March 12, 1929. W. A. HORTHY ET AL 1,705,291

ROAD GRADER

Filed July 16, 1923 3 Sheets-Sheet 1

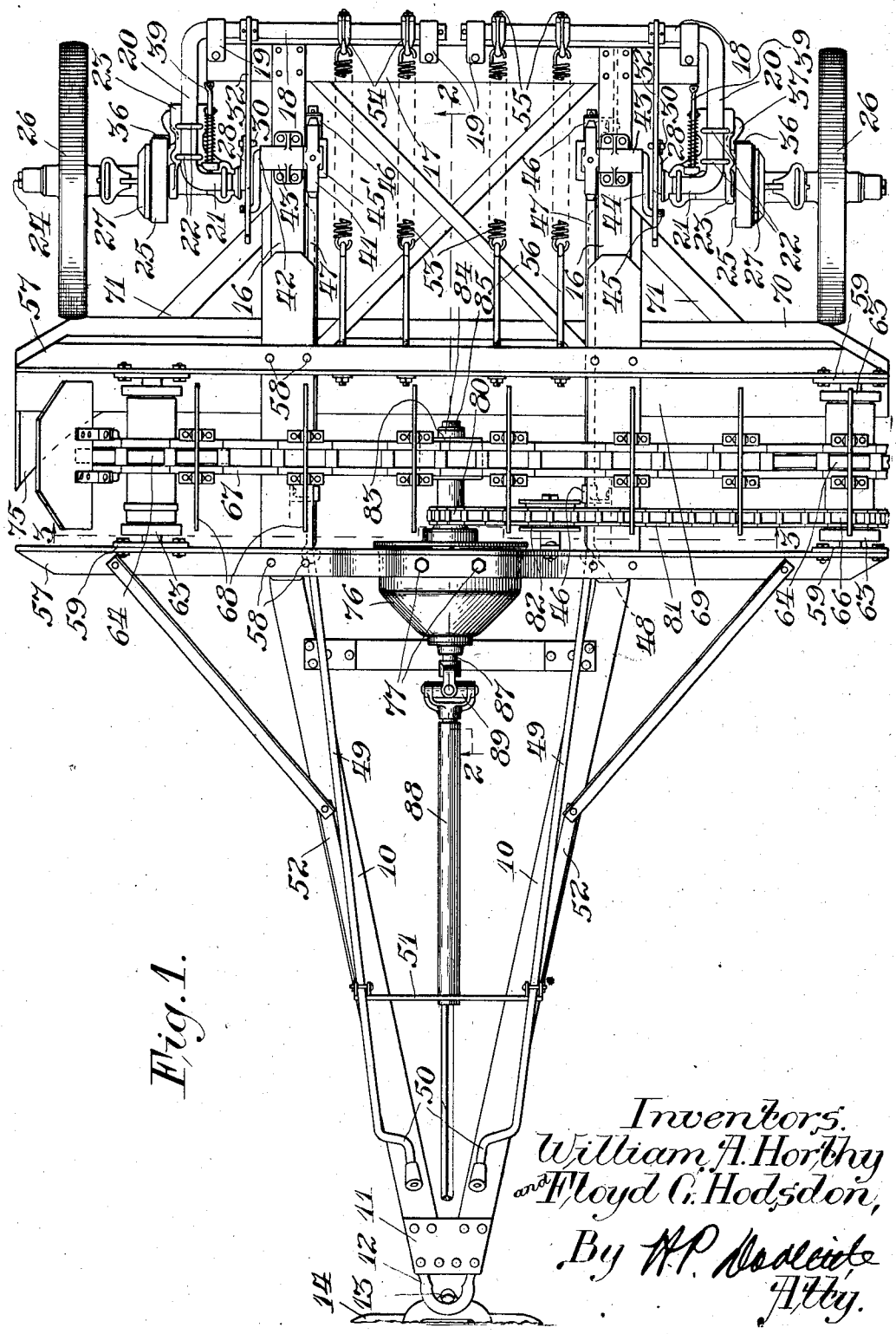


Fig. 1.

