

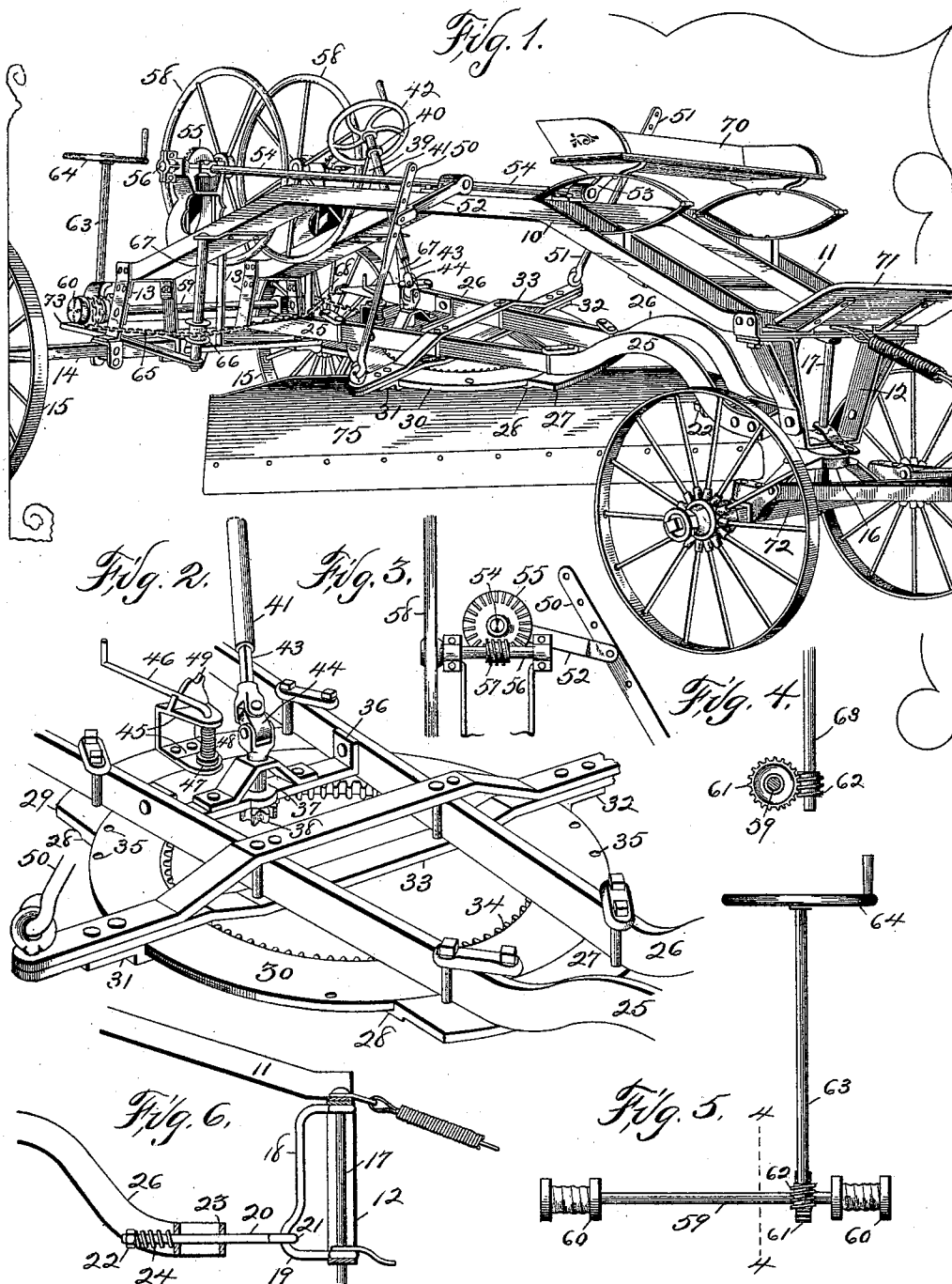
(No Model.)

