H. L. DEVER.

GRADING MACHINE.

APPLICATION FILED DEC. 9, 1920.

1,422,753.

Patented July 11, 1922.

3 SHEETS—SHEET 1.

Fig. 1.

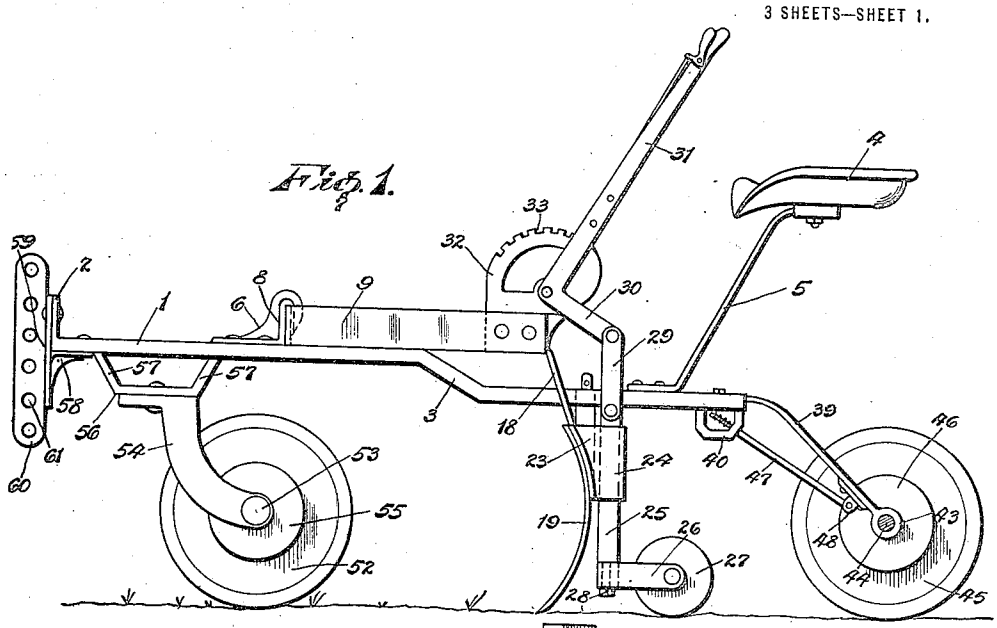
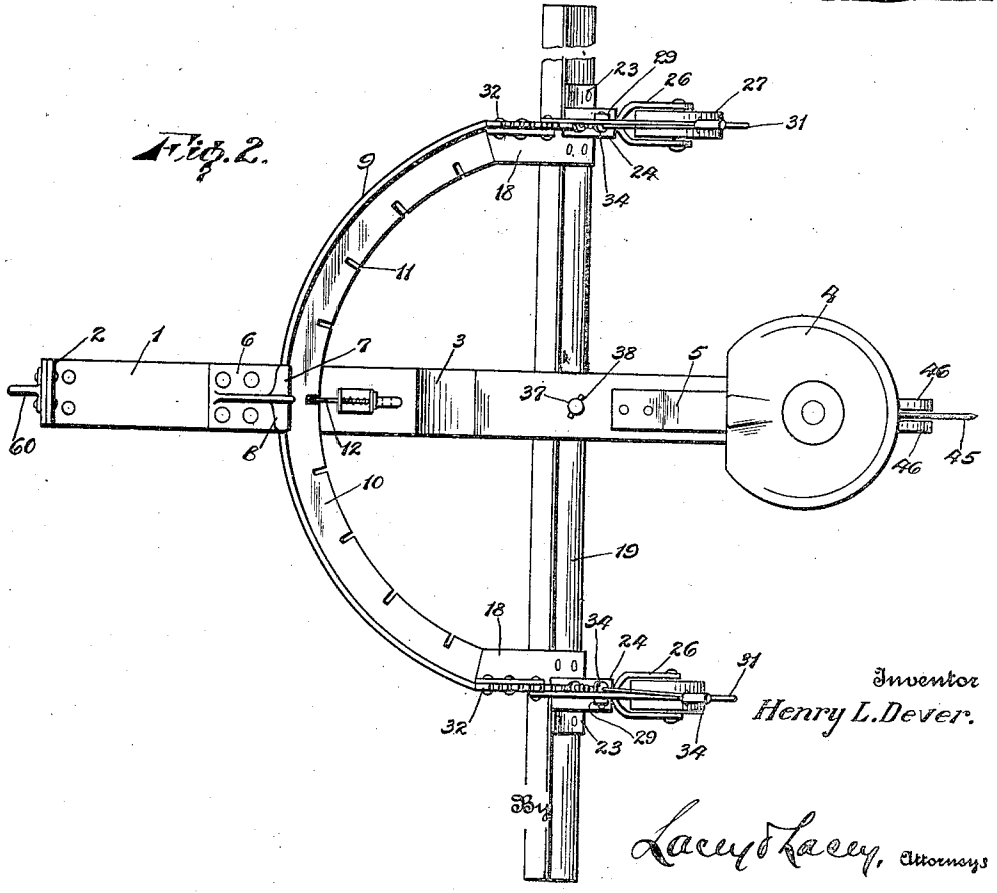


