

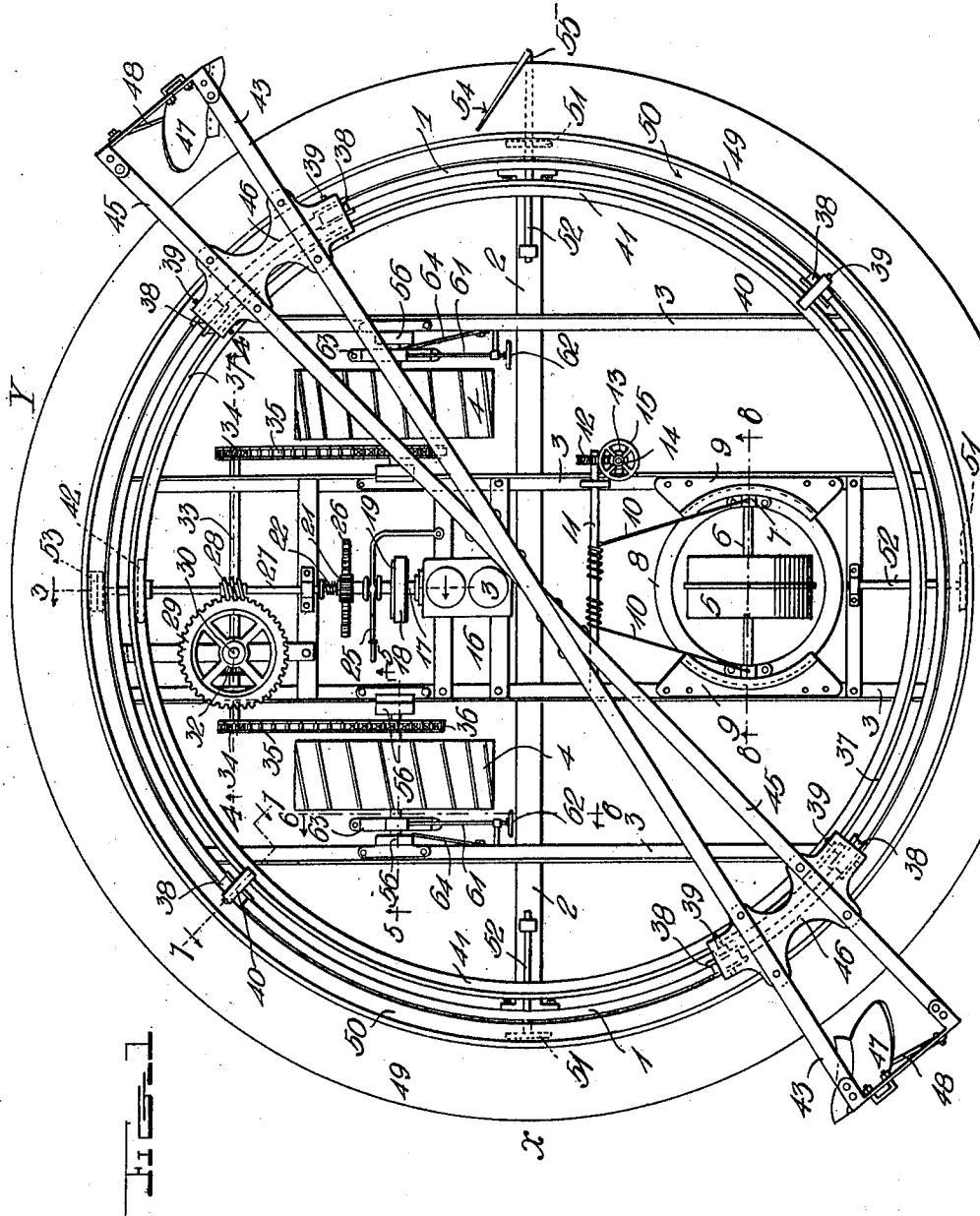
V. LANDHOLM.
ROAD GRADER.

APPLICATION FILED JAN. 27, 1910.