2 Sheets—Sheet 1.

H. K. LEEDHAM.
ROAD GRADER.

No. 583,147.

Patented May 25, 1897.



Witnesses:
W. J. Sankey,
R. G. Orwig

Horatio K. Leedham,
by J. H. Sweet
Att'y.

(No Model.)

2 Sheets—Sheet 2.

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ROAD GRADER.

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Fig. 7.

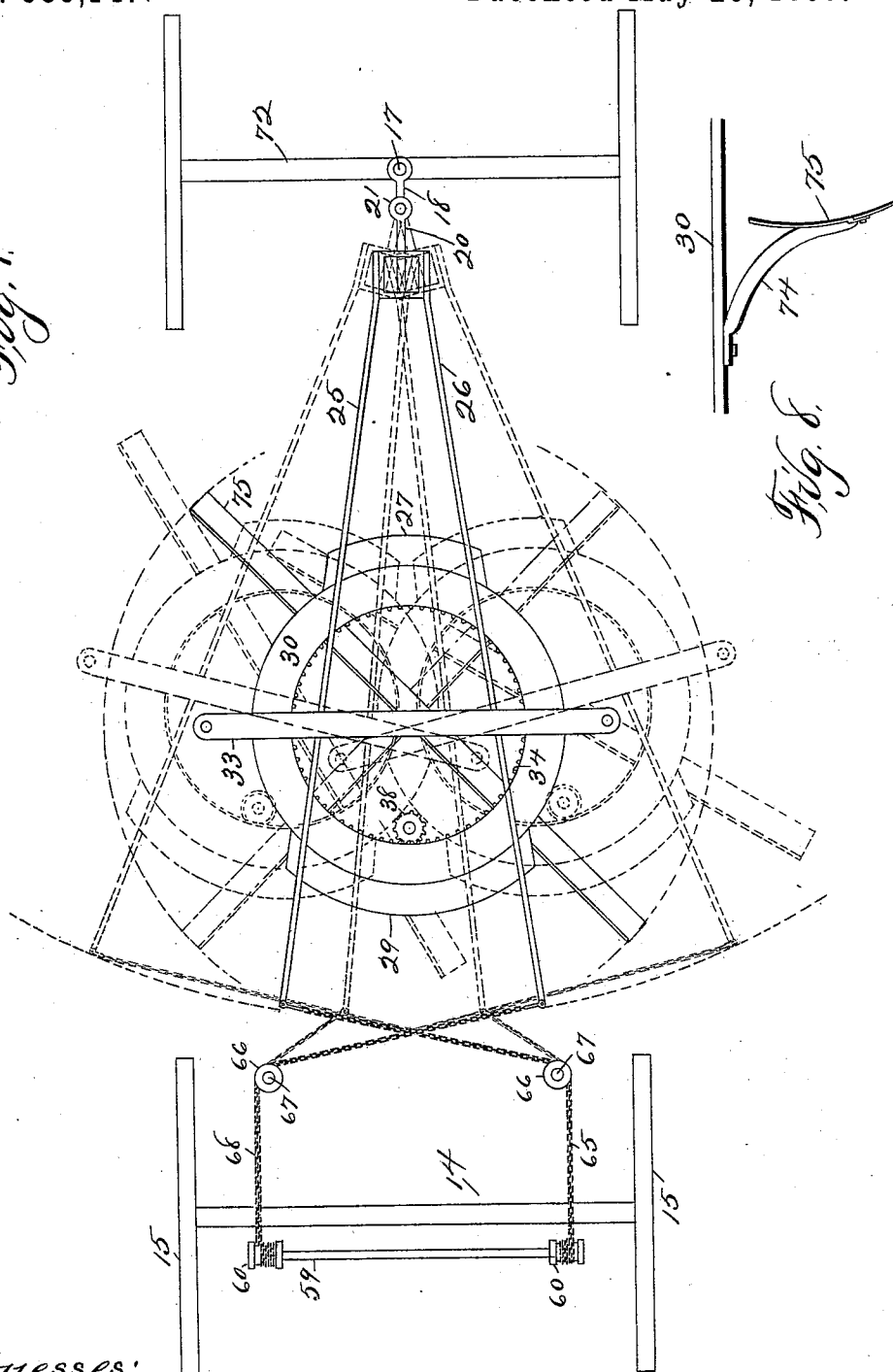


Fig. 8.

