Jan. 6, 1953 J. H. SMEED 2,624,133

LAND LEVELER

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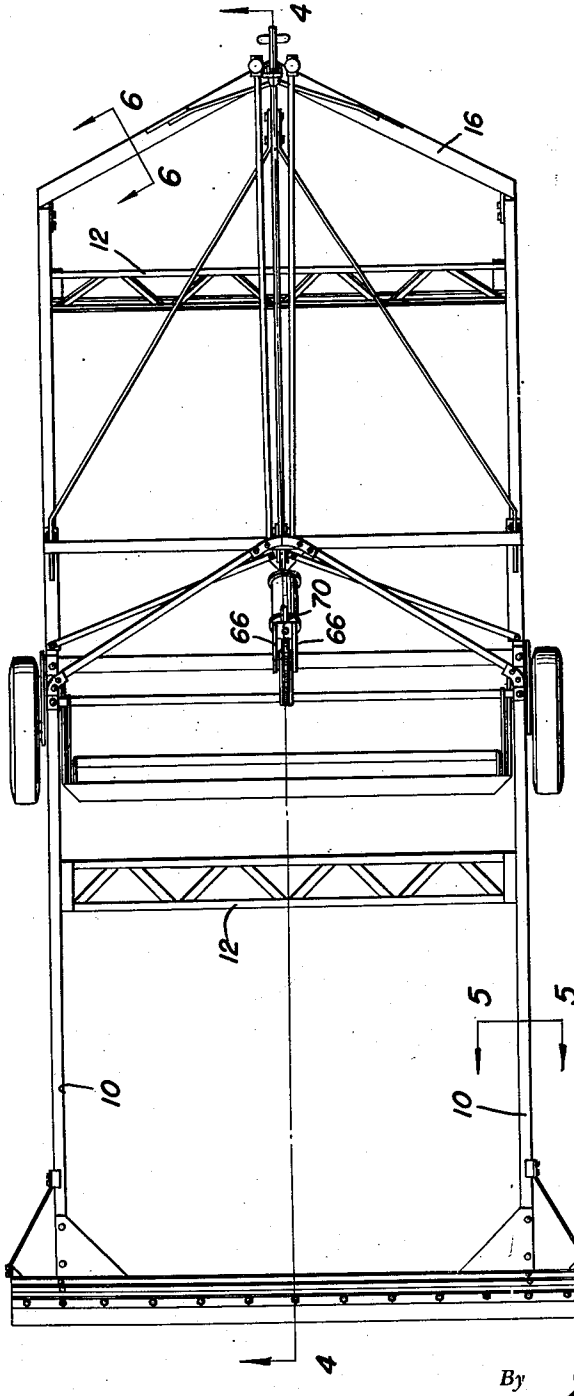

Fig. 1.

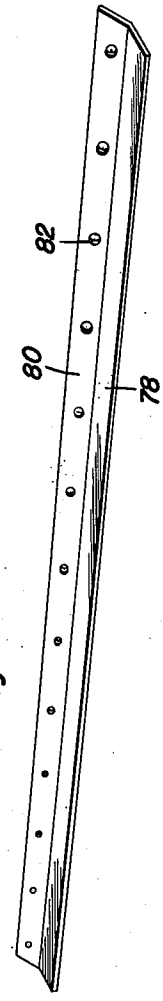

Fig. 8.