Patented Nov. 1, 1910.

3 SHEETS-SHEET 1.

974,397.



Witnesses

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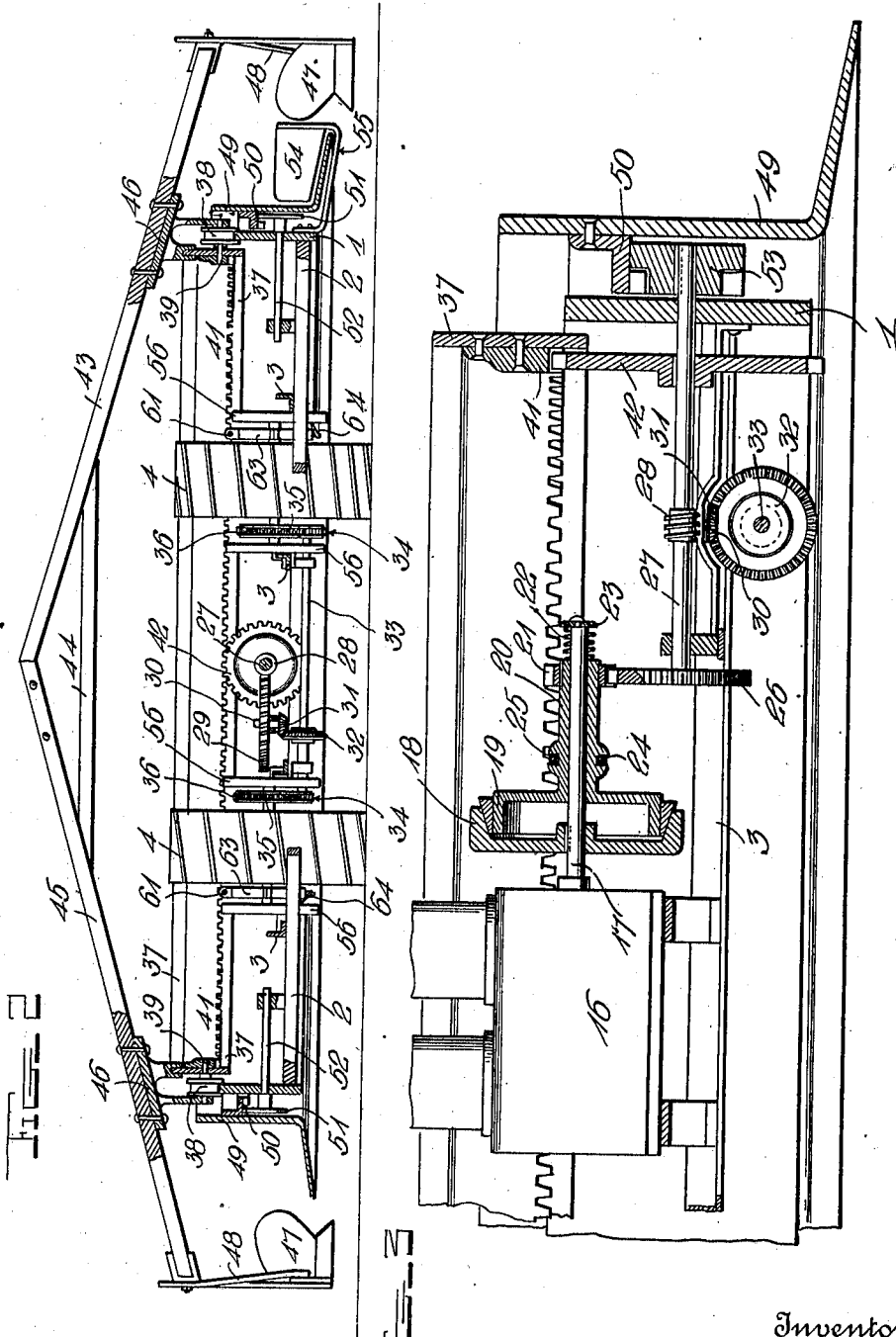
