Oct. 18, 1932. A. RONNING ET AL 1,883,403

ROAD MACHINE

Original Filed July 18, 1924 2 Sheets-Sheet 1

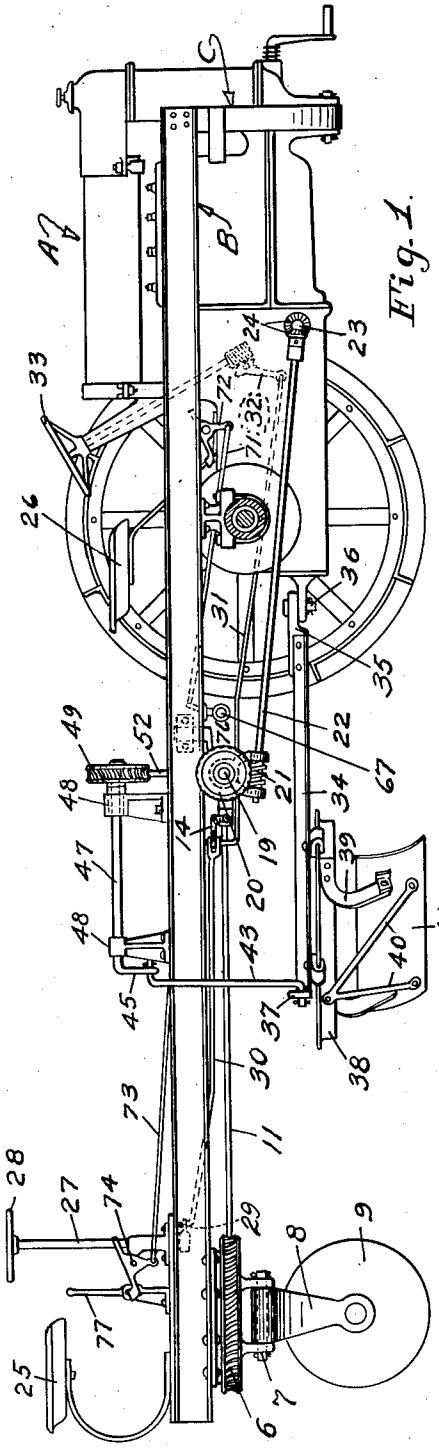


Fig. 1.

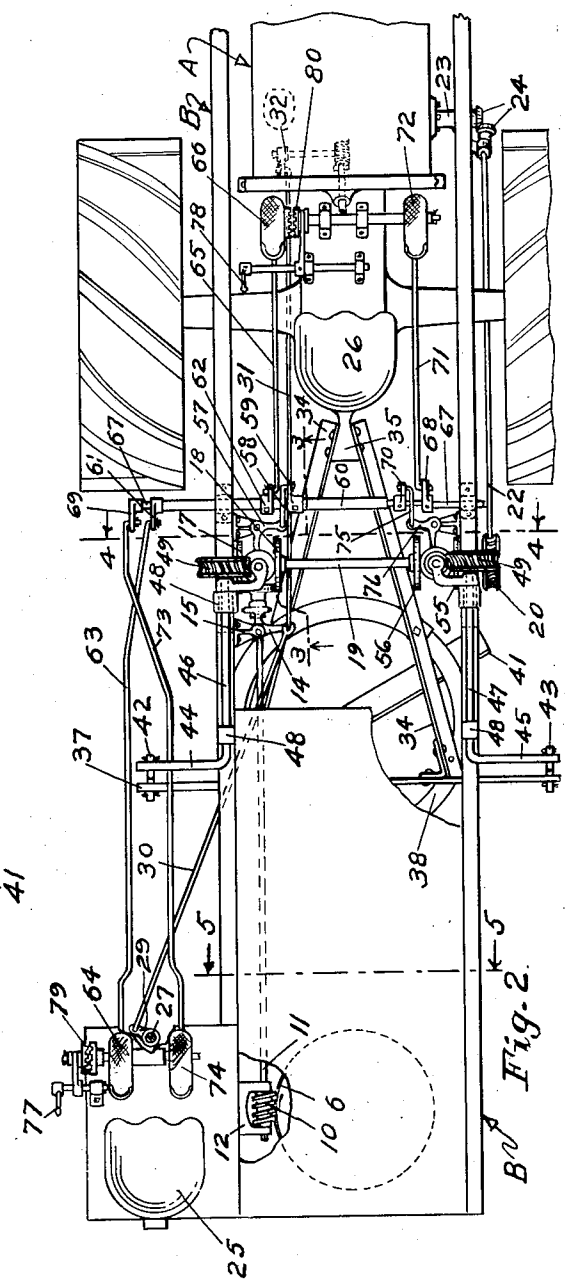


Fig. 2.

