

(No Model.)

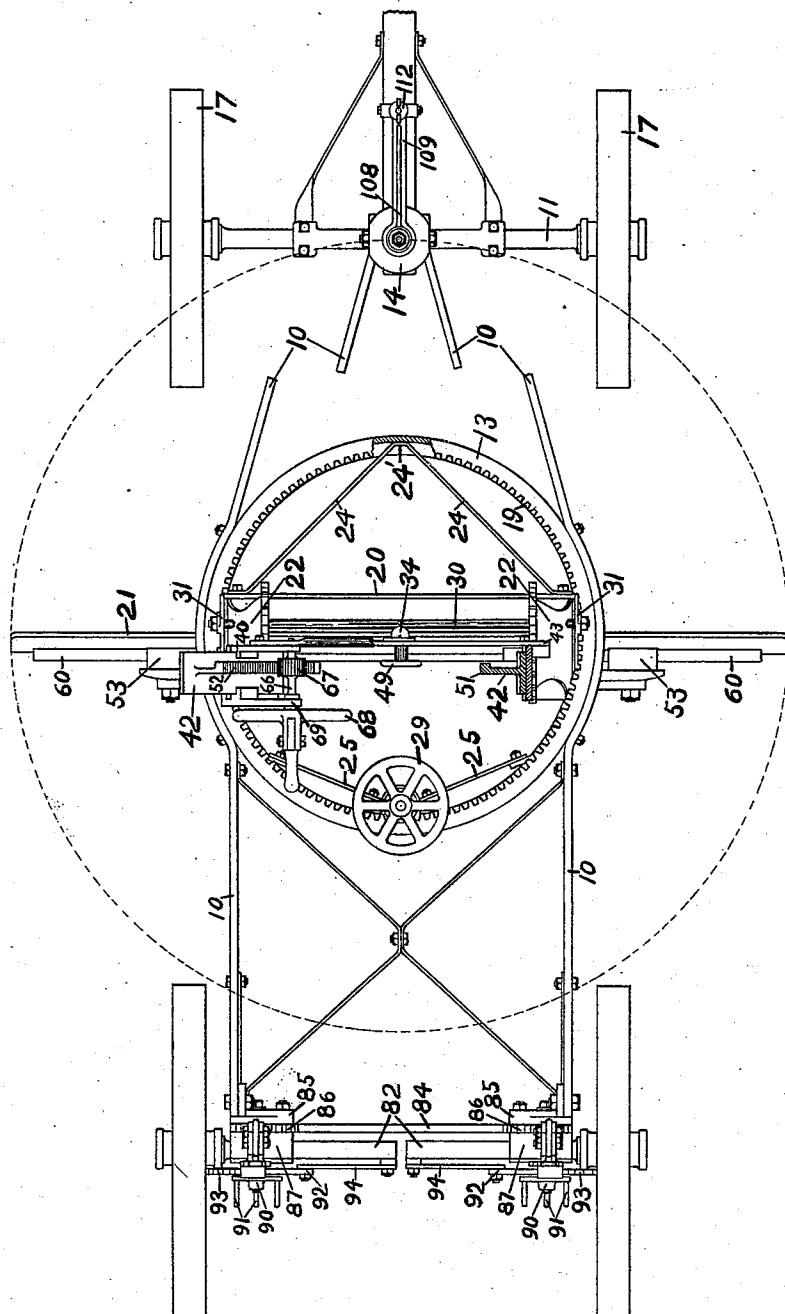
4 Sheets—Sheet 1.

B. POULSON.
ROAD GRADER.

No. 543,191.

Patented July 23, 1895.

Fig. 1.



WITNESSES:

G. B. Taylor
H. S. Coolican.

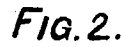
Britton Poulson INVENTOR

BY
A. C. Hartman
ATTORNEY.

4 Sheets—Sheet 2.

No. 543,191.

Patented July 23, 1895.



W. B. Taylor
H. C. Coolican.

BY
H. C. Hastman
ATTORNEY.

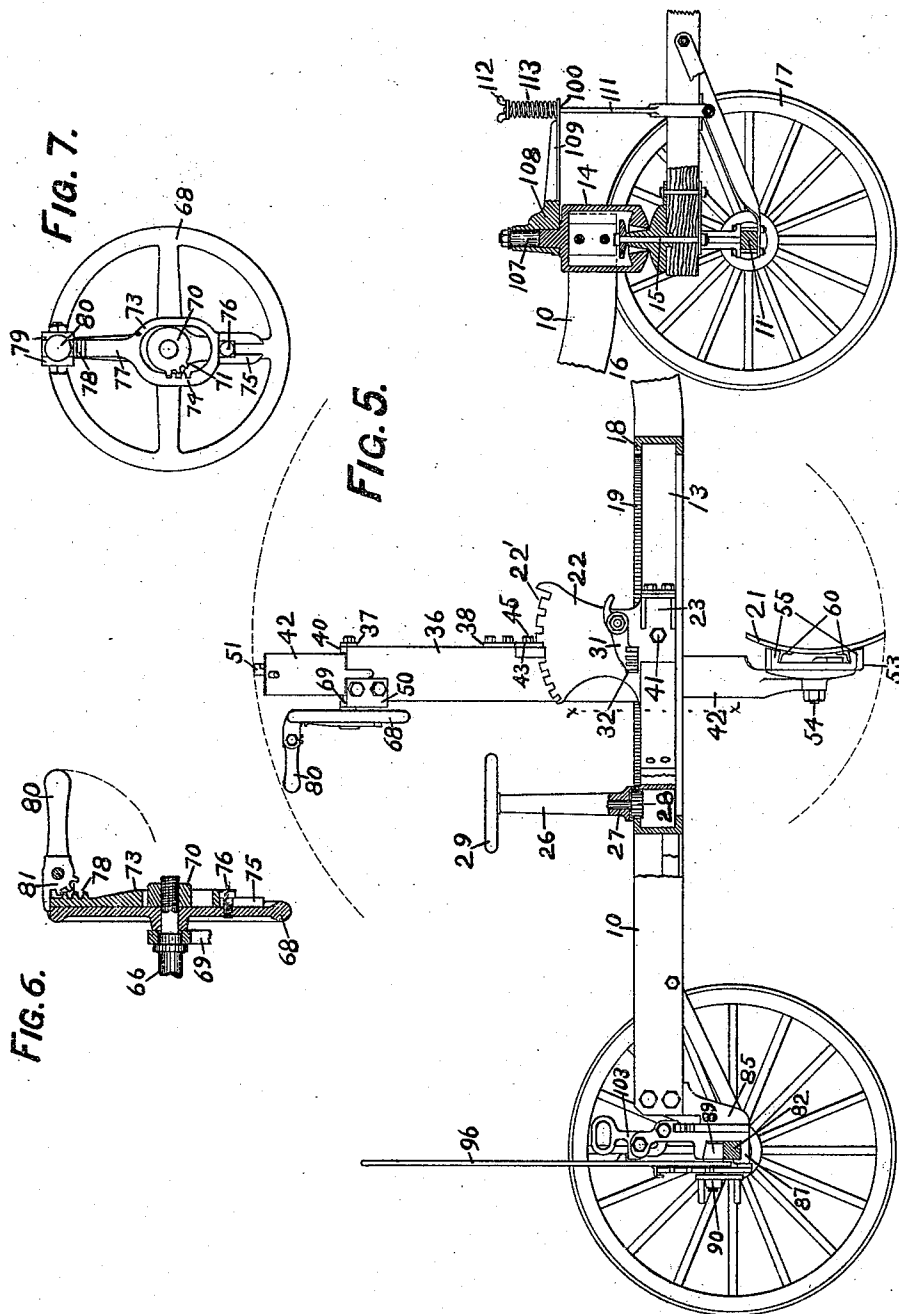
(No Model.)