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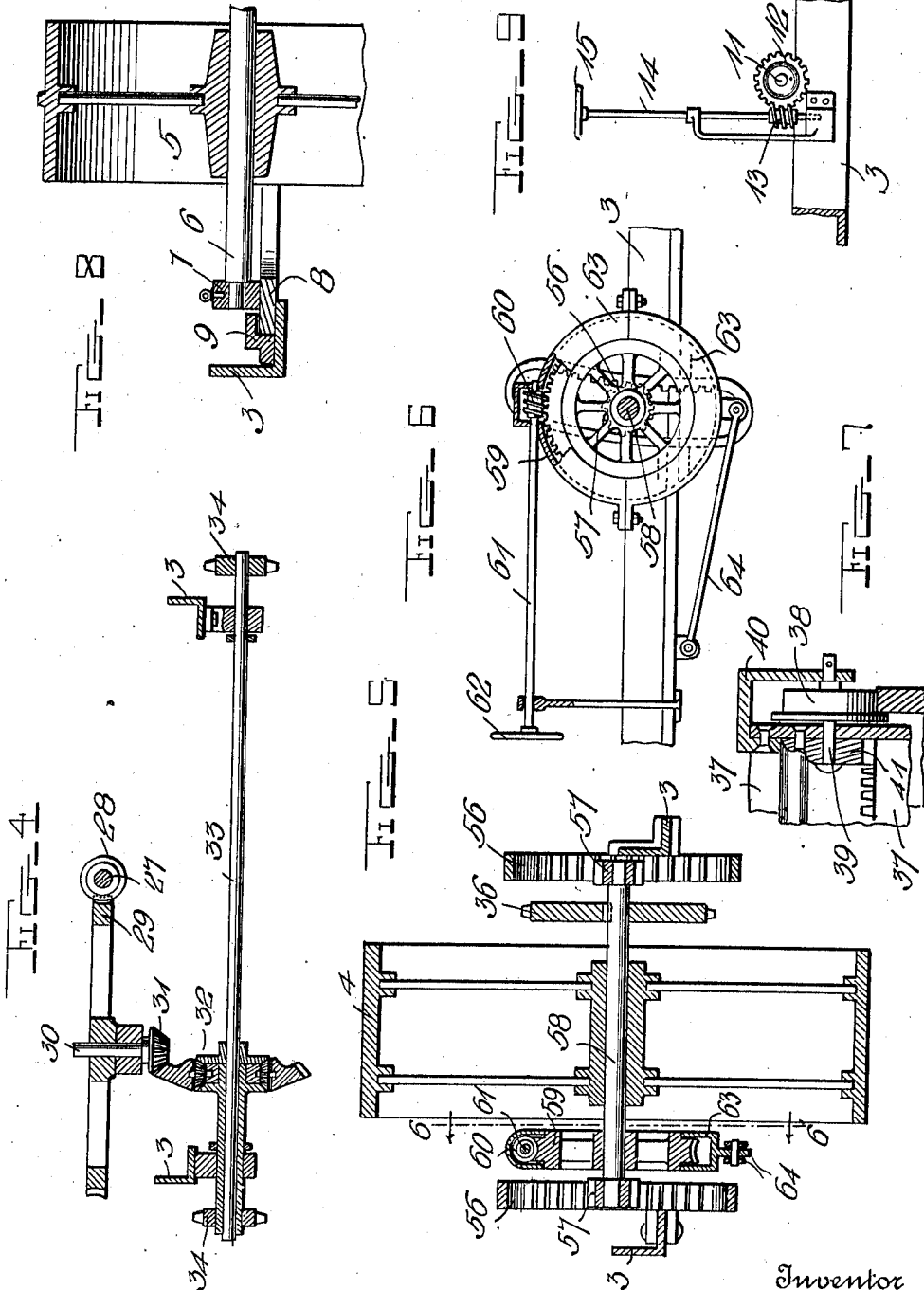
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UNITED STATES PATENT OFFICE.