Witnesses:

W. J. Tanker,
R. G. Curry,

Horatio K. Leedham,
by J. H. Sweet atty.

UNITED STATES PATENT OFFICE.

HORATIO K. LEEDHAM, OF MOUNT PLEASANT, IOWA.

ROAD-GRADER.

SPECIFICATION forming part of Letters Patent No. 583,147, dated May 25, 1897.

Application filed December 19, 1895. Serial No. 572,619. (No model.)

To all whom it may concern:

Be it known that I, HORATIO K. LEEDHAM, a citizen of the United States of America, and a resident of Mount Pleasant, in the county of Henry and State of Iowa, have invented a new and useful Road-Grader, of which the following is a specification.

This invention relates to improvements in road-graders, such as have heretofore been patented to James Holland and the Mount Pleasant Road Grader Company, and involves some of the features of the allowed application of James M. Holland, filed January 5, 1894, and serially numbered 495,772.

Heretofore a great objection has been made to road-graders and their general use thereby largely limited because of the complicated machinery and mechanical details by which the scraper-blade ordinarily is manipulated as required to swing the said scraper-blade laterally relative to the line of advancement of the machine.

The common primary object of all machines of this character is to so adjust, support, and manipulate the scraper-blade and its supporting mechanism as that it may readily and easily be raised and lowered or swung laterally of or diagonally to the line of advancement of the machine, and at the same time to provide a maximum degree of rigidity of connections and support, so that the scraper-blade will, in any position in which it may be located, readily overcome the resistance of hard impacted earth commonly encountered in the practical use of road-grading. It also is extremely desirable that the lateral play of the blade be as great as possible in order that wider areas of surface may be comprehended and reduced to the desired grade or angle.

The special object of my present invention is in line with the general objects stated, and may be briefly summarized as follows: to so support the scraper-blade as that it may be rotated readily and conveniently on a vertical axis; to so mount the scraper-blade and its bar or bars as that the same may be swung laterally to a greater degree than heretofore has been possible; to so connect the bars supporting the scraper-blade with the front trucks of the machine as that the said bars maintain an adjustable relation with the said trucks and occupy a uniform horizontal plane

at their forward ends; to so connect the mechanism supporting the scraper-blade with a worm-gear as that in the manipulation of the gear either or both ends of the scraper-bar may be elevated or lowered independently or conjunctively, as desired, and retained in a given desired position without auxiliary locking mechanism, and to provide a conveniently operated lock whereby the scraper-blade may be rigidly positioned at any desired angle to the line of advancement of the machine.

To the end of attaining the above objects and other objects involving similar mechanism, my invention consists in the construction, arrangement, and combination of parts hereinafter set forth, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a perspective illustrating the working parts of my complete machine, portions of the wheels and tongue only being broken away. Fig. 2 is a perspective illustrating the circle-bar employed to sustain the scraper-blade, the truss and segment bars sustaining the circle-bar, the draft-bars sustaining the truss and segment bars, the mechanism for rotating the circle-bar, and the lock whereby the circle-bar is rigidly positioned. Fig. 3 is a detail rear elevation of the worm-gear mechanism for raising and lowering the scraper mechanism. Fig. 4 is a sectional elevation on the indicated line 4 4 of Fig. 5, and Fig. 5 is a rear elevation in detail of the worm-gear mechanism employed to swing the scraper mechanism laterally. Fig. 6 is a detail elevation, partly in section, longitudinally of the machine, illustrating the means employed to connect the forward ends of the draft-bars to the front trucks. Fig. 7 is a plan in diagram illustrating a normal location of the scraper mechanism relative to the line of advancement of the machine, the dotted lines indicating abnormal positions of the same mechanism. Fig. 8 is a detail elevation illustrating the manner of connecting the scraper-blade to the circle-bar.