4 Sheets—Sheet 3.

B. POULSON.
ROAD GRADER.

No. 543,191.

Patented July 23, 1895.



WITNESSES:

W. B. Taylor
H. C. Cookman.

Britton Foulson

INVENTOR

BY

H. C. Hartman

ATTORNEY.

(No Model.)

4 Sheets—Sheet 4.

B. POULSON.
ROAD GRADER.

No. 543,191.

Patented July 23, 1895.

Fig. 8.

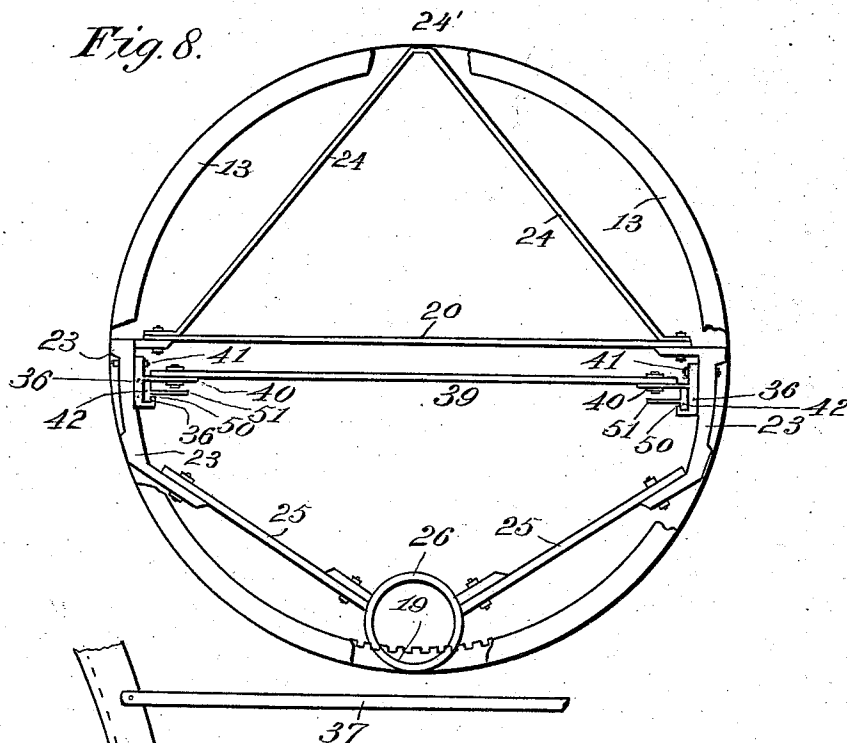
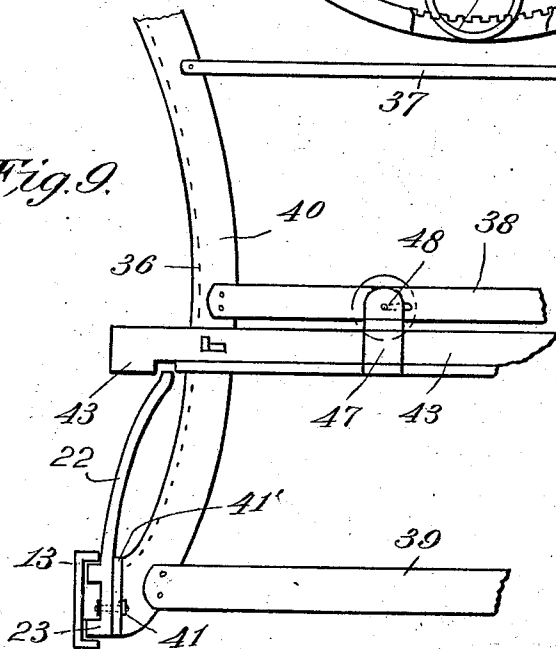


Fig. 9.



WITNESSES

D. P. Hartman
H. S. Soolican.

INVENTOR

Britton Poulson

By
A. C. Hartman Attorney

UNITED STATES PATENT OFFICE.

BRITTON POULSON, OF FORT WAYNE, INDIANA.

ROAD-GRADER.

SPECIFICATION forming part of Letters Patent No. 543,191, dated July 23, 1895.

Application filed August 13, 1894. Serial No. 520,112. (No model.)