VICTOR LANDHOLM, OF WESTPOINT, NEBRASKA.

ROAD-GRADER.

974,397.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Application filed January 27, 1910. Serial No. 540,360.

To all whom it may concern:

Be it known that I, VICTOR LANDHOLM, a citizen of the United States, residing at Westpoint, in the county of Cuming and State of Nebraska, have invented certain new and useful Improvements in Road-Graders; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable other skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in road graders.

One object of the invention is to provide a machine of this character having an improved construction and arrangement of operating devices and means for driving the same whereby the grading of a road is completed in one operation or passage of the grader over the road.

Another object is to provide a machine of this character carrying its own propelling mechanism as well as power for operating the grading mechanism or devices.

With the foregoing and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a top plan view of a road grader constructed in accordance with my invention; Fig. 2 is a central vertical longitudinal sectional view of the same; Fig. 3 is an enlarged detail vertical sectional view taken on the line 3—3 of Fig. 1; Fig. 4 is an enlarged detail vertical sectional view through the propelling mechanism of the machine taken on the line 4—4 of Fig. 1; Fig. 5 is a similar view through one of the supporting wheels and the frame of the adjusting mechanism on the line 5—5 of Fig. 1; Fig. 6 is a similar view on the line 6—6 of Fig. 1 showing the frame adjusting mechanism in side elevation with parts broken away; Fig. 7 is a detail vertical section through one side of the annular ring on the main supporting frame and the plow carrying frame on the line 7—7 of Fig. 1; Fig. 8 is a detail vertical sectional view through a portion of the steering wheel and its supporting frame taken on the line 8—8 of Fig. 1; Fig. 9 is a detail side view of the steering mechanism for the steering wheel.

In the embodiment of the invention, I

provide a supporting frame comprising an annular ring 1 in which is arranged a central transversely disposed cross bar 2 on which and connected at their opposite ends to the front and rear portions of the annular frame or ring 1 are a series of parallel longitudinal bars 3. The bars 2 and 3 are preferably formed of angle iron. The frame is supported at its forward portion by driving and supporting wheels 4, to which the frame is adjustably connected in the manner hereinafter described.

The rear portion of the frame is supported upon a single steering wheel 5 mounted on an axle 6, the ends of which are revolvably mounted in suitable bearings 7 secured to the opposite sides of an annular bearing frame or ring 8 which is slidably or revolvably mounted on the inner longitudinal bars 3 of the main frame and is held in position on said bars by segmental guide plates 9 bolted or otherwise secured to the bars 3 as clearly shown in Figs. 1 and 8 of the drawing.

The steering wheel 5 is operated to guide the machine by means of steering cables or chains 10, the rear ends of which are connected in any suitable manner to the bearings 7 of the axle 6, while the forward ends of said steering cables are adapted to be wound in opposite directions on a steering shaft 11 mounted in suitable bearings on the bars 3, and having fixed on one end a worm gear 12, with which is operatively engaged a worm 13 on the lower end of a steering post 14 which is mounted in suitable bearing brackets on one of the bars 3, and which is provided on its upper end with a steering wheel 15, as clearly shown in Fig. 9 of the drawings. By means of this operating mechanism, the shaft 11 may be revolved in one direction or the other, which will wind up one of the steering cables and unwind the other, or vice versa, thus turning the shaft 6 and the steering wheel 5 one way or the other to guide the machine in the desired direction.

Arranged at a suitable position on the main frame is a motor 16 which may be of any suitable form and construction, and on the shaft 17 of which is fixedly mounted a combined fly wheel and clutch member 18, the opposite member 19 of which is slidably and loosely mounted on the shaft and has formed thereon a bearing sleeve 20 on one

end of which is fixedly mounted a spur gear pinion 21. On the forward end of the shaft 17 is arranged a coiled spring 22 which is confined between a cap 23 bolted to the end of the shaft and the adjacent end of the sleeve 20, whereby the pressure of said spring is exerted on the sleeve to force the same rearwardly and the clutch member 19 into operative engagement with the combined clutch member and fly wheel 18 fixed to the motor shaft. The sleeve 20 has formed at a suitable point therein an annular groove 24, with which is connected in any suitable manner a shifting lever 25, whereby the clutch member 19 is retracted or disengaged from the clutch member 18, thereby throwing the operating mechanism of the machine out of gear.