In the construction of the machine as shown I preferably employ oppositely-located and longitudinally-parallel-disposed side beams 10 11, which beams are preferably made of channel-bars and rest at their front ends upon the bolster 12 and at their rear ends

upon standards 13 13. The standards 13 13 are mounted upon and fixed to the rear axle 14 of the machine, which axle is supported in wheels 15 15. The bolster 12 rests upon a fifth-wheel 16 and is connected thereto by a king-bolt 17. A bail 18, provided with loops at its upper and lower ends, is vertically positioned, so that the king-bolt 17 traverses the said loops. The bail 18 is provided near its lower end with a half-loop 19 at the rear of the king-bolt. A draw-rod 20 is provided and is formed with a loop or eye 21 on its forward end, embracing the bail 18 and normally resting in the half-loop 19. The draw-rod 20 has a straight body portion and a screw-threaded rear end on which is mounted an adjusting-nut 22. The body portion of the draw-rod 20 traverses apertures formed in the central portion of a head-block 23, and an expansive coil-spring 24 is mounted on said draw-rod between the rear face of the head-block and the adjusting-nut 22, which spring forms a cushion for the draft when applied to the head-block.

Draft bars or beams 25 26 are provided and are rigidly secured at their forward ends to and upon opposite sides of the head-block 23. The draft-bars extend rearwardly from the head-block to a transverse plane slightly in advance of the wheels 15 15 and in their rearward extension diverge in opposite directions from the longitudinal axis of the machine.

The draft-bars are arched or goosenecked immediately in the rear of the points of attachment to the head-block, and there is located beneath said bars, immediately at the rear of the arches therein, a segment-bar 27. The segment-bar 27 is rigidly clamped to the draft-bars and is provided with downwardly and rearwardly extending lugs or seats 28, arranged at the ends and at intermediate points of the length of said bar. A similar segment-bar 29, of greater length than the bar 27, is oppositely positioned on the draft-bars 25 26 at such a distance to the rear of the bar 27 as may be necessary to permit of the introduction therebetween of a circle-bar of the desired diameter. The segment-bar 29 is provided with downwardly and forwardly extending lugs of a like character to those indicated at 28, and it may be observed that all of the lugs on the segment-bars radiate from a common axis which is the axis of each segment. The segment-bar 29 also is clamped rigidly to the draft-bars, and by reason of the clamps employed to mount the segment-bars said bars may be adjusted to some degree relative to each other or readily removed or replaced.

A circle-bar 30 is provided, which comprises an annular plate of a thickness corresponding approximately to the thickness of the segment-bars and designed to rest upon the lugs of the segment-bars and be confined against upward movement by the draft-bars. The circle-bar 30 is confined against forward or rearward movement by the segment-bars and

is supported against lateral movement and central flexure by lugs 31 32, fixed to and projecting downwardly and inwardly from a truss 33, which truss is clamped to the draft-bars approximately midway between the segment-bars. The circle-bar 30 is provided with an internal gear 34 and a series of vertical apertures 35. A bearing-plate 36 is interposed between and rigidly fixed to the draft-bars 25 26 at the rear of the truss 33 and in front of the segment 29, in which bearing-plate is vertically positioned a short shaft 37, bearing on its lower end a pinion or driving-gear 38, which gear meshes with the gear 34 of the circle-bar. A shoulder is formed on the shaft 37 and engages against the upper face of the bearing-plate to sustain the said shaft, and the upper portion of said shaft is bossed and bifurcated. A cross-bar (not shown) connects the channel bars or beams 10 11 at a point above and slightly to the rear of the vertical plane of the shaft 37, and a bracket 39 is fixed to said cross-bar and extends upwardly and forwardly therefrom. An eyebolt 40 is swiveled in the bracket 39, and a sleeve 41 is loosely mounted in the eye of said eyebolt and is provided at its upper end with a hand-wheel 42. The sleeve 41 is circular in cross-section and squared or made angular on its interior and is designed to admit an angular rod 43, which rod is connected at its lower end by a link 44 to the bifurcated end portion of the shaft 37.