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

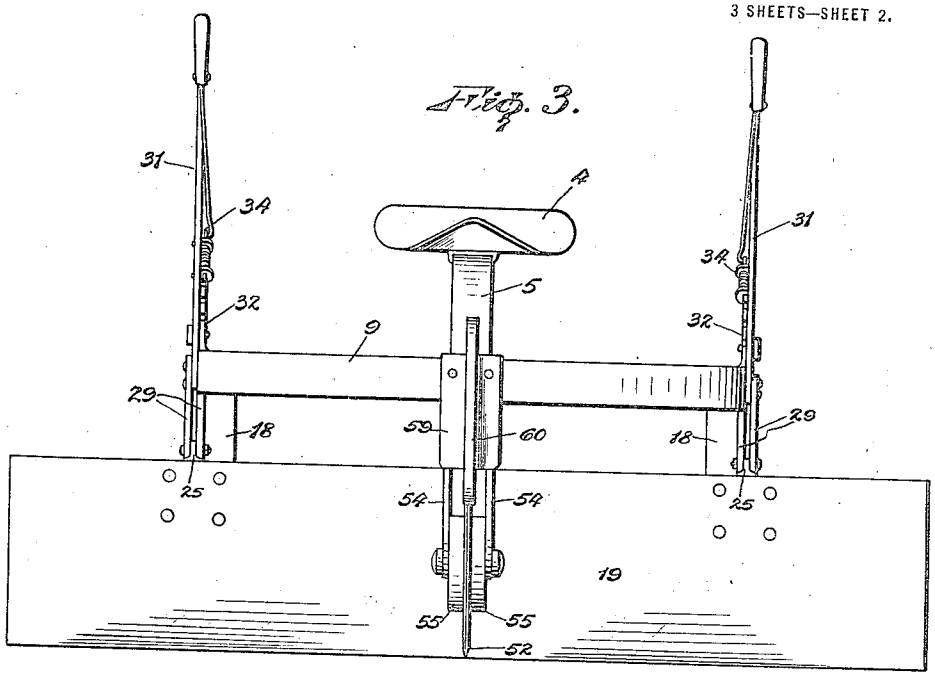
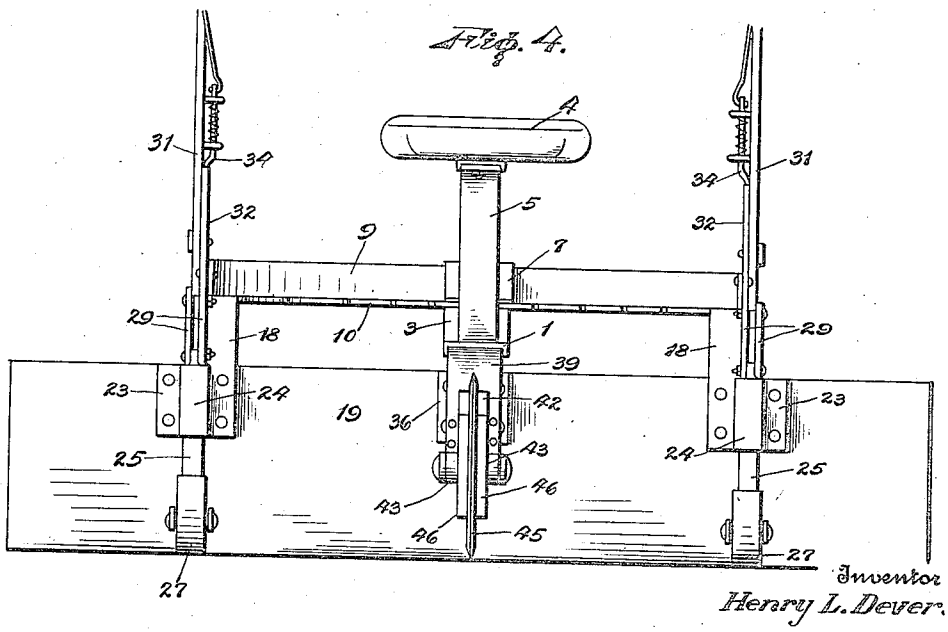


Fig. 4.