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Filed July 16, 1923 3 Sheets-Sheet 2

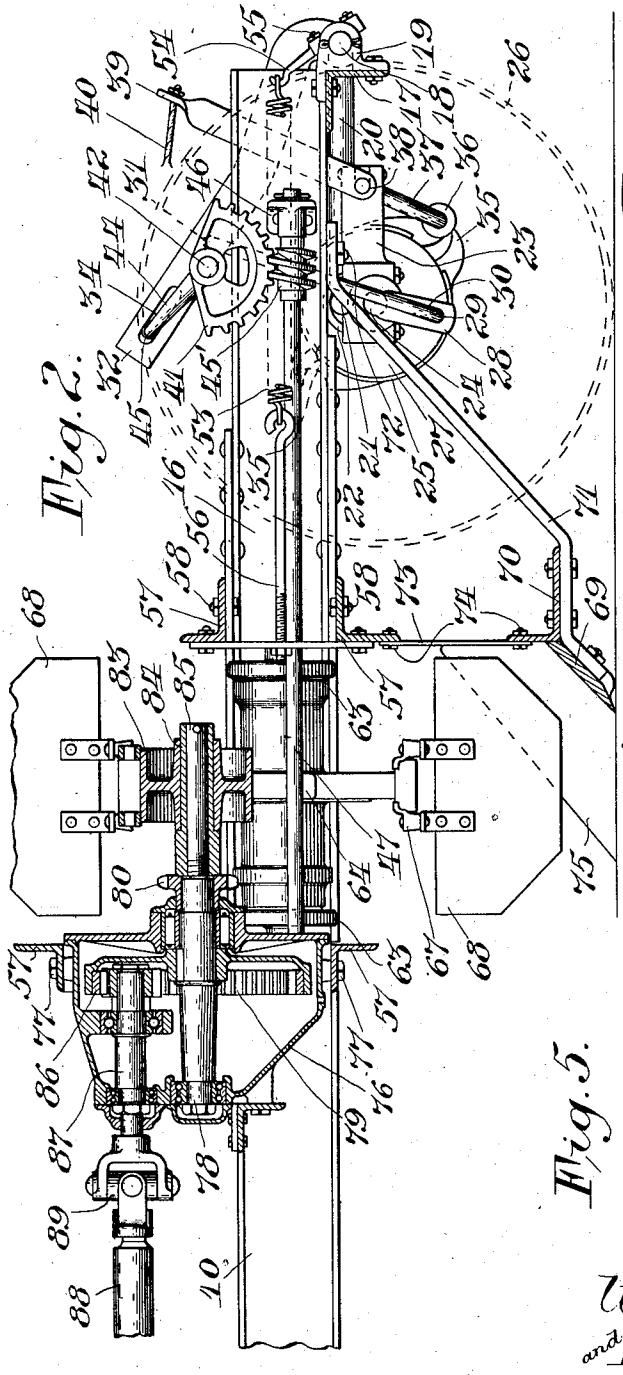


Fig. 2.

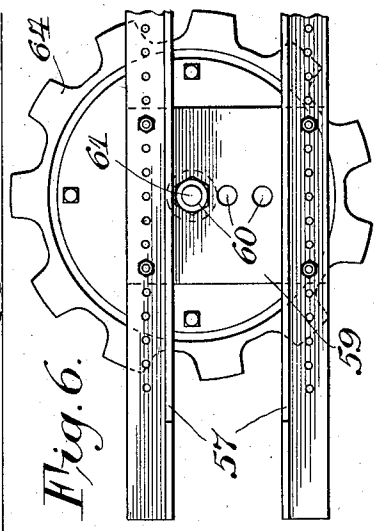


Fig. 6.

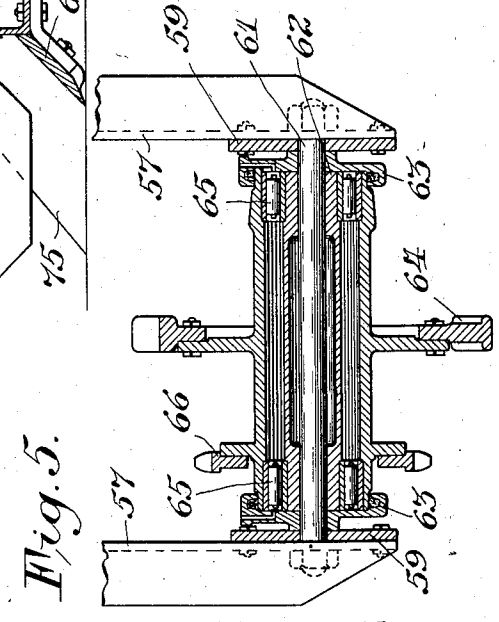


Fig. 5.