To all whom it may concern:

Be it known that I, BRITTON POULSON, a citizen of the United States, residing at the city of Fort Wayne, in the county of Allen, in the State of Indiana, have invented certain new and useful Improvements in Road-Graders; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in road-graders of the class known as "wheeled scrapers," in which the scraper-blade is supported by a frame mounted on wheels.

The objects of my invention are to provide an improved device for supporting the tongue; to provide improved means for extending the rear axles and adjusting them to any desired angle; to provide convenient and efficient means for adjusting the scraper-blade vertically and laterally; to provide improved means for the adjustment of the scraper-blade at different angles to the line of propulsion and for reversing; to provide improved means for adjusting the pitch of the scraper-blade and to provide an improved road-machine of more economical construction and direct action to the work required; and the invention consists in the construction and novel combination of parts hereinafter described, pointed out in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a top view of the machine. Fig. 2 is an elevation of the machine viewed from the rear, partly in section, on line *xx* of Fig. 5. Fig. 3 is a vertical cross-section of the adjusting devices of the extension-axle. Fig. 4 is a rear elevation of the devices shown in Fig. 3. Fig. 5 is a side elevation of the machine with part of the frame 1 broken away to give room for the working parts. Fig. 6 is a vertical section of the elevating and locking device of the scraper-blade; and Fig. 7 is a side view of the same device last named. Fig. 8 is a sectional view of the under side of the rotating frame, showing its connection with the circular frame; and Fig. 9 is a front elevation of one side of the rocking frame and

its connection with the rotating frame, the latter in section.

The references are by numerals.

The main frame of the machine consists of two side bars 10, extending from the rear axle to the front axle, and the circular frame 13 attached thereto, as shown in Fig. 1. The forward ends of these side bars 10, forming the draw-bar, are brought nearly together and firmly secured to a head-block 14, which is held revolubly in place on the front axle by the bolt 15, Fig. 5. These side bars 10 are also curved to form a goose-neck 16, under which the front wheels 17 may pass, so as to turn shortly. The center part of these side bars 10 are expanded or curved outwardly about half way between the axles and are adapted to support and be firmly attached to a circular frame 13, which thereby is made to form part of the main frame. This circular frame 13 is made, preferably, of channel-iron, with its flanges on the inner periphery, and is firmly attached to the draw-bars 10. The upper flange 18 of this circular frame 13 is provided with cogs 19 around its entire periphery. A rotating frame which supports the mechanism for the various adjustments of the scraper-blade 21 is mounted in the channel of the circular frame 13, as shown in Fig. 1.

The rotating frame consists essentially of two supports or main standards 23 which partly enter and are held in place in said channel at opposite sides by a cross-bar 20, as shown in Fig. 8. These main standards 23 are also further secured in place by braces 24 in front and braces 25 in rear. The front braces 24 are preferably of one piece, their junction-point forming a bearing 24' which enters in and is held in place by said channel. The rear braces 25 are attached at their junction to a hollow standard 26, a portion of which projects into the said channel, by which construction the rotating frame is held firmly and rotatably in place in the circular frame 13. These main standards 23 are preferably provided with vertical plates or flanges 22, formed integrally, to furnish means to aid in limiting the motion of the rocking frame, &c., as hereinafter described. This hollow standard 26 furnishes my preferred means to sup-

port the mechanism for revolving the rotating frame, which consists of a shaft 27 and pinion 28 meshing in the cogs 19 of the circular frame 13 and a hand-wheel 29 to operate the shaft 27.

The main standards 23 are provided with means to lock them in place when the proper angular adjustment of the blade 21 has been secured. This preferably consists of a rocking rod 30 passing through the main standard-flanges 22, and provided on each end, outside of the standard-flanges 22, with a falling segment 31, which engages the cogs 19 on the upper flange of the circular frame. An operating-rod 33 extends up from the center of this rocking rod 30 in easy reach of the operator, and is made of such dimensions, or preferably provided with a knob 34 having such weight, that when in locking position the locking parts are held in place by its gravity, because the rod 33 with its knob 34 falls back of the center of the rod 30. It is also so adjusted that when reversed it unlocks the parts and falls forward of the center and holds by its weight without having to be held by the operator in either position. The scraper-blade 21 being suitably connected to the main standards 23 by intervening mechanism, the mechanism described constitutes the means for its angular adjustment and for reversing.

To regulate the pitch of the scraper-blade a rocking frame is pivotally mounted between and attached to these main standards 23. It consists of two curved standards 36 (right and left) and brace-bars holding them rigidly in place, one 37 at the top, one 38 in the center, and one 39 at the bottom. These curved standards 36 are preferably provided with a flange 40, projecting on one side for strength, and to them the braces 37, 38, and 39 are rigidly attached, forming a solid rocking frame. The lower ends of the curved standards 36 are attached to the main standards 23 by pivot-bolts 41, forming a strong pivotal connection upon which the rocking frame is swung backward or forward. The bolts 41 pass through bosses 41', which are attached to the lower ends of the standards 36. (See Fig. 9.) The lifting-arms 42 of the scraper-blade 21 are held and guided by these curved standards 36 by suitable mechanism, confining them to a vertical motion in the same or in coincident lines therewith.

The scraper-blade 21 is attached firmly to the lower ends of the lifting-arms 42, and is then adjusted to any desired pitch by inclining the lifting-arms 42 backward or forward. This is done by moving the rocking frame, which carries them on its pivot-bolts 41. Such pitch is retained by suitable mechanism engaging the segment-rack 22', formed on the upper end of the main standard-flanges 22. My preferred mechanisms for such engagement consist of a locking-bar 43, provided with slots through which bolts 45 pass and secure it to the flange 40 of the curved standards 36 of the rocking frame, the slots per-

mitting a limited lateral motion of the bar 43. The ends of this locking-bar 43 are provided with cogs or projections 43', adapted to engage the segment-rack 22' of the main standard-flanges 22 when the bar 43 is moved in one direction and to be disengaged when moved in another direction, and it is also provided with means to secure it in position. For such means I form a projection of plate 47 at or near the center of the bar 43, extended up on one side of the center brace-bar 38 of the rocking frame and secured thereto by a bolt 48 operated by a hand-wheel 49 on the opposite side. This construction furnishes the means whereby the scraper-blade 21 is adjusted to and in any required pitch to its work, according to the different kinds of soil to be handled.