An angle-plate 45 is fixed to the upper face of the segment-bar 29 and projects over and upon the rear portion of the circle-bar. The angle-plate 45 is apertured with registering holes located in the orbit of travel of the apertures 35 in the circle-bar 30. A bent rod 46 is provided and the vertical portion thereof is seated in the apertures in the angle-plate 45 and is of such length as to extend through said angle-plate and into one or another of the apertures 35 in the circle-bar. A collar 47 is rigidly mounted on the vertical portion of the rod 46 and an expansive coil-spring 48 is mounted on the rod between said collar and the upper portion of the angle-plate and normally tends to depress said rod into engagement with the circle-bar. The horizontal portion of the rod 46 extends across a standard 49, fixed to the angle-plate, and said standard is provided with two notches in its upper edge at different altitudes, which notches are connected by an inclined portion of the edge.

The outer end portions of the truss 33 are connected by rods 50 51 to crank-arms 52 53, respectively, which crank-arms are located on opposite sides of the machine and at times project in opposite directions. The crank-arm 52 is connected rigidly to the forward end portion of a rock-shaft 54, seated in bearings mounted on the channel bar or beam 10 and extending rearwardly to a point approximately over the rear axle of the machine. A face-wheel 55 is mounted rigidly on the rear

end of the rock-shaft 54 and is of such formation and construction as to serve and operate as a worm-wheel. A short shaft 56 is mounted adjacent to the rear end of the rock-shaft 54 and at right angles thereto, and a worm 57 is formed on said shaft 56 and engages with the wheel 55. The inner end portion of the shaft 56 is provided with a hand-wheel 58. The crank-arm 53 is mounted on a similar rock-shaft located on the beam 11 and is operated by a similar worm-gear at the rear end thereof.

A shaft 59 is horizontally positioned parallel with and adjacent to the rear axle 14 of the machine, and is provided at each end with a drum 60. A worm-wheel 61 is mounted rigidly on the shaft 59 and is engaged by a worm 62 on a vertical shaft 63, seated in the rear portion of the frame of the machine and operated by a hand-wheel 64 on its upper end. A chain 65 is connected at its rear end to the right drum 60, extends forward therefrom around a flanged sleeve 66, mounted on a standard 67, which standard is seated in an inclined position in the machine-frame and extends from said sleeve across the plane of the draft-bar 25, and is attached by means of a clevis to the rear end of the draft-bar 26. A chain 68 is connected at its rear end to the left drum 60, extends forward therefrom around a sleeve similar to the sleeve 66 and mounted in same manner, and extends from said sleeve across the plane of the draft-bar 26 and across the forward end portion of the chain 65, and is connected by a clevis to the rear end of the draft-bar 25.

The worm-gear, sleeves, and standards, and the chains operated thereby, are the same in this application as in the allowed application previously mentioned herein, with the exception that in this instance the forward ends of the chains cross each other and connect to two bars, whereas in the prior application the chains were conjunctively attached to a single bar.

A seat 70 is mounted on the forward portions of the beams 10 11, and a foot-rest 71 is located below and in front of the seat. An axle 72 is fixed to and supports the fifth-wheel 16, and a tongue or other draft mechanism is attached to the axle. A platform 73 is supported on or adjacent to the rear axle 14 of the machine and is employed to support an attendant who operates the scraping mechanism.

Two beams 74 are fixed to and extend downwardly and forwardly from opposite sides of the circle-bar 30, and a scraper-blade 75 is fixed to the lower forward ends of said beams and is thereby rigidly connected to the circle-bar.