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ROAD GRADER

Filed July 16, 1923 3 Sheets-Sheet 3

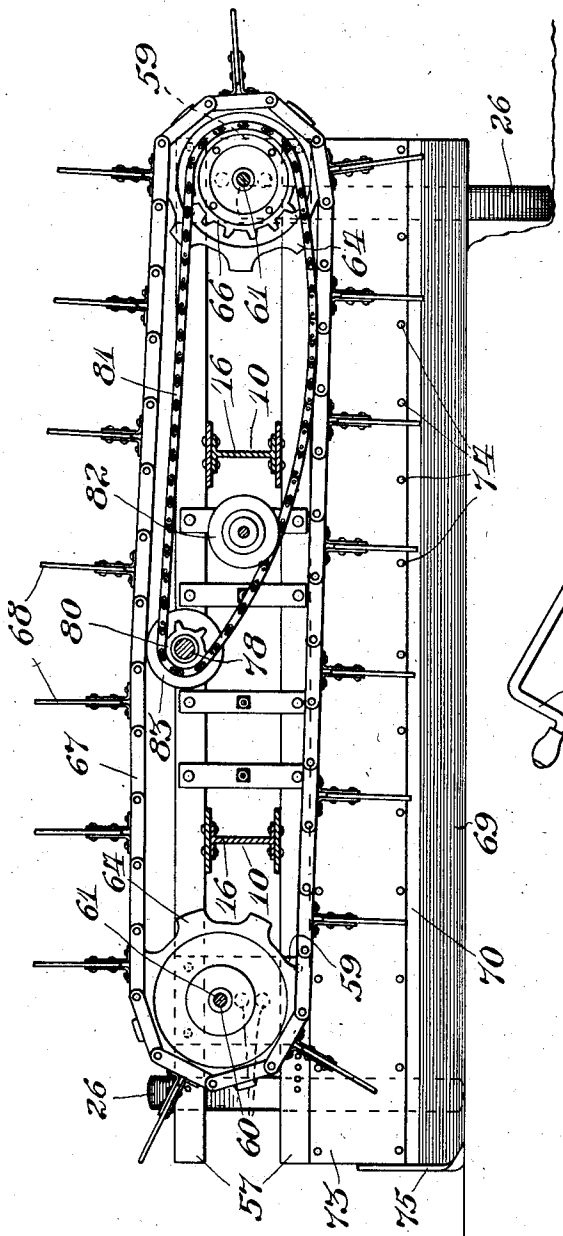


Fig. 3.

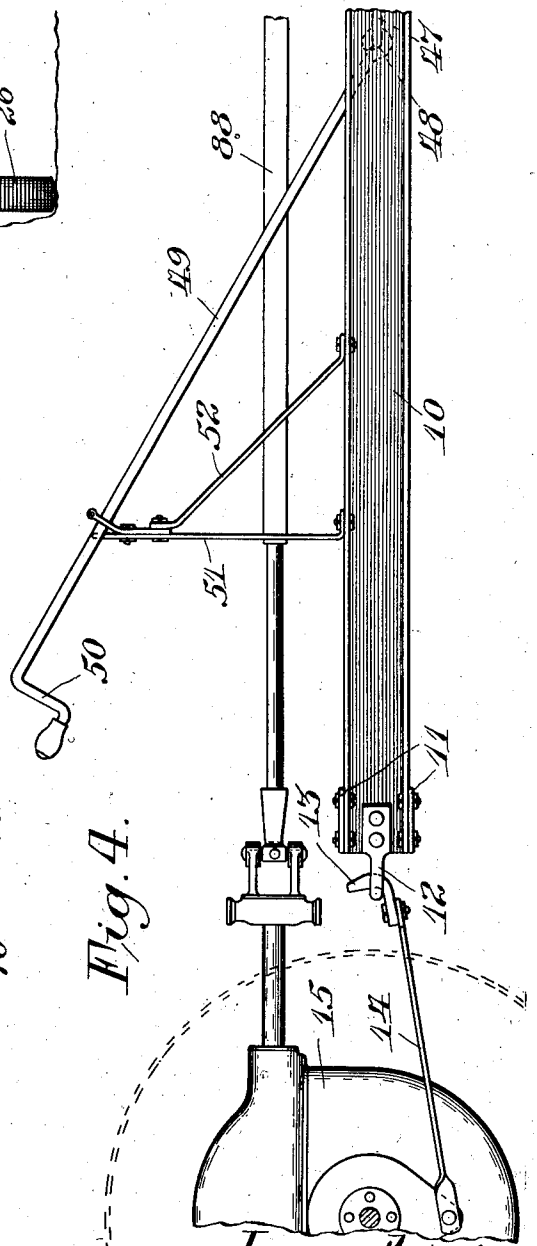


Fig. 4.