For the particular purpose of adjusting the pitch of the blade the standards 36 need not be curved, but such curved form is preferable in my mechanism for lateral adjustment of the scraper-blade 21, which I will now describe in connection with my device for vertical adjustment of the scraper-blade.

The curved standards 36 of the rocking frame are curved outwardly, forming segments of a circle. On the inner sides of these standards 36, which is their outer periphery, T-shaped lifting-arms 42, curved on the same radius, rest with their flat sides against the curved standards 36 and are held movably in place thereon by guides 50, attached thereto. The upper ends of the T-edges 51 of these lifting-arms 42 are provided with rack-gears 52 for about one-third of their length, for the purpose of raising and lowering them by means of pinions meshing in the rack-gears. The lower ends of these lifting-arms 42 are attached to the scraper-blade 21 in any suitable manner; but I prefer to attach to the ends of the lifting-arms a rocking block 53 by a pivot bolt 54, whereby the block rotates in a vertical plane in front of the arms 42. This block 53 is constructed with half V-shaped projections 55 on their upper and lower ends, and the scraper-blade is provided with flanges 60 upon its back, riveted thereto and forming guides or ways adapted to slide in and be held and guided by these half V-shaped projections 55. The lower flange on the back of the scraper-blade is provided with perforations 61, into which dogs 62, pivoted to the block 53, drop, and thereby lock the scraper-blade 21 in position. These dogs 62 are operated by means of connecting-rods 63, extending upward along the sides of the T 51 of the lifting-arms 42, and are provided with a T-handle 64 to lift them out of engagement, and they are held in such position by the ends of the T-handle 64 engaging loops 65 on the lifting-arms 42.

It will be seen from the construction that when the dogs 62 are held up out of engagement the scraper-blade 21 can be removed entirely out of connection with the blocks 53 for repairs and sharpening, and that when it is slid and held in place by means of its

flanges 60 and the half V-shaped projections 55 of the blocks 53 and both dogs 62 are then let down, so as to drop into the perforations 55, the blade 21 will be held rigidly in place, locking also the lifting-arms 42. Therefore when the blade 21 is to be raised or lowered, it is necessary that one of the dogs 62 be raised up out of engagement, and as the blade 21 is drawn upward it will then slide through the disengaged block 53 freely, out or in, as it is raised or lowered. It is also evident that when it is lowered the blade 21 slides outward from the main frame on the side on which the dog 62 holds the scraper-blade 21 in place to the block. This movement outward is by virtue of the circle of the lifting-arm, which carries it outwardly as it is moved down and draws the blade inwardly as it is moved upward, so that to give a lateral motion of the blade 21 on either side of the machine, as desired, the scraper-blade 21 is locked by means of the dogs 62 to the block on the side on which it is desired to extend the blade 21, and is disengaged to have free movement in the opposite block 53. When no lateral movement is required, both blocks 62 are disengaged and the lifting-arms are lowered until the blade is in position, and the blade is then locked by the dogs. Ordinarily the lateral extension required can thus be secured, but sometimes it is desired to increase the lateral extension of the blade. To do so—say to the right—the left block is locked to the blade by its dog, as described, and the right one disengaged and raised by the lifting-arm. As it is raised the block is thereby drawn inwardly and toward the center of the blade and is secured there by its dog. Then the lifting-block is disengaged and the right lifting-arm lowered into position, thereby moving its block and the attached blade downwardly and outwardly farther to the right than before. This operation may be repeated until the extreme limit of extension is reached. These lifting-arms 42 are raised or lowered and locked in place independently of each other by any suitable means, but I prefer the construction shown in Fig. 1, which consists of a shaft 66 and pinion 67 held in engagement with the rack-gear 52 of the lifting-arms 42 and operated by a crank-wheel 68, projections 69 for holding the shaft 66 in place being attached to the upper ends of the curved standards 36 of the rocking frame. This wheel 68 is of peculiar construction. The end of the pinion-shaft 66 is provided with a nut 70, which is circular in form and is provided with gear-teeth 71 on one side.

A stirrup 73, centrally placed on the face of the wheel 68, is provided with a rack 74 upon one side, which engages the teeth 71 of this nut. The blank side of the stirrup 73 serves to hold these two parts in engagement. At one end of this stirrup 73 is a slotted projection 75, through which a bolt 76 passes and assists in holding the stirrup 73 to the face of the wheel 68. The opposite end of

this stirrup 73 is provided with an extension-bar 77, having a rack 78 on its end, which extends and is guided between two lugs 79 attached to the rim of the wheel 68. The handle 80 is provided at one end with a segmental head 81, which is pivoted between these two lugs 79 and is thereby held in engagement with the rack 74 of the stirrup. When the handle 80 is raised so as to be at a right angle to the plane of the wheel 68, it is in position for operating, for the nut 70 has been loosened by the movement of the stirrup-rack 74, so the pinion-shaft 66 will turn freely. The lifting-arms 42 may then be raised or lowered independently of each other, as desired, and when adjusted the handle 80 is moved down on the face of the wheel 68, the gear connections operated by this motion turning the nut 70 tight, thereby drawing the wheel 68 and the collar of the pinion-shaft 66 tight against the sides of its bearing, thus locking the shaft 66 and the lifting-arms 42 in the position placed.