When it is desired to adjust the scraper-blade laterally relative to the line of advancement of the machine, the operator, standing upon the rear end of the platform, rotates the hand-wheel 64 and shaft 63, thus actuating the worm 62, which meshes with the worm-wheel 61 and rotates the shaft 59. In the ro-

tation of the shaft 59 one of the chains is unwound from and the other is wound upon the respective drums and the rear ends of the draft-bars are thereby carried laterally into the positions shown by dotted lines in Fig. 7 or such intermediate positions as the attendant may desire.

When it is desired to lift one or the other end of the scraper-bar, one or the other of the hand-wheels 58 is rotated, thus operating the worm-gear connected thereto, oscillating the shaft 54 and crank-arm 52 or 53, as the case may be, and lifting the rod 50 or 51. Either or both of the hand-wheels 58 may be operated at a time as it may be desired to lift or lower either or both ends of the scraper-bar.

When it is desired to adjust the scraper at an angle or any angle relative to the line of advancement of the machine, the lever or rod 46 is pedally moved up the incline and into the upper notch of the standard 49 to release the circle-bar, and the hand-wheel 42 is rotated. In the rotation of the hand-wheel 42 the sleeve 41 is revolved, the angular rod 43 is rotated, the shaft 37 is acted upon and drives the gear 38 in mesh with the gear 34 and rotates the circle-bar, and, since the circle-bar is rigidly connected to the scraper, the said scraper thereby is adjusted. When the desired degree of adjustment is secured, the rod 46 is pedally removed from the upper notch of the standard 49 and reseated in the lower notch and the lower end thereof engages the circle-bar.

If the scraper-blade in its forward progress should come in contact with an immovable body, such as a stone or stump, it may be freed from this obstacle by reversing the circle-bar carrying the blade, or it may be lifted entirely over the impediment by the manipulation of hand-wheels 58, actuating the rocking arm, and thus raising the truss 33.

I claim as my invention—

1. In a road-grader, the combination with a wheel-truck and draft-bars mounted thereon, of a truss rigidly mounted transversely of said draft-bars and projecting beyond the same; a circle-bar carried by said truss, which circle-bar is toothed entirely around its inner edge and revoluble relative to the truss, segment-bars rigidly fixed to the draft-bars in front of and behind the circle-bar and engaging under said circle-bar, a gear supported by the draft-bars and engaging the toothed edge of the circle-bar, a shaft universally jointed to said gear, means for rotating said shaft; a scraper bar or blade carried by said circle-bar, means for elevating said draft-bars and lowering the same and means for shifting said draft-bars laterally.

2. In a road-grader, draft-bars, a head-block connected to the forward ends of said draft-bar, a draw-rod yieldingly mounted in said head-block and a bail provided with a notch or half-loop to receive said draw-rod and normally retain the same.

3. In a road-grader a circle-bar, an inter-

nal gear on said circle-bar, a driving-gear meshing with said internal gear a short shaft carrying said driving-gear, an angular shaft 43 universally jointed to the said short shaft, 5 a sleeve 41 having an angular interior bore longitudinally thereof to receive the angular shaft 43, and a hand-wheel on the upper end of said sleeve.

4. In a road-grader, a circle-bar provided 10 with a series of vertical apertures, segment-bars provided with lugs to support said circle-bar and a locking-rod mounted for rotation and rectilinear reciprocation on one of said segments and engaging at times in one 15 or the other of the apertures in said circle-bar in combination with a plate 49 having seats in its upper edge at different elevations to receive the locking-rod and hold the same

in or out of engagement, a collar 47 on the rod and an expansive coil-spring acting against 20 said collar to seat the locking-rod when released from the upper seat in the plate.

5. In a road-grader, draft-bars, a head-block connected to the forward ends of said 25 draft-bars, a draw-rod yieldingly mounted in said head-block, a bail provided with a half-loop or notch to receive said draw-rod and normally retain the same, the draw-rod being free to move under strain forwardly and vertically out of the half-loop a material distance, 30 and a pin to which the bail is hinged.

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