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Original Filed July 18, 1924 2 Sheets-Sheet 2

Fig. 3

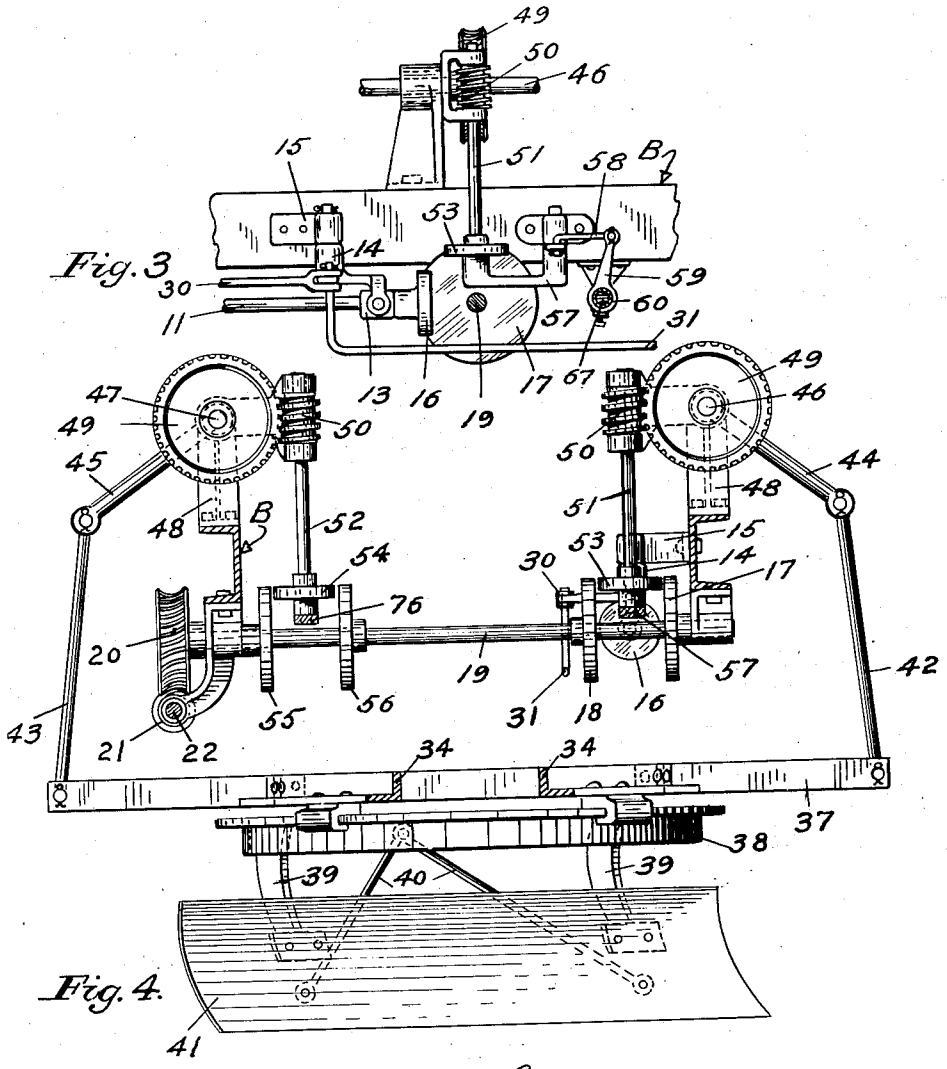


Fig. 4.

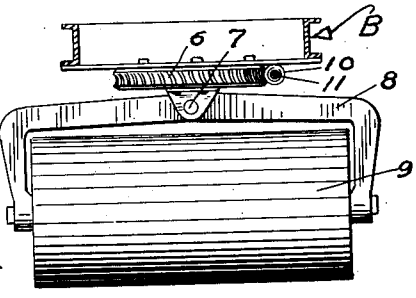


Fig. 5.

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UNITED STATES PATENT OFFICE

ADOLPH RONNING, OF MINNEAPOLIS, AND ANDREAN G. RONNING, DECEASED, LATE OF MINNEAPOLIS, MINNESOTA, BY ADOLPH RONNING AND JACOB A. RONNING, EXECUTORS, OF MINNEAPOLIS AND ST. PAUL, MINNESOTA

ROAD MACHINE

Original application filed July 18, 1924, Serial No. 726,662. Divided and this application filed January 31, 1928. Serial No. 250,884.