My construction for the extension of the axles consists in providing two half-axes 82 to the rear end of the machine to be moved independently, and also mechanism for tilting them, so as to throw the wheel at an angle to the plane of the frame, and is as follows: To the rear end of the side bars 10 of the main frame I secure two brackets 85, respectively, which extend downward, as shown in Fig. 5, and are suitably braced thereto. To the lower ends of these brackets 85 a cross-bar 84 is rigidly secured, forming a rear brace to the main frame. At each end of this cross-bar 84 segment-racks 86 are formed on top and extended upward for the purpose of affording part of the means by which the tilting blocks 87 are locked in place. The tilting blocks 87 are pivoted to each end of this cross-bar 84, the pivot-centers coinciding with the centers of the segment-racks 86. The pivot-bolts 88 for this purpose extend through and beyond the tilting blocks 87, and their ends are provided with screw-threads, as shown in Fig. 3. These tilting blocks 87 are recessed through their center to receive the axles 82 and a wedge-block 89, which has a straight side against the axle and an inclined or beveled side opposite thereto, that side of the tilting block being beveled outwardly to correspond thereto, so that when the wedge-block 89 is forced into the recess it binds the axle firmly in and to the tilting blocks 87, which are then secured rigidly to the cross-bar 84. The preferred mechanism for so securing the blocks 87 is a foot-nut 90 on the end of the pivot-bolt 88, the extension-arms 91 of which afford means for the operator to turn it with his feet. The half-axes 82 are thus held in these tilting blocks 87, and also held to the frame, by means of the foot-nut 90, forcing the wedge-block 89 firmly in place and binding the whole firmly to the ends of the cross-bar 84. The axles are moved inwardly and outwardly

from the frame by any suitable means. I prefer the construction shown in the drawings, which consists of a rocking lever 92, pivoted on the same pivot-bolt 88, its upper end provided with a segmental rack 93, and its lower end pivoted to a connecting-rod 94, which extends and is pivoted to the inner end of the half-axle 82. The rocking lever 92 is provided on its inner side with a hub or boss 95, which impinges against the wedge-block 89, and on this boss a hand-lever 96, provided at that end with a longitudinal slot 97, is mounted to operate the segment-rack 93 of the rocking lever 92. The hand-lever 96 is provided with a projection extended over and down upon the segmental rack 93 of the rocking lever 92, and has a tooth 99 on its inner side, which is adapted to engage the teeth of said segmental rack 93. So when the axle 82 is free to be operated, the operator drops the lever down until this tooth 99 engages the cogs of the segmental rack 93, and thereby is enabled to move it backward or forward, carrying the attached axle in and out from the main frame. When the axle has been moved in or out to its desired position, the operator locks the parts in place by operating the foot-nut and turning it up tightly, whereby all the parts are firmly and rigidly bound to the cross-bar 84.

The means for tilting the axle 82 consists of an extension 100 on top of and attached to the tilting block 87, provided with a slot at its upper end and also a slotted projection 102 on one side extending over and down upon the segment-rack 86 of the cross-bar 84. A flat dog 103, provided with a handle 104 at its upper end, is held in place in the slotted parts of said extension 100 and projection 102 by bolts 105 passing up through them, and is adapted to engage the cogs of said segmental rack 86. This flat dog 103 has also another function. When it is raised up out of engagement the upper end is adapted to pass between two lugs 106, attached to the inner side of the hand-lever 96, whereby the hand-lever when thus engaged tilts the blocks 87 and its attached axle 82 to any desired angle. The flat dog 103 is then pushed down into engagement with the segmental rack 86, thereby locking the block 87, the foot-nut tightened, and the parts are then held rigidly in the position given them. By this construction, when the dog 103 is raised it engages the hand-lever 96 and disengages the rocking block, so that the operation of the hand-lever then tilts all the parts together. When the flat dog is lowered into engagement with the rack of the cross-bar, the rocking block is locked in position and the hand-lever can operate only to move the half-axes.

The construction for holding the tongue is as follows, (see Fig. 5.) On top of the head-block an upright shaft 107 is secured, upon which a bracket 108 is held pivotally for the purpose of turning with the tongue. Its arm 109 extends out over the tongue and is pro-

vided with an orifice 110 in its end, through which a rod 111 passes. One end of this rod 111 is suitably secured to the tongue and is provided with a thread and thumb-nut 112 on the other end. Between the thumb-nut and the top of the bracket a spiral spring 113 is placed around the rod, and by means of the thumb-nut 112 the rod 111 is adjusted to retain the tongue in any given elevation. By this construction the horses are relieved from the weight of the tongue, and may raise or lower it when emergency requires, the spring device admitting of such change of position.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a road grader of the class named, a frame for the support of the scraper blade and its mechanism, consisting of two side bars extended from the rear to the front axle, the forward ends being brought together and suitably secured to the front axle, and curved so as to form a goose neck under which the front wheels may pass; the said side bars being expanded or curved outwardly near their center part and adapted to support and be firmly attached to a circular frame: a circular frame firmly attached to said side bars, and forming part of the main frame and adapted to support the mechanism for elevating and rotating and the lateral adjustments of the scraper blade: and mechanism for elevating, rotating and laterally adjusting the scraper blade, suitably connected to said circular frame.

2. In a road grader of the class named, a circular frame made of channel iron, with the flanges on the inner periphery, and rigidly attached to the main frame of the machine: cogs formed upon one of the flanges of said circular frame around the entire periphery: mechanism for supporting the scraper blade and providing for its various adjustments mounted in the said circular frame: a hand wheel, shaft, and pinion, suitably mounted with the pinion meshing with the cogs of said circular frame and adapted to rotate the said mechanism.

3. In a road grader of the class named, a circular frame secured rigidly to the main frame of the machine, and provided with rack gear around its periphery: a rotating frame for operating the mechanism for the various adjustments of the scraper blade, consisting of two main supports or standards therefor, and guided in place within said circular frame by suitable mechanism, and adapted to be rotated therein: means to rotate said frame in said circular frame: mechanism for the various adjustments of the scraper blade secured to said rotating frame: and a scraper blade suitably attached to said mechanism.

4. In a road grader of the class named, a circular frame rigidly attached to the main frame of the machine, and provided with rack gear around its periphery: a rotating frame for operating the mechanism for the various

adjustments of the scraper blade, consisting of two main supports or standards therefor, held and guided in place on the sides of said circular frame, and adapted to be rotated therein: means to rotate said frame in said circular frame: mechanism for the various adjustments of the scraper blade secured to said rotating frame: a scraper blade suitably attached to said mechanism: a rocking rod journaled in the bearings in the main standards and extending beyond them and provided on each end on the outside of the main standards with a falling segment adapted to engage the circular frame so as to lock the rotating frame in place at any point of angular adjustment: and means to operate said rod.