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UNITED STATES PATENT OFFICE.

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ROAD GRADER.

Application filed July 16, 1923. Serial No. 651,712.

This invention relates to improvements in road grading machines and has for its principal object to provide a device of this general character having novel and improved means whereby the same may effectively scrape, level, build and maintain the surface of a roadway, and also excavate or fill ditches.

Another object is to provide a device of this general character embodying an endless conveyor positioned in the front of a scraper blade arranged in such a manner that the same may be adjusted bodily, or at either end, to the requirements of the operator.

Another object is to provide a grader in which either side of the scraping mechanism may be raised or lowered independently of the other.

A still further object is to provide a road grader in which two power actuated mechanisms are arranged in transverse alinement for raising and lowering the grader.

These and other objects are attained by a novel construction and arrangement of the various parts in which an endless conveyor belt is positioned in front of the scraper blade, by means of which the surface of the ground is scraped and the conveyor is employed to convey or carry the material scraped by said blade from one side of the grader to the other. Positioned to the rear of the scraping and conveying mechanism and supporting the main frame of the road grader are two oppositely disposed power lift mechanisms, which are adapted to operate independently of each other for the purpose of elevating either side of the scraping and conveying mechanism should an obstruction, such for instance as a stone or a culvert, be encountered during the operation of the road scraper.

Referring to the drawings—

Fig. 1 is a top plan view showing our improved road grader;

Fig. 2 is a side elevational view of the road grader taken on the lines 2—2 in Fig. 1;

Fig. 3 is a front elevational view taken on the lines 3—3 in Fig. 1 showing the relative position of the endless conveying mechanism with respect to the scraper blade and also showing the manner in which the endless conveyor is operatively geared to the power transmission shaft;

Fig. 4 is a detail view showing the manner in which the forward end of our improved road grader is pivotally connected to the tractor and also showing the manner in which the grader is operatively connected to the tractor; and

Figs. 5 and 6 are cross-sectional and side elevational views respectively of the endless conveyor sprockets.

Our improved road grading machine, as illustrated in the accompanying drawings, comprises two oppositely disposed diverging main frame members 10 having their forward ends secured together by means of steel plates 11. Secured to the main frame members 10 is a U-shaped draft bracket 12 which is adapted to pivotally connect the road grader to a hook 13 secured to the draft member 14 of a tractor 15. The main frame members 10 extend rearwardly and terminate in parallel extending portions 16. Extending transversely with respect to the longitudinal main frame members 16 and secured thereto is a frame member 17.

In connection with our improved road grader, we have provided a novel power lift device in which two power lift mechanisms are arranged in transverse alinement for supporting the rear end of the grader. This mechanism comprises two oppositely disposed crank shafts 18 pivotally mounted in brackets 19 secured to the transverse frame member 17. The crank shafts 18 have formed integrally therewith longitudinally extending portions 20 which terminate at their forward ends in transversely extending portions 21. The portions 20 and 21 have secured thereto, by means of U-bolts 22, axle bearing brackets 23. Rotatably mounted in the bearing brackets 23 are crank shafts 24. The crank shafts 24 have secured thereto, by any well known means, intermittently operable clutch elements 25. Rotatably mounted on the outer ends of the crank shafts 24 are supporting wheels 26. Secured for rotation with the supporting wheels 26 are second clutch elements 27. The inner ends of the crank shafts 24 are provided with crank arms 28. The free ends of the crank arms 28 are provided with apertures 29 which are adapted to pivotally receive connecting links 30. The upper ends of the links 30 are pivotally connected at 31 to lifting levers 32. The levers 32 are mounted at their rear ends on the crank shafts 18. The forward ends of the levers 32 are provided with longitudinally extending