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LAND LEVELER

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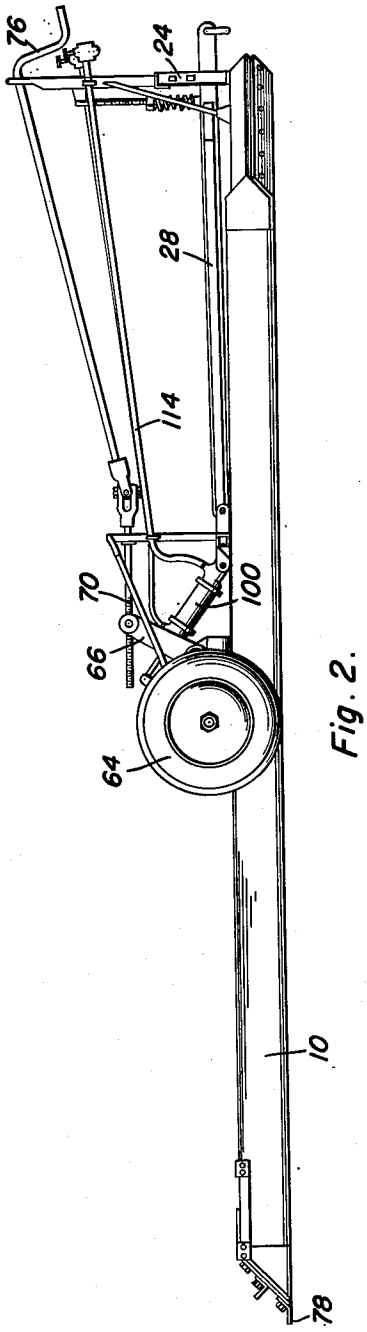

Fig. 2.

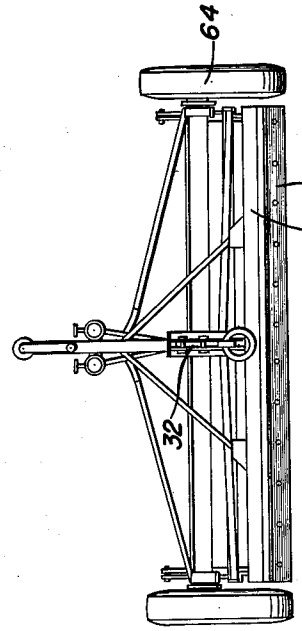

Fig. 3.

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LAND LEVELER

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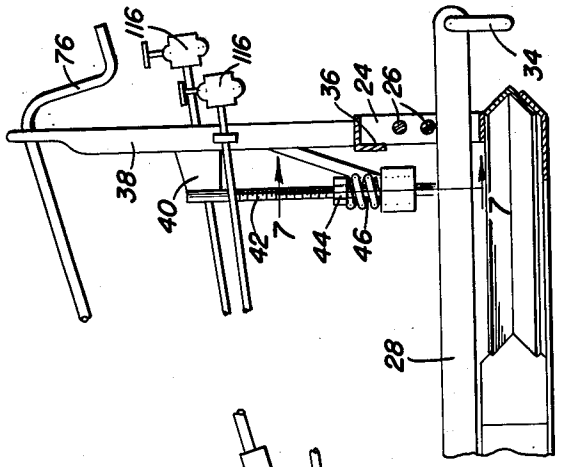


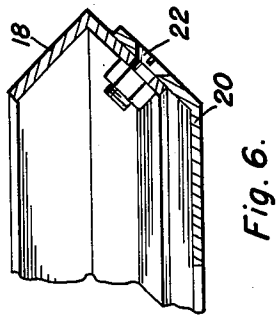


Fig. 6.

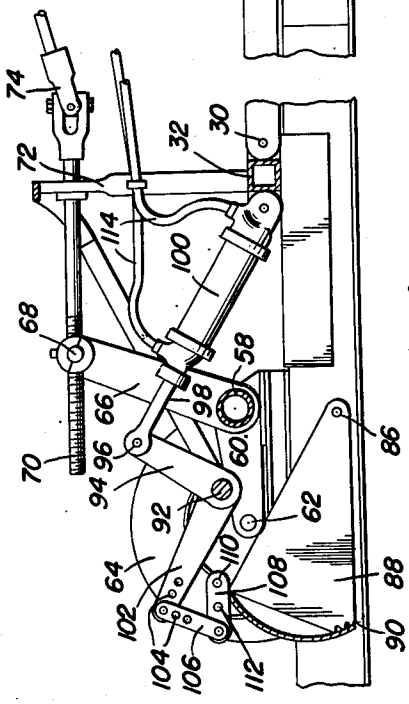


Fig. 4.