This invention relates to road grading machinery, and the primary object is to provide a road working machine having a grader blade, with manually controlled, selectably actuable, and power operated means for vertically and angularly adjusting the operating position of the blade as the machine travels over the road. Another object is to provide manually controlled power operated means for steering the machine. Further and more specific objects will be disclosed in the course of the following specification, reference being had to the accompanying drawings, wherein:

Fig. 1 is a side elevation of the machine, as seen from the right and with the near traction wheel broken away for purpose of illustration.

Fig. 2 is a plan view of the machine as shown in Fig. 1, but with various parts broken away.

Fig. 3 is an enlarged sectional detail view on the irregular line 3—3 in Fig. 2.

Fig. 4 is an enlarged sectional elevation on the line 4—4 in Fig. 2.

Fig. 5 is a sectional elevation on the line 5—5 in Fig. 2.

This application is a divison of a co-pending application, Ser. No. 726,662, filed July 18, 1924 now Patent No. 1,660,050, issued February 21, 1928, for road grader.

Referring to the drawings more particularly and by reference characters, A designates a tractor unit of a conventional type, from which the usual or normal forecarriage has been removed, and which is maintained in its normal horizontal position by a frame B that extends rearwardly from the tractor. The frame B, at an intermediate position rests upon and is secured to the rear axle housing of the tractor, and, at its front end the frame is provided with a yoke C that extends under and supports the front end of the tractor, from whence the forecarriage has been removed. At its rear end the frame B carries a large worm gear 6, that is pivoted as at 7 to and is carried on a yoke 8, which in turn embraces a drum or road roller 9. The drum 9 is angled, to steer the machine, by a worm 10 that meshes with and operates the gear 6. The worm 10 is mounted on a shaft 11, journaled in a bearing 12, at its rear end, while its forward end is carried in a bearing 13 of a bell crank yoke 14 pivoted to a bracket 15 on the frame B. At its forward end the shaft 11 is provided with a friction wheel 16 adapted to frictionally engage a disc 17 or a disc 18, depending upon the direction of rotation desired. These discs 17 and 18 are mounted on a continuously rotated shaft 19. Unless pressure is applied to the yoke 14 the wheel 16 remains idle between the discs, but when the yoke is shifted slightly in either direction, it will be seen that the motion of the shaft 19 will be imparted to the worm gear 6 until the steering member 9 is angled, in either direction, as desired, and thus the machine may be steered as may be found necessary. The shaft 19 is continuously rotated, from the tractor engine, through the medium of a worm gear 20, a worm 21, and a shaft 22 that is driven by the power shaft 23 of the motor through bevel pinions 24.

The machine is provided with two operators' stations, 25 and 26, and a double set of controls, so that the entire machine can be operated by an operator at either station, or, if so desired, one operator may operate the tractor and steering controls, while the other operator tends to the implement controls.

A steering column 27 and hand wheel 28 is provided for the rear operator, and the column is provided with a short arm 29 that is connected by a control rod 30 to the bell crank yoke 14. A similar rod 31 connects the yoke 14 to a crank 32 of the normal steering mechanism of the tractor, having the hand wheel 33. Thus, when either hand wheel 28 or 33 is slightly rotated to right or left, the tractor power will be utilized in steering the machine to the right or left, thus relieving the operator of this effort and labor with which he is otherwise burdened as a manual task.

The construction and operating connections of the grader, which is suspended under the frame B and rearwardly of the tractor unit, will now be described.

A grader frame proper comprises a pair

of rearwardly diverging angle iron draw bars 34, connected at their front ends by a casting 35, which is pivotally secured, as at 36, to the main tractor unit. The rear ends of the draw bars are connected by a transverse beam 37. Secured under the frame, and rotatably adjustable with respect thereto, is a circular supporting member 38, known as a circle, to which is secured, by brackets 39 and braces 40, the scraper blade 41.

The ends of the beam 37 are suspended by links 42 and 43 from the arms 44 and 45, at the rear ends of shafts 46 and 47, respectively. These shafts are suitably journaled in brackets 48, carried on the frame B, and are provided, at their forward ends, with worm gears 49 that mesh with worms 50. These worms are carried on vertical shafts 51 and 52. The lower end of the shaft 51 (see Figs. 3 and 4) has a wheel 53 that operates between the disks 17 and 18, similarly to wheel 16, and the shaft 52 has a corresponding wheel 54 that operates between a pair of disks 55 and 56 at the other end of the shaft 19. Thus, when either of the wheels 53 or 54 is brought into frictional contact with one of the discs 17, 18, 55 or 56, it will be seen that one end or the other of the grader blade will be either raised or lowered. As long as the wheels or rollers 53 and 54 are left in idle or neutral positions between the discs, the position of the grader blade will remain fixed, as it is set, because the worm gear connections 49—50 will effectively lock the blade against any adjusting tendency that its weight or road conditions might exert.