The pinion 21 on the sleeve 20 of the clutch member 19 is operatively engaged with a spur gear 26 mounted on a drive shaft 27 which is journaled in suitable bearings in the main frame, as shown. On the shaft 27 is fixedly mounted a worm 28 which is operatively engaged with a worm gear 29 fixed on the upper end of a vertically disposed shaft 30, journaled in suitable bearings on the main frame of the machine and having fixed on its lower end a beveled gear 31, which is engaged with a differential gear 32 fixedly mounted on a propelling shaft 33 journaled in suitable bearings on the bars 3 of the main frame. On the opposite ends of the propelling shaft 33 are mounted sprocket pinions 34 which are connected by sprocket chains 35 to sprocket gears 36 secured to the driving and supporting wheels of the machine. By this arrangement of gearing, it will be seen that the supporting and propelling wheels are operated to drive or propel the machine at a slow rate of speed whereby the grading mechanism herein-after described will be given sufficient time to operate as the machine is being moved along.

Arranged above and within the annular ring 1 of the main supporting frame is an annular plow carrying frame 37 which is revolubly supported on the ring 1 of the main frame by a series of flanged supporting rollers 38 revolubly mounted on axle bolts or pins 39, the inner ends of which are inserted through the annular frame or ring 37 and the outer ends of which are engaged with angle brackets 40 secured to said frame 37, as clearly shown in Figs. 3 and 7 of the drawing. On the inner side of the annular frame or ring 37 is bolted or otherwise secured an annular rack 41, the teeth of which are arranged on its lower edge and are adapted to engage an operating gear 42 which is fixedly mounted on the shaft 27, whereby the movement of said shaft is employed to revolve the frame 37.

Connected to the annular frame or ring

37 at diametrically opposite points are inwardly extending upwardly inclined plow beams 43, the inner ends of which are joined together over the center of the main frame and are connected at their upper ends by a brace 44. Connected to the beams 43 and diverging therefrom toward their outer ends are brace bars 45, said bars and plow beams being connected to the upper edge of the annular frame 37 by suitable connecting plates or castings 46. To the outer ends of the beams 43 are connected suitable plows 47, said plows being braced and held in position by rods 48 which are connected at one end to the heels of the plows and at their opposite ends to the outer ends of the brace bars 45. By thus supporting the plows 47, the latter will be carried around the frame 1 by the operating mechanism of the frame 37 as hereinbefore described. The plows 47 may be of any suitable form, such as disk plows, mold-board plows, or the like, the latter form of plow being shown in the drawings.

In connection with the plowing mechanism, I preferably employ a dirt carrying mechanism comprising an annular substantially L-shaped frame 49, the lower outwardly projecting portion of which inclines downwardly at a slight angle as shown. The frame 49 is of slightly larger diameter than the main frame or ring 1 and is arranged around the outer side of said main frame and is revolubly supported by means of a combined annular track and toothed rack bar 50, which is bolted or otherwise secured to the inner side of the vertical portion of the dirt carrier frame 49 and which is engaged with and supported on a series of guiding and supporting rollers 51 fixed on the outer ends of short shafts 52, journaled in suitable bearings on the main frame 1, as clearly shown in Fig. 2 of the drawings. The supporting rollers 51 are provided with a narrow periphery and are adapted to engage the smooth or track portion of the combined track and rack 50, while with the toothed or rack portion of said combined track and rack bar is engaged a combined gear pinion and guide roller 53 which is fixedly mounted on the outer end of the drive shaft 27, as clearly shown in Figs. 3 and 4 of the drawings.