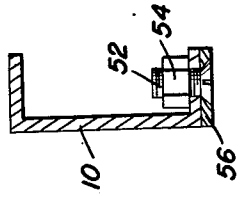


Fig. 5.

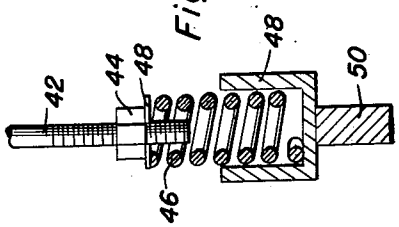
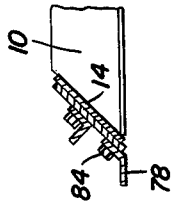


Fig. 7.



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LAND LEVELER

Jack H. Smeed, Caldwell, Idaho

Application October 13, 1947, Serial No. 779,480

3 Claims. (Cl. 37—150)

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This invention comprises novel and useful improvements in a land leveler and more specifically pertains to a device having improved means for grading and leveling a surface.

The principal object of this invention resides in the provision of an apparatus which may be readily adjusted to give the desired leveling operation, and wherein is provided improved power operated means for adjustably grading a surface, said leveling and grading operations being, if desired, performed concurrently.

An important feature of the invention resides in a simplified and novel means for operating a grading blade of the device; and in adjusting the same by hydraulic operating means.

A further feature of the invention resides in the provision of a manual adjusting means for raising or lowering the frame of the device upon its supporting wheels, to thereby vary the angle at which the leveling blade engages the surface and varies the pressure and weight applied thereto.

A still further feature of the invention resides in a novel and improved means for adjusting the initial pressure applied to the leveling blade.

These, together with various ancillary objects of the invention which will later become apparent as the following description proceeds, are attained by this device, a preferred embodiment of which has been illustrated by way of example only in the accompanying drawings, wherein:

Figure 1 is a top plan view of the device;

Figure 2 is a side elevational view, showing the supporting wheels in their fully retracted position;

Figure 3 is a front elevational view of the apparatus in the position shown in Figure 2;

Figure 4 is a longitudinal vertical sectional view taken through the apparatus, parts being broken away and illustrating certain features of the operating mechanism thereof;

Figure 5 is a fragmentary detailed view upon an enlarged scale taken substantially upon the transverse vertical plane of the section line 5—5 of Figure 1;

Figure 6 is a similar view to that of Figure 5 taken substantially upon the plane of the section line 6—6 of Figure 1;

Figure 7 is a fragmentary detailed view taken in vertical section substantially upon the plane of the section line 7—7 of Figure 4; and,

Figure 8 is a perspective view of the leveling blade of the device.

Referring now more specifically to the accompanying drawings, wherein like numerals designate similar parts throughout the various views, it will be seen that the frame of the device includes a pair of side members 10 which are preferably of channel-shape construction, to which are secured transversely extending reinforcing members 12 and inclined rear end member 14, and a V-shaped front member 16, to provide a generally rectangular frame construction. The front member 16, as shown more clearly in Figures 4 and 6, includes upper and lower angle members 18 and 20, which are secured as by fastening means 22 and provide rearwardly diverging upper and lower surfaces. The lower surfaces assist in preventing the frame striking and being stopped by irregularities in the surface being treated.

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Mounted upon the forward end of the frame, that is upon the apex of the V-shaped front member 16, is a supporting standard 24 provided with a pair of laterally extending vertically spaced lugs or rods 26 for a purpose to be later set forth. A draw bar 28 is positioned along the longitudinal axis of the framework, being pivoted as at 30 at its rear end to suitable lugs or brackets carried by the laterally extending frame member 32 secured upon the upper surface of the frame members 10. The front end of the draw bar extends through the vertical slot 33 of the support 24, and beneath the stop lugs or bolts 26. At its extreme front end, the draw bar is provided with a ring 34 or other fastener by means of which the device may be secured to a towing or tractive vehicle. The stop means 26 comprise an arrangement for limiting the upward pivotal movement of the draw bar relative to the frame 10, since either one or both of the bolts 26 may be removed to selectively limit the upward travel of the draw bar. If both bolts are removed, the draw bar will then be free to strike the lower surface of a transverse member 36, which member supports a vertically extending rod or frame member 38. Extending rearwardly from the latter as at 40 is a bracket from which depends a rigidly attached downwardly extending screw threaded bolt 42. As shown best in Figures 4 and 7, an adjusting nut 44 and compression spring 46 together with a washer 47 are provided on the bolt 42 and a cup-shaped seat or socket member is provided to receive the spring 46 and has a downwardly extending abutment plug 50 for bearing upon the upper surface of the draw bar. The arrangement is such that upward movement of the draw bar is resisted by the pressure applied by the spring 46, which may be adjusted by the nut 44 to pro-