5. In a road grader of the class named, a main frame consisting of two side bars extending from the front to the rear axles: a circular frame fixed rigidly to said side bars: a rocking frame adapted to be revolved within said circular frame, consisting essentially of two main standards held and guided in the opposite sides of said circular frame: and a rocking frame pivotally mounted between and attached to said standards, consisting of two vertical standards adapted to form guides for the lifting arms of the scraper blade extended above the circular frame and held or braced rigidly in place by suitable braces: lifting arms adapted to slide upon said standards and be secured thereto: a scraper blade attached to the lower ends of said lifting rods: and means to lock the frame and lifting rods at any angle or pitch of the blade.

6. In a road grader of the class named, a circular frame suitably fixed and secured to the main frame, provided with rack gear extending around its inner periphery: a rotating frame mounted revolubly in said circular frame, having main standards for the support of the mechanism for the adjustment of the scraper blade and its upper ends expanded in segment form and provided with serrations or cogs: a rocking frame pivotally mounted and attached to and between the main standards, consisting of two curved standards held on opposite sides to each other by suitable braces: mechanism attached to said curved standards adapted to lock the rocking frame in place by engaging the cogs upon the upper ends of said main standards so as to hold the curved standards rigidly at any vertical angle at which they may be placed.

7. In a road grader of the class named, a circular frame secured rigidly to the main frame and provided with rack gear extending around its inner periphery: a rotating frame mounted revolubly in said circular frame, having main standards for the support of the mechanism for the adjustment of the scraper blade, the upper ends of the main standards being expanded in segment form and provided with serrations or cogs: a rocking frame pivotally mounted and attached to and between the main standards, consisting of two curved standards held on opposite sides to each other

by suitable braces: mechanism attached to said curved standards adapted to lock the same in place by engaging the cogs upon the upper ends of said main standards, so as to hold them at any vertical angle at which they may be placed: curved elevating arms mounted in guides attached to said curved standards and held and guided thereby, and provided at their upper ends with rack gear: mechanism to operate said rack gear: and a scraper blade attached to the lower ends of said lifting arms.

8. In a road grader of the class named, a circular frame rigidly secured to the main frame and provided with rack gear extending around its inner periphery: a rotating frame mounted revolubly in said circular frame, having main standards for the support of the mechanism for the adjustment of the scraper blade, the upper ends of the main standards being expanded in segment form and provided with serrations or cogs: a rocking frame pivotally mounted and attached to and between the main standards, consisting of two curved standards adapted to form guides for the lifting arms and held on opposite sides of the circular frame by suitable braces: mechanism attached to said curved standards adapted to lock the same in place by engaging the cogs upon the upper ends of said main standards, so as to hold them at any required vertical angle: curved lifting arms for the scraper blade mounted in guides attached to said curved standards and held and guided thereby, and provided at their upper ends with rack gear: mechanism to operate said rack gear: rocking blocks pivotally attached to the lower ends of the lifting arms provided with recesses, the upper and lower sides of which are half V-shaped inwardly, so as to form a dove-tailed guide or slot: a scraper blade provided with flanges secured to the back part thereof, adapted to form guides or ways to slide in and be held by the half V-shaped projections on the rocking blocks: and means to secure said scraper blade in place in said blocks.

9. In a road grader of the class named, a circular frame rigidly secured to the main frame and provided with rack gear extending around its inner periphery: a rotating frame mounted revolubly in said circular frame and provided with main standards for the support of the mechanism for the adjustment of the scraper blade: a rocking frame pivotally mounted and attached to and between the main standards, consisting of two curved standards held on opposite sides to each other by suitable braces: mechanism adapted to lock the main standards and curved standards at any angle to each other when required: curved lifting arms mounted in guides attached to said curved arms, and held and guided thereby, and provided at their upper ends with rack gear: mechanism to operate said rack gear for raising and lowering said lifting arms: a scraper blade attached to the lower ends of said lift-

- ing arms: rocking blocks pivotally attached to the lower ends of the lifting arms and provided with recesses, the upper and lower sides of which are half V-shaped inwardly, so as to form a dove-tailed guide or slot: a scraper blade provided with flanges secured to the back part thereof, and adapted to form guides or ways to slide in and be held by the half V-shaped projections on the rocking blocks: perforations in one of the flanges of the scraper blade, and dogs adapted to engage said perforations, and means to operate the dogs.
10. In a road grader of the class named, a circular frame rigidly secured to the main frame of the machine: a rotating frame mounted in and adapted to be revolved therein upon said circular frame and provided with two standards on opposite sides adapted to support the mechanism for supporting the scraper blade: a rocking frame consisting of two vertically arranged supports held in place by suitable braces and pivotally attached at their lower ends to said standards of said rotating frame: lifting arms adapted to slide upon said vertical supports and be held in place thereby: a scraper blade attached to the lower ends of the lifting arms: a shaft and pinion mounted in projections attached to the upper end of said standards, and held in engagement with a rack on the upper end of said arms: a crank wheel mounted upon the end of said shaft: a nut adapted to clamp said wheel and a collar to said shaft firmly against the bearing between them, for the purpose of locking said shaft: a stirrup placed upon the outer face of said wheel, provided with a rack upon one side, which engages the teeth formed on said nut: a slotted projection on one end of said stirrup through which a bolt passes to assist in holding the stirrup movably to the face of the wheel: an extension bar on the other end of the stirrup having rack teeth on its end and extending between two lugs attached to the rim of the wheel: a handle provided at one end with a segmental rack and pivoted between said two lugs, so as to be held in engagement with the said rack on said extension; as and for the purpose substantially as described.
11. In a road grader of the class named, brackets securely attached to the rear ends of the side bars forming the main frame and extended downward: a cross bar rigidly secured to the lower ends of said brackets and provided with segment racks on top at each end: a tilting block mounted on a pivot bolt secured to the ends of said cross bar, the center or axis coinciding with the center of the segment rack, the tilting blocks being recessed through their center part and each adapted to receive therein a half axle and a wedge block: two half axles placed within said recess of said tilting blocks: wedge blocks placed within said recesses on one side of said half axles and having the upper side inclined or beveled and adapted to bind the axle firmly in said tilting block when forced into the recess: means to force said wedge firmly into said block and bind the parts securely to the tilting block: and means to move said axles in or out from the main frame: and means to tilt said block so as to place the half axles at any incline to the main frame which may be required, and secure the block firmly in the position required.
12. In a road grader of the class named, two half axles secured in blocks attached to the rear end or cross bar of the frame, said blocks being recessed to receive and hold said axles: wedge blocks adapted to bind said half axles in said blocks: means to force said wedge blocks in place and means to extend said half axle in and out from the main frame as described.
13. In a road grader of the class named, an upright shaft attached to the front axle or to the mechanism supporting the frame thereon: a bracket mounted on said frame so as to turn with the tongue: an arm to said bracket extending out over the tongue and provided with an orifice in its end: a rod suitably secured to said tongue and passing up through said orifice, and provided with a thread and thumb nut above said bracket: and a spiral spring placed around said rod between the thumb nut and said bracket, for the purpose and substantially as described.
14. In a road grader of the class named, a frame consisting of two side bars brought together in front and suitably pivoted to the front axle, adapted in the center part to inclose a circular frame: brackets attached to the rear ends of said side bars extending downward: a cross beam secured to said brackets: a circular frame securely attached to the side bars and provided with a segment rack: a rotating frame mounted revolubly in said circular frame: a hand wheel, shaft and pinion mounted upon said rotating frame with the pinion engaging the teeth of said segment rack: standards attached to the rotating frame for supporting the mechanism operating the scraper blade laterally and vertically: and mechanism supporting the scraper blade, and adapted to lower and raise the same at the will of the operator and to laterally adjust the same mounted in said rotating frame.
15. In a road grader of the class named, a frame consisting of two side bars brought together in front and suitably pivoted to the front axle—adapted in the center part to inclose a circular frame: brackets attached to the rear ends of said cross bars, extending downward: a cross bar or beam secured to said brackets: a circular frame securely fixed to said side bars and provided with a segment rack: a rotating frame mounted revolubly in said circular frame: a hand wheel, shaft and pinion mounted upon said rotating frame with the pinion engaging the teeth of the segment rack: supports or standards for the attachment and support of the mechanism operating the scraper blade secured to and forming