By means of the combined gear pinion and guide roller 53, the movement of the shaft 27 is imparted to the annular dirt carrier 49 through the right angular track and rack bar 50, thereby causing the dirt which is thrown onto the lower radially projecting portion of the carrier by the plows 47 to be carried around to the position for dumping the same at which point the dirt is pushed off from the carrier 49 by means of a scraping blade 54 which is arranged at a suitable angle above the lower radial portion of the

carrier and is held in operative engagement therewith by a suitable arm or bracket 55, connected to the frame 1 and projecting outwardly beneath the dirt carrier and upwardly at the outer edge thereof as shown.

In order to tilt the machine to one side to bring the plows into position for engaging the dirt at the side of the road, I provide a suitable frame raising and tilting mechanism which is here shown and preferably comprises segmental racks 56 which are secured to and arranged on the inner sides of the bars 3 between which the supporting wheels 4 are mounted and with which are engaged gear pinions 57 keyed or otherwise fixedly secured to the outer ends of the shafts or axles 58, on which the supporting and driving wheels 4 are loosely mounted. On one end of the shafts 58 between the wheels 4 and the gear pinions 57 are fixedly mounted worm gears 59, with which are engaged worms 60 on the forward ends of operating shafts 61, the rear ends of which are provided with operating wheels 62 by means of which the worm gears 59 are operated to turn the shafts 58 in one direction or the other, thereby engaging the gear pinions 57 thereon with the teeth of the segmental racks 56 which will raise or lower said racks and the frame to which they are connected, thus adjusting one side or the other of the main frame to the desired height for engaging the plows with the ground. The worm gear 59 and worm 60 are preferably inclosed in a suitable housing 63, said housing being connected at its lower side by a brace bar 64 to one of the bars 3 of the main frame as shown. By means of the frame adjusting mechanism just described, the main frame may be tilted downwardly and forwardly so that the side of the machine adjacent to the road side will be lowered into such position that when the plows are brought around by their operating mechanism, they will engage the ground and begin to work at about the point marked "X" on Fig. 1 of the drawings at which point they penetrate the ground to the greatest depth and from this point the plows continue to work in the ground until the point marked "Y" on Fig. 1 of the drawing is reached, at which point the plows entirely leave the ground.

In the engagement of the plows with the ground, as just described, the depth of the cut gradually decreases from the point of engagement indicated by "X" in Fig. 1 to the point where they leave the ground as indicated by "Y" in Fig. 1. While the plows are thus working, the dirt is being thrown onto the adjacent portion of the carrier and is conveyed around thereby to the inner side of the machine and is discharged along the center of the road by the scraper 54, as hereinbefore described. It will thus be seen that the dirt

is plowed up and removed from the sides of the road and deposited along the center thereof in one operation, thus completing the grading in one passage of the machine over the road.

It will be understood that the propelling mechanism is geared to move the machine at such rate of speed compared with the speed or movement of the plows that the entire surface of the ground will be acted on by the successive engagement therewith of the plows when brought around by their operating mechanism. It will also be understood that the plows and the dirt carrier are geared to operate at the proper relative rates of speed to permit the carrier to continuously receive and discharge the dirt.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention as defined in the appended claims.

Having thus described my invention, what I claim is:—

1. In a road grader, a supporting frame, a plow carrier revolvably mounted on said frame, plows supported and operated by said carrier, a revolvably mounted dirt carrier adapted to receive the dirt thrown up by said plows and to discharge the same at a pre-determined point, and means to operate said plows and dirt carrier at the proper rates of speed.

2. In a road grader, a self propelled supporting frame, a plow carrier revolvably mounted on said frame, plows supported and operated by said carrier, a rotary dirt carrier revolvably mounted on said frame, a driving mechanism to operate said plows and dirt carrier at the proper rates of speed, a steering mechanism, and means to raise and lower one or the other side of said machine to cause the plows to engage the ground at the proper point.