vide any desired resistance or tension to the bar. This provides a cushioning means whereby the framework is partially supported upon the draw bar, which will yield upon a predetermined shock, and an arrangement whereby the draw bar will be positively stopped by one of the stopping means 26 or 36.

As shown best in Figure 5, the lower surface of the channel frame members 10 have detachably secured thereto, as by a fastening bolt 52 and nut 54, a plate or shoe 56 which is intended to rest upon and constitute a slide engaging the surface over which the device travels.

Suitably journaled in supporting brackets carried by the frame members 10, is a supporting axle 58 which, upon its outer extremities beyond the frame members 10, is provided with crank arms 60. The crank arms carry stub axles 62 upon which are rotatably mounted supporting wheels 64. A pair of operating arms 66 (see Figure 1) are rigidly attached to the axle 58 intermediate the ends thereof, which at their outer extremities are provided with a transversely extending crank pin 68. The pin 68 has a diametrical internally threaded bore receiving a screw threaded rod 70 which extends through a supporting bracket 72 mounted upon the transversely disposed member 32. The rod 70 is connected as by universal joint couplings 74 to a manually operated crank 76 journaled in the above mentioned member 38. As will thus be readily seen, rotation of the crank 76 results in longitudinal adjustment of the crank pin 68 upon the screw 70, and thereby causes rotation of the crank arm 66 and rotation of axle 58, causing the crank member 60 to raise or lower the wheels 64, and thereby regulate the position of the channel members 10 and shoes 56 relative to the surface being treated.

Thus, the wheels may be completely retracted as shown in Figure 4, whereby the device is supported upon the shoes 56 and slides over the surface of the ground. When by manual operation of crank 76 the wheels are lowered, the front end of the frame is elevated from the ground, the action of the spring 46 on draw bar 26 assists in lifting the front end, while the rear end remains dragging upon the ground. Secured at the rear end, as shown in Figures 1, 4 and 8, is a transversely disposed leveling blade 78 having an upwardly and angularly disposed flange 80 provided with suitable apertures 82 whereby through the instrumentality of bolts 84 or other suitable fastening means, the blade may be secured to the rear frame member 14, in a position wherein the blade 78 is co-planar with the surface of the shoes 56. Thus, as the frame members 10 are inclined relative to the ground by the above mentioned operation of the wheel adjustments, the trailing edge of the blade member 78 is caused to scrape the ground with increasing force, to increase its leveling and scraping action thereon.

In order to further adapt the device to scraping and grading surfaces, the frame members 10 have pivotally mounted, as at 86, upon the outer surfaces thereof, generally triangular shaped blade supporting arms 88 which are secured to the extremities of a scraping blade 90 extending generally transversely of the frame members 10 and therebetween.

Suitably journaled upon the frame members 10, is a transverse shaft 92 and intermediate this shaft are provided a rigidly attached pair of operating levers 94 to which is pivoted, as at 96, a piston rod 98 of a hydraulic operating cylinder 100. At the extremities of the shaft 92 are provided a pair of crank arms 102 to which are adjustably connected as by a series of longitudinally spaced apertures 104, connecting links 106 which also engage and are pivoted to a lever 108 having a stationary fulcrum 110 and a pivotal connection 112 with the above mentioned members 88. Connected to the opposite ends of the hydraulic cylinder 100, are a pair of hydraulic or other pressure fluid lines 114, controlled by valves 116, operated from any suitable source such as the hydraulic pressure line in a tractor or the like, whereby the bell crank arrangement of levers 94 and 102 may be rocked about the axis 92, thereby raising or lowering the members 88 and the scraper blade 90.