ing part of said rotating frame: a rocking frame consisting of standards to support and guide the lifting arms suitably braced and mounted pivotally in and between the standards attached to the rotating frame: guides 5 formed on said standards of said rocking frame: lifting arms for the scraper blade held in and guided by said guides, their lower ends attached to the scraper blade: and means to 10 elevate and lower the lifting rods at will.

16. In a road grader of the class named, a circular frame secured rigidly to the main frame and provided with a segment rack: brackets attached to the rear ends of the 15 main frame and extended downward: a cross beam secured to said brackets: blocks secured on either end of said cross beam, provided with recesses for two half axles to be held and moved inwardly or outwardly from the frame: 20 means to bind or lock said half axles at any given place in said blocks: a rotating frame provided with supports or standards for the mechanism operating the scraper blade, mounted revolubly in said circular frame, and 25 provided with a shaft and pinion meshing in said segment rack: means to operate said pinion: mechanism attached to the standards of said rotating frame adapted to support the scraper blade and elevate and lower the 30 same at either end at the will of the operator.

17. In a road grader of the class named, a circular frame securely fixed to the main frame and provided with a segment rack: brackets attached to the rear ends of said 35 main frame: a cross beam securely attached to the brackets below the plane of the main frame and extended the full width of the frame: blocks attached to said cross beam at either end, provided with recesses to hold and 40 permit a sliding movement of two separate half axles: means to hold and lock said half axles in place at any given point of extension: means to extend said half axles separately at will of the operator: and means to rotate said 45 blocks with their attached axles so as to place the axles separately at any given angle to the plane of the frame: a rotating frame mounted revolubly in said circular frame and provided with means to rotate the same: 50 mechanism for the support of the scraper blade attached to said rotating frame and adapted to lower or elevate the scraper blade on either side separately at will of the operator.

18. In a road grader of the class named, a circular frame securely fixed to the main frame and provided with a segment rack: a 55 rotating frame mounted revolubly in or upon said circular frame, and provided with standards for the support of the mechanism operating the scraper blade laterally and vertically: a hand wheel, shaft, and pinion mounted in said rotating frame with the pinion 60 meshing with the teeth of said segment rack: a rocking frame provided with two curved standards pivoted at their lower ends on either side to the standards of said rotating

frame: guides formed on said curved standards to receive and hold in place the lifting arms of the scraper blade: lifting arms to the 70 scraper blade mounted in guides: means to elevate and lower said lifting arms separately at will and lock them in place vertically: blocks attached to the lower ends of the lifting arms, provided with means to hold the 75 scraper blade adjustably in or to them: means to bind said scraper blade in place in the blocks, and to release them separately so as to permit a lateral movement of the scraper blade. 80

19. In a road grader of the class named, a circular frame securely fixed to the main frame: a rotating frame mounted in said circular frame adapted to be rotated or revolved 85 therein: means to rotate said frame and lock it in place when the proper angular adjustment has been secured: standards attached to said rotating frame and forming part of it, adapted to support the mechanism of the scraper blade for lateral and vertical adjustment: a rocking frame consisting of two 90 vertical standards pivoted at their lower ends to the standards of said rotating frame: means to incline the same backward or forward and lock them in place at any suitable angle: 95 guides upon said vertical standards adapted to support and guide the lifting rods of the scraper blade: lifting rods for the scraper blade mounted in guides: means to elevate and lower them at will, separately: blocks attached to the lower ends of said lifting rods, 100 provided with recesses adapted to hold projections upon the scraper blade: a scraper blade provided with projections adapted to move in and be guided by the recesses of said 105 blocks: means to lock the scraper blade in said blocks separately: brackets attached to the rear ends of the frame of said machine on either side thereof: a cross bar attached to the lower end of said brackets and securely 110 bracing the same: blocks attached to either side of said cross bar provided with recesses adapted to secure a sliding movement therein of the two half axles: two half axles mounted in said blocks: means to lock and bind them 115 in place in said blocks: and means to extend them in and out from the frame at will, separately.