slots 34 for a purpose hereinafter set forth. The intermittently operated clutch members 25 are provided with oppositely disposed stop engaging portions 35 which are adapted to engage rollers 36 mounted on the arms 37 pivoted to the rear end of the bearing brackets 23 at 38. Secured to the arms 37, or formed integrally therewith above the pivots 38, are upwardly extending levers 39. The levers 39 have their free ends connected by means of ropes 40 within easy reach of the operator on the tractor. The power lift mechanism thus briefly described is the power lift mechanism now in general use on implements employing this type of power lift construction and, therefore, does not per se form a part of this invention and for this reason has not been described in detail. Like power lifts of this general type it will, of course, be understood, that the operator on the seat may pull the rope 40 on either side of the road grader and swing the arm 37 outwardly, disengaging the roller 36 from the stop 35 and thereby permitting the intermittently operating clutch element 25 to become engaged with the continuously operating clutch member 27. This causes the crank arm 28 of the shaft 24 to be actuated and through the link 30, the crank shaft 18 is oscillated in brackets 19 which in turn raises or lowers the road grader with respect to the ground. In connection with the operation of these power lift mechanisms, it will, of course, be understood, that when the grader proper encounters an obstruction, such as a stone or culvert, that either power lift mechanism may be thrown into operation and the road grader lifted at either end independently of the other.

In order to provide means for more finely adjusting the relative position of the scraper blade with respect to the ground, we have provided a manually operated adjusting mechanism on both sides of the grader. This mechanism comprises segmental gears 41 secured to shafts 42 journaled in brackets 43 fixed to the longitudinal frame members 16. The outer ends of the shafts 42 are provided with crank arms 44. The free end of each crank arm is provided with a stud 45 which is adapted to slidably engage the free end of the lever 32 by engaging the slotted portion 34 of this lever whereby lever 32 is oscillated, moving as a unit the crank shaft 18 on its axis through the connecting link 30 which in turn raises or lowers the road grader with respect to the ground. The segmental gears 41 are actuated by means of worms 45′ which are rotatably mounted in brackets 46 secured to the frame members 16. Secured to the worms 45′ are forwardly extending shafts 47. The forward ends of the shafts 47 are provided at 48 with members which are adapted to form universal connections with shafts 49 in any well known manner. The forward ends of the shafts 49 are provided with crank handles 50 positioned within easy reach of the operator on the tractor. The shafts 49 are supported in the position shown in Fig. 4 by brackets 51 and braces 52 secured to the main frame members 10.

The weight of the road grader is partly supported on the cranked axles by a plurality of balancing springs 53 having their rearward ends connected to hooks 54 which are secured to the crank axles 18 by means of bolts 55. The forward ends of the springs 53 are adjustably secured to the road grader by means of adjustable hook bolts 56.

Our improved scraper and conveying mechanism will next be described. This mechanism comprises the supplemental transversely extending frame members 57 secured by means of bolts 58 to the longitudinally extending frame members 16. Secured to the outer ends of the transverse frame members are oppositely disposed and vertically positioned plates 59. These plate members are adjustable on the transverse frame members 57 as shown in Fig. 6. The plate members 59 are provided with a plurality of vertically disposed apertures 60 which are adapted to receive shafts 61. Rotatably mounted on the shafts 61 are spacer bushings 62. Positioned between the outer ends of the bushings 62 and the plates 59 are mud guards or shields 63. Rotatably mounted on the bushings 62 are sprockets 64. Interposed between the sprocket hubs of the sprockets 64 and the bushings 62 are oppositely disposed anti-friction roller bearings 65. One of the sprockets positioned at the outer end of the transverse frame has formed integrally therewith a drive sprocket 66 for the purpose hereinafter set forth. Trained about the large sprockets 64 positioned at the outer ends of the supplemental frame, is an endless conveyor belt 67. This belt 67 is provided with a plurality of conveyor paddles 68 which are secured to alternate links of the conveyor belt as shown in Fig. 3. From the construction thus described, it will be noted that we have provided means for vertically adjusting the conveyor belt relative to the ground and also provided means for adjusting the conveyor belt transversely with respect to the supplemental frame.

Positioned below and to the rear of the transverse endless conveyor is our improved scraper blade 69. The blade 69 is secured to a transverse angle frame member 70 by means of angularly disposed diverging braces 71. The rearward ends of the braces 71 are secured to the main frame member 16 at 72. The scraper blade 69 and angle 70 are further supported and braced to the road scraper by means of a transversely extending plate 73 secured thereto by means of bolts 74. The scraper blade 69 is provided at its right hand side, as shown in Fig. 1, with a forwardly extending toe 75 which performs the function

of throwing dirt or material in advance of the knife into a position to be engaged by the transversely operating conveyor paddle 68.