The series of apertures in the members 102, 106 and 108, see Figure 4, afford convenient facilities for adjusting the amplitude and rate of movement of each end of the scraper blade 90.

From the foregoing it will be readily seen that power operated means are provided for adjusting the cut or penetration of the scraper blade, and that manual means are provided for varying the operation of the leveling blade.

The construction of the device is particularly adapted to facilitate partial dismantlement thereof to facilitate shipment.

Since numerous modifications will readily occur to those skilled in the art, after a consideration of the foregoing specification and accompanying drawings, it is not intended to limit the invention to the exact construction shown and described, but all suitable modifications and equivalents may be resorted to falling within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. A grading machine comprising an elongated generally rectangular frame, a crank axle journaled transversely of and intermediate the forward and rear ends of the frame, supporting wheels mounted on the crank axle, means for rocking the crank axle to selectively raise and lower the wheels relative to the frame, a transversely extending leveling blade mounted on the rear end of the frame, a cutting blade oscillatably mounted on the frame for vertical movement relative thereto, means for selectively raising and lowering the cutting blade, a longitudinally extending tow bar pivoted at its rear end to the frame for vertical swinging movement, means for adjustably and yieldingly urging downward movement of the tow bar relative to the frame, said means including an externally threaded bolt, a socket member in alignment with the bolt, a coiled compression spring disposed about the bolt and having one end seated in the socket member, and a nut adjustably threaded on the bolt engaging the other end of the spring, a standard on the frame adjacent the forward end thereof, a bracket on the standard overlying the tow bar, said last mentioned means extending between the bracket and the tow bar.

2. A grading machine comprising an elongated generally rectangular frame, a crank axle journaled transversely of and intermediate the forward and rear ends of the frame, supporting wheels mounted on the crank axle, means for rocking the crank axle to selectively raise and lower the wheels relative to the frame, a transversely extending leveling blade mounted on the rear end of the frame, a cutting blade oscillatably mounted on the frame for vertical movement relative thereto, means for selectively raising and

lowering the cutting blade, a longitudinally extending tow bar pivoted at its rear end to the frame for vertical swinging movement, means for adjustably and yieldingly urging downward movement of the tow bar relative to the frame, said means including an externally threaded bolt, a socket member in alignment with the bolt, a coiled compression spring disposed about the bolt and having one end seated in the socket member, and a nut adjustably threaded on the bolt engaging the other end of the spring, a standard on the frame adjacent the forward end thereof, a bracket on the standard overlying the tow bar, said last mentioned means extending between the bracket and the tow bar, said standard having a slot therethrough which slidingly receives the tow bar therethrough, and removable means carried by the standard and extending across the slot to limit movement of the tow bar therein.

3. A grading machine comprising an elongated generally rectangular frame, a crank axle journaled transversely of and intermediate the forward and rear ends of the frame, supporting wheels mounted on the crank axle, means for rocking the crank axle to selectively raise and lower the wheels relative to the frame, a transversely extending leveling blade mounted on the rear end of the frame, a cutting blade oscillatably mounted on the frame for vertical movement relative thereto, means for selectively raising and lowering the cutting blade, a longitudinally extending tow bar pivoted at its rear end to the frame for vertical swinging movement, means for adjustably and yieldingly urging downward movement of the tow bar relative to the frame,

said means including an externally threaded bolt, a socket member in alignment with the bolt, a coiled compression spring disposed about the bolt and having one end seated in the socket member, and a nut adjustably threaded on the bolt engaging the other end of the spring, a standard on the frame adjacent the forward end thereof, a bracket on the standard overlying the tow bar, said last mentioned means extending between the bracket and the tow bar, said bolt being fixedly secured to the bracket, and in abutment depending from the socket member and bearing against the top of the tow bar.

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