The roller 53 is moved into engagement with either of its friction discs, by a bell crank member 57, which, in turn is actuated by a link 58 and an arm 59 of a sleeve 60 which is journaled to the frame B. The sleeve is also provided with arms 61 and 62, the first of which is connected by a rod 63 to a rear (left) foot pedal 64, while the latter is connected by a rod 65 to a front (left) foot pedal 66.

Rotatably secured in the sleeve 60, and also journaled to the frame B, is a shaft 67, having three crank arms 68, 69 and 70. The crank arm 68 is connected by a link rod 71 to a front (right) foot pedal 72, the arm 69 is connected by a link rod 73 to a rear (right) foot pedal 74, and the arm 70 is connected by a link 75 to a bell crank lever 76, which controls the position of the friction roller 54 between the discs 55 and 56. It will thus be seen that either operator will be able to control the vertical position of either end of the grader blade by foot manipulation, and by a mechanism that is very sensitive to the operators' adjustments, yet also subject to the fast and powerful action of the tractor engine.

The entire scraper frame may also be raised and lowered without changing the working angle of the blade 41, by clutch hand levers 77 and 78, which, by means of respective clutch locks 79 and 80, lock the pedals together, for simultaneous movements. These clutches are both shown as out of active engagement. When engaged, however, it will be seen that a movement of either pedal will impart a like movement to the other pedal, and consequently the entire blade will be raised and lowered without altering its working angle.

It is understood that suitable modifications may be made in the general design and structural details of the invention as herein shown, provided, however, that said modifications come within the spirit and scope of the appended claims. The invention having just been fully disclosed and described, what is claimed is:

1. The combination with a grading machine having a grading implement, of a pair of power operated devices for vertically and selectively adjusting the sides of the implement, controls for respectively regulating said devices, and means for optionally locking said controls together whereby both sides of the implement may be simultaneously adjusted.

2. The combination including a tractor unit, a frame having one end carried by the unit and having a ground engaging support at its other end, a road working implement arranged under the frame and adapted to be drawn along therewith, means for adjusting the operative angular and vertical positions of the implement, and manually controlled means for applying power from the tractor unit to the said adjusting means.

3. In a machine of the character described, the combination including a tractor unit, a frame carried in part by and extending longitudinally from the tractor unit, a grader implement arranged under the frame, an operator's station on the machine, and traction engine operated devices, having controls extending to within reach of the operator at said station, for adjusting the operative angular position of the grader implement and for raising and lowering the implement without disturbing the angularly adjusted position to which it may have been previously adjusted.

4. In a machine of the character described, the combination including a tractor unit, a frame secured at one end to and extending longitudinally from the tractor unit, a grader implement arranged under the frame, an operator's station on the machine, and mechanisms adapted to be driven by the engine of the tractor, and having controls extending to within reach of an operator at said station, for steering the machine, for adjusting the operative angle of the implement, and for

vertically adjusting the implement without disturbing the angular position thereof.

5. A power grader comprising a suitably supported frame, an engine for propelling the same, a road working tool suspended under the frame, a pair of cranks carried by the frame and having link connections with the tool for vertically and angularly adjusting the same, self-locking worm gear devices for adjusting the cranks, and power take off connections, including manually controlled friction operated devices, for transmitting power from the engine to the worm gear devices.

6. A power grader comprising a suitably supported frame, an engine for propelling the same, a road working tool suspended under the frame, a pair of cranks carried by the frame and having link connections with the tool for selectively or simultaneously adjusting the respective ends thereof, and manually controlled power transmitting means connecting said cranks with the engine.

7. A power grader comprising a suitably supported frame, an engine for propelling the same, a road working tool suspended under the frame, a pair of cranks carried by the frame and having link connections with the tool for adjusting the respective ends thereof, and manually controlled power transmitting means for selectively applying power from the engine to either or both of said cranks.

8. A tool adjusting mechanism for a road machine having a motor, comprising devices at the sides of the machine for raising and lowering the ends of the tool, said devices each including a worm and worm gear driven thereby, and reversible power transmitting connections for respectively transmitting power from the motor to either or both of said worms selectively.