We have provided a simple power transmission mechanism which is adapted to transmit the power from the tractor to operatively drive the endless conveyor belt of the road grader. This transmission mechanism comprises a housing 76 secured by means of bolts 77 to the forward side of the supplemental frame 57. Rotatably journaled in the housing 76 is a transmission shaft 78 which has secured thereto an internal gear 79. Secured to the rearward end of the shaft 78 is a drive sprocket 80. The drive sprocket 80 is operatively geared to the sprocket 66 by means of a chain 81. The usual adjustable idler roller chain tightener 82 is adapted to engage the loose side of the chain 81 as shown in Fig. 3. In order to support the upper run of the endless belt conveyor 67, we have provided an idler roller 83 journaled on a shaft 84 secured to an extension 85 of the transmission shaft 78. The internal gear 79 is operatively driven by a pinion 86 secured to a supplemental shaft 87 driven by the tumbling or power shaft 88 extending rearwardly from the tractor. The usual universal joint 89 is provided connecting the supplemental shaft 87 and tumbling shaft 88 to compensate for variations and adjustment of the road grader with respect to the tractor.

In the operation of the above described device, the scraper blade together with the endless belt conveyor is adjusted to the desired position in which one side of the road grader is usually raised above the other for grading or elevating the center of the roadway. In this position, the desired adjustment may entirely be attained by the manually adjusting mechanism and then when any obstruction, such as a stone or culvert, is encountered, the operator may pull on the rope 40 positioned on either side of the road grader and thus raise that side of the road grader encountering the obstruction so that the grader may pass over without damaging or impairing the conveyor or blade. As the grader passes over the ground, it will, of course, be understood that as the blade cuts or plows up the ground, the material accumulates in advance of the blade and the conveyor thus conveys or carries the accumulated material to one side and thus levels the roadway. From the above description, it will be seen that we have provided a simple and efficient operating road grader and one which may be quickly and readily adjusted to the requirements to which such machines are subjected. In the specification, we have described the endless conveyor as only operating in one direction or conveying the material in one direction with respect to the grader but it will be understood that the conveyor may be operated in the reverse direction by reversing the power transmission on the tractor and thus the road grader may be employed to grade the road on either side of the roadway when travelling in either direction.

While we have in this specification described one embodiment which our invention may assume in practice, it is, of course, to be understood that the form herein shown is for the purpose of illustration and may be modified without departing from the spirit and scope of our invention.

What we claim as our invention and desire to secure by Letters Patent is:

1. In a grader, a longitudinally extending frame, a transverse frame secured to said first mentioned frame, an endless conveyor mounted to operate in said transverse frame, a scraper blade positioned to the rear of and below said conveyor, sprockets positioned at the outer ends of said transverse frame around which said endless conveyor is trained, a power transmission shaft positioned centrally of said endless conveyor and gearing mechanism for driving one of said sprockets from said transmission shaft.

2. In a road grader, a frame, a blade secured to the frame in a fixed position, a conveyor disposed in advance of and parallel to the blade for conveying the material scraped by said blade, and means on the frame for fixing the conveyor in several positions of adjustment vertically with respect to the blade and other means for fixing the conveyor in several positions of adjustment longitudinally with respect to the blade.

3. In a road grader, a frame, a blade secured to the frame in a fixed position, a conveyor disposed in advance of and parallel to the blade for conveying the material scraped by said blade, and means on the frame for fixing the conveyor in any one of several positions of adjustment in a plurality of directions with respect to the blade.

4. In a road grader, a frame, a transversely extending blade secured to the frame in a fixed position, a conveyor disposed in advance of and parallel to the blade for conveying the material scraped by said blade, and means on the frame for fixing the conveyor in any one of several positions of adjustment laterally with respect to the blade.

5. In a road grader, a frame, a transversely extending blade secured to the frame in a fixed position, a conveyor disposed in advance of and parallel to the blade for conveying the material scraped by said blade, and means on the frame for fixing the conveyor in any one of several positions of adjustment vertically with respect to the blade.

In testimony whereof we affix our signatures.

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