belt 99. Also, main frame 96 at its rear end has a hinged connection in the form of two self aligning bearings 105 and 106, see FIG. 6, with the truck frame 93. The extension frame 75 has a hinged connection 102 in a post 103 on the main frame 96, and the downward movement of the cutter disks of cutter head 95 is limited by stop screws, one of which is shown at 104 in FIG. 1. Means are provided for driving the front wheels 115 and rear wheels 101 from the hydraulic motor 107. Accordingly, as shown in FIGS. 4 and 5, the hydraulic motor 107 is mounted above hinge connection 121 on a platform 108 and has a shaft 109 to drive gear reducer 110 on the outer end of platform 108. Gear reducer 110 has a sprocket 111 for a chain 112 which drives a sprocket 113 on the shaft 114 of the front wheels 115. The shaft 114 has a sprocket 116 for a chain 117 which drives a sprocket 118 on the shaft 119 of the rear wheels 101. Drive sprocket 111 is smaller than driven sprocket 113 while sprockets 116 and 118 are of the same size. These shafts 114 and 119 are journaled in bearings on the truck frame 93.

The rear end of platform 108 has a hinged connection 121 with the main frame 96 and the front end of platform 108 has an adjusting screw 122 engageable with truck frame 93 to adjust the height of the drive sprocket 111 and adjust the slack in the chain 112.

Accessible to the operator while riding on trailer 92, is a level control wheel 123, see FIGS. 4 and 5, on a rod 124, the lower end of which has threads 125 for engagement with the threads of a nut 126 welded or other-

wise secured to the frame 96. The lower end of the rod 124 is flexibly coupled as at 127 to a bracket 128 in which the self aligning bearing 106 is mounted, bearing 106 having a casing 129 bolted to the truck frame 93 as shown at 130. Operating the handle 123 to rotate rod 124, raises or lowers its associated side of the frame 96. The angularity of the frame 96 may thus be adjusted to position the cutter head 95 at a selected level to determine the depth of the cut effected by the cutter head. The level condition of the frame 96 can be observed by means of the level indicator 131 mounted on the casing 132 on the frame 96. Engine 135 is fixed to frame 96 by bolts 148.

Casing 132 has a sloping front forming an instrument panel 133 for an emergency hand pump 134 to provide fluid pressure for the hydraulic motor 107 in case the engine 135 should fail. Also, on the instrument panel 133, as shown in FIG. 3, are throttle 136, choke 137, oil level indicator 138 for oil reservoir 140, ammeter 139 for battery 141, fluid pressure gauge 142, control valve 143 for hydraulic motor 107, and control valve 144 for jack cylinder 146. The jack cylinder 146 serves to raise and lower the front wheels 147 relatively to the frame 96. The fluid pump 145 is driven by the engine 135 and supplies fluid pressure to operate both the hydraulic motor 107 for driving purposes and jack cylinder 146 to raise or lower the front end of frame 96 and the cutter disks of cutter head 95 carried thereby, as shown and described in connection with Figs. 6 and 9 of S.N. 615,937.

This application is a division of S.N. 706,138 filed December 30, 1957, for Concrete Bump Cutter, the latter being a continuation in part of S.N. 615,937, filed October 15, 1956, for Concrete Bump Cutter which discloses and claims the cutter head 95.

Various other cutters may be used and various other modifications may be made in the invention without departing from the spirit of the following claims.

I claim:

1. A steering control for a bump cutter comprising a vehicle having a frame, said frame having front wheels and a truck having a truck frame having bearings thereon for axles having front and rear wheels respectively, said vehicle frame having a rear end supported by and terminating in a hinge connection with said truck frame intermediate its said front and rear wheels, a cutter shaft carried by said vehicle frame in front of its said front wheels, means connecting said front wheels of said frame and the front of said vehicle for relative movement up and down, means comprising a hydraulic cylinder for raising or lowering the front of said vehicle frame and said cutter shaft with respect to said front wheels of said vehicle frame, a motor on said vehicle frame for said cutter shaft in combination with an extension frame having a rear end having a pivotal connection with said vehicle frame, said extension frame having a front end having a wheel for engaging the paving ahead of said front wheels of said vehicle frame, an adjustable stop between said vehicle frame and said extension frame for limiting the lower position of the front of said vehicle frame and said cutter shaft, a remote steering control comprising a steering rod having a steering drive con-

nection with said wheel of said extension frame, and bearing means carried by said extension frame providing the sole support for said steering rod, said steering rod having a handle at the rear of said vehicle.

2. A steering control for a bump cutter comprising a vehicle having a frame, said frame having front wheels and a truck having a truck frame having bearings thereon for axles having front driving wheels and rear driving wheels respectively, said vehicle frame having a rear end supported by and terminating in a hinge connection with said truck frame intermediate its said front and rear wheels, a cutter shaft carried by said vehicle frame in front of its said front wheels, means connecting said front wheels of said vehicle frame and the front of said vehicle frame for relative movement up and down, a motor on said vehicle frame for said cutter shaft, in combination with an extension frame having a rear end having a pivotal connection with said vehicle frame, said extension frame having a front end having a wheel for engaging the paving ahead of said front wheels of said vehicle frame, stop means between said vehicle frame and said extension frame to limit the pivotal movement between said frames, a remote steering control comprising a steering rod having a steering drive connection with said wheel of said extension frame, and bearing means carried by said extension frame providing the sole support for said steering rod, said steering rod having a handle at the rear of said vehicle.

3. A steering control for a bump cutter according to claim 2, said truck being arranged at the rear of said vehicle frame, said truck frame at the rear of its said wheels having a platform for an operator.

4. A steering control for a bump cutter comprising a vehicle having a frame, a truck having a truck frame having bearings thereon for axles having front and rear driven wheels respectively, a motor for driving said wheels, said vehicle frame having a rear end supported by and terminating in a hinge connection with said truck frame intermediate its said front and rear wheels, a cutter shaft carried by the front of said vehicle frame, means comprising a hydraulic cylinder for raising or lowering the front of said vehicle frame and said cutter shaft, a motor for said cutter shaft, an extension frame having a rear end having a pivotal connection with said vehicle frame, said extension frame having a front end having a front wheel for engaging the paving ahead of said cutter, a stop between said vehicle frame and said extension frame for limiting the lower position of the front of said vehicle frame and said cutter shaft, a remote steering control comprising a steering rod extending from the front of said extension frame to the rear of said vehicle, said steering rod having a steering drive connection with said front wheel of said extension frame, and bearing means carried by said extension frame providing the sole support for said steering rod, said steering rod having a handle at an operator's position at the rear of said vehicle, and controls for said motor at said position.

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