9. A tool adjusting mechanism for a road machine having a motor, comprising devices at the sides of the machine for raising and lowering the respective ends of the tool, said devices each including a worm and worm gear driven thereby, and means for selectively transmitting power, from the motor to either of said worms, including a pair of manually controlled power transmitting devices.

10. A tool adjusting mechanism for a road machine having a motor, comprising devices at the sides of the machine for raising and lowering the respective ends of the tool, said devices each including a worm and worm gear driven thereby, shafts carrying the worms at respective ends thereof, and separate selectively operable members at the other ends of said shafts for controlling the transmission of power thereto from the motor.

11. A tool adjusting mechanism for a road machine having a motor, comprising devices at the sides of the machine for raising and lowering the ends of the tool, said devices each including a worm and worm gear driven thereby, shafts carrying the worms at respective ends thereof, and friction devices at the other ends of said shafts for controlling the transmission of power thereto from the motor, and means for selectively or simultaneously operating said friction devices.

12. A power grader comprising a main frame having a motor for propelling the same, a grader frame disposed under the main frame, a power shaft journaled transversely in the main frame and connected with the motor whereby it may be continuously driven thereby, two pair of driving friction members carried by the shaft, a pair of driven friction members disposed one between each pair of driving friction members for selective contact therewith, and laterally disposed grader frame adjusting devices operatively connected to said driven friction members.

13. A power grader comprising a main frame having a motor for propelling the same, a grader frame disposed under the main frame, a power shaft journaled transversely in the main frame and connected with the motor whereby it may be continuously driven thereby, two pair of driving friction members carried by the shaft, a pair of driven friction members disposed one between each pair of driving friction members for selective contact therewith, a pair of adjusting mechanisms connecting said driven friction members with the grader frame, and means for manually engaging the respective driven friction members with the driving members to effect adjustments to the grader frame through said adjusting mechanisms.

14. A power grader comprising a main frame having a motor for propelling the same, a grader frame disposed under the main frame, a power shaft journaled transversely in the main frame and connected with the motor whereby it may be continuously driven thereby, two pair of driving friction members carried by the shaft, a pair of driven friction members disposed one between each pair of driving friction members for selective contact therewith, a pair of adjusting mechanisms connecting said driven friction members with the grader frame, manual controls for the driven friction members, and means for optionally locking said controls, with respect to each other, to simultaneously operate both of the adjusting mechanisms.

15. A road working machine having a suitably supported frame, an engine carried by the frame, a grader blade carried by the frame, a mechanism connected to the engine, so as to be driven thereby, for angularly adjusting the blade, said mechanism including manually controlled means for raising and lowering the blade without disturbing the

angularly adjusted position to which it may have been previously adjusted.

16. A road grading machine comprising a frame, an engine and grader blade carried by the frame, a pair of connections between the frame and the blade for vertically adjusting the opposite ends of the latter, a power member connected to the engine so that it may be continuously actuated thereby, whether the machine is travelling or not, means for selectively engaging the power member with either of said connections whereby to effect a predetermined angular adjustment to the blade, and means for subsequently engaging the power member to both of said connections whereby both ends of the blade will be simultaneously adjusted so as to maintain said predetermined angular adjustment when the entire blade is vertically adjusted.

17. In a road grader, a wheeled main frame, a scraper blade, links connecting the scraper blade with the main frame, adjusting mechanism connected to the links for operably disposing and angularly adjusting the scraper blade with respect to a road surface, a continuously moving power driven shaft adapted for operating said adjustment independent of movement of the grader, connections from said shaft to the adjusting mechanism, and mechanism for selectively disengaging or engaging said connections.

18. A tool adjusting mechanism for a road machine having a motor, comprising devices at the sides of the machine for raising and lowering the ends of the tool, said devices each including a worm and worm gear power transmitter, and reversable power transmitting connections for respectively transmitting power from the motor to either or both of said transmitters selectively.

19. A tool adjusting mechanism for a road machine having a motor, comprising devices at the sides of the machine for raising and lowering the respective ends of the tool, said devices each including a worm and worm gear power transmitter, and means for selectively transmitting power, from the motor to either of said transmitters, including a pair of manually controlled power transmitting devices.

In testimony whereof, we affix our signatures, at Minneapolis, Minnesota, this 28 day of January, 1928.

ADOLPH RONNING.
ADOLPH RONNING,
JACOB A. RONNING,
Executors of the Last Will and Testament of Andrean G. Ronning, Deceased, a Joint Inventor.