20. In a road grader of the class named, the combination of the side bars 10 with the circular frame 13: the upper flange 13 provided with cogs: the scraper blade: a rotating frame adapted to be revolved within the circular frame, provided with standards 22: a segment rack 22': means to rotate the frame in or upon 125 the circular frame: means to lock the rotating frame in position when the proper angular adjustment has been secured: a rocking frame consisting of the curved standards 36: brace bars securing the same in place: the flange 130 40: pivot bolts 41 securing the lower ends of the standards to the rotating frame: lifting arms 42: the locking bar 43, provided with means to lock the rocking frame in place: guides 50

for the lifting arms of the scraper blade: rack gear 52 on the lifting arms: rocking blocks 53 on the lower ends of the lifting rods, pivotally attached thereto—the blocks being provided with V-shaped recesses: flanges 60 on the scraper blade: perforations 61 in said flanges: dogs 62 pivoted to the blocks: connecting rods 63 connected to the dogs for operating: means to elevate and lower the lifting arms of the scraper blade: brackets 85 attached to the rear end of the frame: a cross bar 84 attached to the dogs: tilting blocks 87 provided with recesses adapted to hold half axles: half axles 82 sliding in recesses in said tilting blocks: wedge blocks 89: the pivot bolt 88 passing through the tilting blocks and provided at its end with a foot nut 90: a rocking lever 92: the segmental rack 93 on said lever: connecting rod 94: hand lever 96: projection 98 on said lever: teeth 99 on the inner side of said projection: the extension 100 on top of the rocking block provided with a slot at its upper end and also with a slotted projection 102: flat dog 103 provided with a handle: lugs 106 on the inner side of the hand lever, substantially as and for the purpose described.

21. In a road grader of the class named, a frame for the support of the scraper blade and its mechanism, consisting of two side bars extended from the rear to the front axle, the forward ends being brought together and suitably secured to the front axles, and the rear ends provided with brackets attached thereto and suitably braced: a cross bar secured to said brackets rigidly holding them in place: the said side bars being expanded or curved outwardly near their center part and adapted to support and be firmly attached to a circular frame: a circular frame firmly attached to said side bars and formed of channel iron, and provided with rack teeth on the upper channel: a rotating frame consisting of two main supports or standards suitably braced and adapted to be guided and rotated within the channel of said circular frame: a hand wheel, shaft, and pinion mounted in said rotating frame, the pinion meshing with the teeth of said circular frame: a rocking rod journaled in the bearings in the main standards and extending beyond them, and provided on one end, on the outside of the main standards, with a falling segment adapted to engage the cogs in the circular frame, so as to lock the rotating frame at any point of angular adjustment: a rocking frame consisting of two curved standards adapted to form guides for the lifting arms of the scraper blade, suitably braced in place, the lower ends being pivotally attached to the standards of the rotating frame: cogs formed on the upper ends of the main standards: a locking bar attached to said curved standards and adapted to lock the rocking frame in place by engaging the said cogs on the main standards: curved lifting arms for the scraper blade mounted in guides attached to said curved standards and held and guided

thereby, and provided at their upper end with rack gear: a shaft and pinion meshing in the projections attached to the upper end of said curved standards and held in engagement with the rack on the upper end of said lifting arms: a hand wheel mounted on the end of said shaft: a nut adapted to clamp said wheel and collar to said shaft firmly against the bearing between them, to lock said shaft in place: a stirrup placed upon the outer face of said wheel, provided with a rack upon one side, which engages the teeth formed on said nut: a slotted projection on one end of said stirrup through which a bolt passes to assist in holding the stirrup movably to the face of the wheel: an extension bar on the other end of the stirrup having rack teeth on its end and extended between two lugs attached to the rim of the wheel: a handle, provided at one end with a segmental rack and pivoted between said lugs so as to be held in engagement with said rack on said extension: rocking blocks pivotally attached to the lower ends of said lifting arms and provided with recesses, adapted to hold flanges attached to the scraper blade and permit a lateral motion: a scraper blade provided with flanges secured to the back thereof and adapted to form guides or ways and to slide in and be held by the recessed portion of the rocking blocks: perforations in one of the flanges of said scraper blade: dogs adapted to engage said perforations: a connecting rod attached to said dogs extending upward and provided with a handle in easy reach of the operator, to operate said dogs: segment racks formed on the ends of the cross bar attached to said brackets at the end of the frame: tilting blocks mounted on pivot bolts through the end of said cross bar, the centers or axis coinciding with the center of the segment racks—the tilting blocks being recessed through their center part and each adapted to receive therein a half axle and a wedge block: two half axles placed within said recesses outside of the tilting blocks: wedge blocks placed within said recesses on one side of said half axles and having the upper sides inclined or beveled, and adapted to bind said axles firmly in the tilting blocks when forced into the recesses: a foot nut on the end of the pivot bolt upon which the tilting blocks turn, and adapted to clamp and force the wedge block into place: half axles 82 adapted to slide in and be held in the tilting blocks 87: the rocking lever 92 provided with a segmental rack 93: the connecting rod 94 pivoted to the rocking lever at one end and to the inner end of the half axles at the other end: a hub or boss on the inner side of the rocking lever through which the pivot bolt 88 passes: a hand lever 96 provided with a longitudinal slot mounted on said hub or boss, and also provided with a projection extended over and down upon the segmental rack 93, and provided with a tooth 99: the extension 100 on top of the tilting blocks, provided with a slotted projection 102:

the flat dog 103 provided with a handle, held and guided in the slotted parts of said extension 100 and projection 102: the upright shaft 107 on top of the head block: the bracket 108
5 provided with its arms 109 and having an orifice 110 in its end: a lifting rod 111 attached to the tongue at one end and provided with a thread and thumb nut 112 at the other end: the spiral spring 113 placed between the thumb

nut and the end of the bracket 108, all substantially as and for the purpose described.

In testimony whereof I hereunto subscribe my name, in the presence of two witnesses, this 4th day of August, 1894.

BRITTON POULSON.

Witnesses:

H. C. COOLICAN,
H. C. HARTMAN.