3. In a machine of the character described, a supporting frame comprising an annular ring and a series of cross bars connected to said ring, supporting and driving wheels revolvably mounted in said frame, a steering and supporting wheel, means to operate said steering and supporting wheel, a propelling mechanism connected with said drive wheels, an annular rotary plow carrier revolvably mounted on said main frame, means to drive said plow carrier, inwardly and upwardly inclined plow beams secured to said carrier, means to brace said beams, plows arranged on the outer ends of said beams, an annular rotary dirt carrier adapted to receive the

dirt thrown up by said plows, means to drive said dirt carrier, and means to discharge the dirt therefrom at the desired point.

4. In a machine of the character described, 5
a main supporting frame comprising an annular ring and a series of cross bars, supporting and driving wheels mounted between said cross bars at the forward end of the frame, an annular steering wheel frame rev- 10
olubly mounted in the rear portion of said main frame, a steering wheel journaled in said revolubly mounted frame, a steering shaft, steering cables connected to said rotary steering wheel frame and adapted to 15
be wound in opposite directions upon said steering shaft whereby said steering wheel is turned one way or the other to guide the machine, means to operate said steering wheel shaft, a driving mechanism connected 20
to said driving wheel, a rotary plow carrier supported by said main frame, a rotary dirt carrier, and means to operate said plow and dirt carrier.

5. In a road grader, a main wheeled supporting frame comprising an annular ring 25
forming a track, a rotary plow carrier comprising an annular frame, an annular rack secured to said frame, a series of supporting rollers revolubly mounted on said carrier 30
and adapted to engage the track formed by the ring of said main frame, a driving gear engaged with said rack, plow beams secured to said annular frame, plows carried by the outer ends of said beams, and a rotary dirt 35
carrier mounted on said main frame and adapted to receive the dirt thrown up by said plow and to discharge the same at a pre-determined point.

6. In a road grader, a wheeled supporting 40
frame comprising an annular ring forming a track, an annular plow carrier, a series of supporting rollers revolubly mounted on said carrier and adapted to travel on the track formed by the ring of said main frame, 45
an annular rack bar secured to said annular plow carrier, plow beams secured to said carrier, plows arranged on the outer ends of said beams, an annular substantially L-shaped dirt carrier, a combined track and 50
rack bar secured to said dirt carrier, a series of supporting rollers revolubly mounted on said main frame to receive said track whereby said dirt carrier is revolubly supported in position to receive the dirt thrown up by

said plow, a drive shaft, gears arranged on 55
said shaft to engage the racks on said plow carrier and dirt carrier whereby said parts are operated at the proper relative rate of speed, and a motor geared to said drive shaft. 60

7. In a road grader, a wheeled supporting frame, comprising an annular frame or ring forming a track, an annular rotary plow carrier revolubly mounted on said track, plows secured to said plow carrier, an 65
annular rotary dirt carrier revolubly mounted on said main frame in position to receive the dirt thrown up by said plows, a scraper arranged on said main frame and adapted to discharge the dirt from said dirt carrier at a 70
pre-determined point, an operating mechanism connected with said plow carrier and dirt carrier, a motor carried by said main frame to drive said operating mechanism, and a propelling mechanism also operated 75
by said motor to propel the machine while said plows and dirt carrier are being operated.

8. In a road grader, a main supporting frame comprising an annular ring and a 80
series of cross bars, supporting and driving wheels arranged between said cross bars at the forward end of the machine, a steering wheel arranged at the rear end of the machine, a motor mounted on said main frame, 85
a drive shaft having a clutch connection with said motor whereby said shaft may be thrown into and out of gear, an operating shaft geared to said drive shaft, a propelling shaft geared to said drive wheels, a 90
differential gear connection between said propelling shaft and said operating shaft, means connected with the shafts of said driving and supporting wheels to raise or 95
lower one side or the other of said main supporting frame, a rotary plow carrier geared to said operating shaft, plows secured to said carrier, a rotary dirt carrier also geared to said operating shaft, and means to discharge the dirt from said carrier at a pre- 100
determined point.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

VICTOR LANDHOLM.

Witnesses:

WM. GENTRUP,
W. A. BLACK.