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3 SHEETS—SHEET 3.

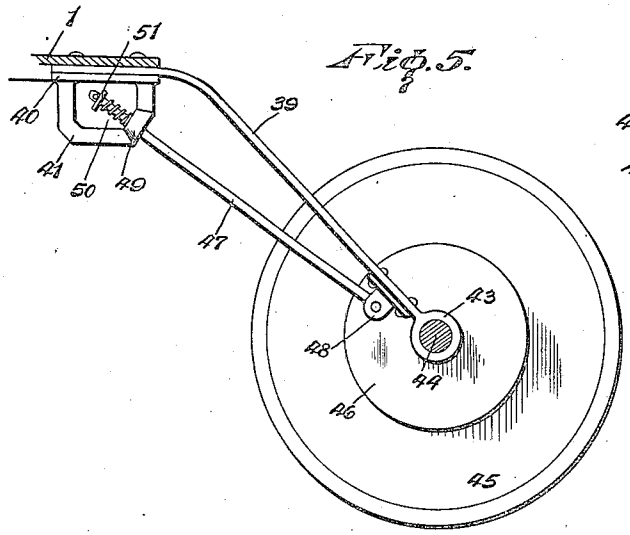


Fig. 5.

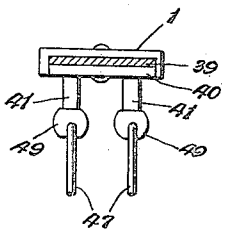


Fig. 6

Fig. 8.

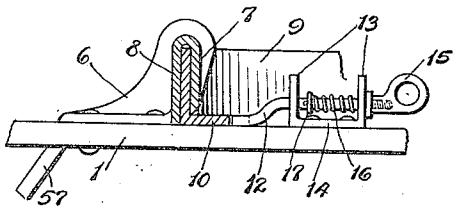
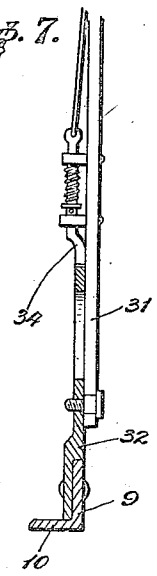


Fig. 7.



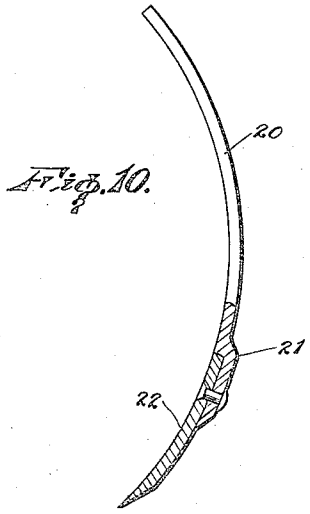


Fig. 10.

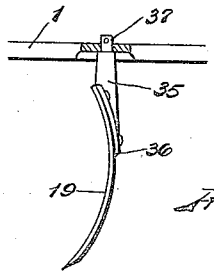


Fig. 9.

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HENRY L. DEVER, OF OWENSBORO, KENTUCKY.

GRADING MACHINE.

1,422,753. Specification of Letters Patent. Patented July 11, 1922.

Application filed December 9, 1920. Serial No. 429,405.

To all whom it may concern:

Be it known that I, HENRY L. DEVER, a citizen of the United States, residing at Owensboro, in the county of Daviess and State of Kentucky, have invented certain new and useful Improvements in Grading Machines, of which the following is a specification.

This invention relates to grading and ditching machines and has for its object the provision of a simple, strong, durable and inexpensive machine which will be efficient in use and which may be readily manipulated to set the blade at any desired angle or to cause either end of the blade to run at a desired height relative to the opposite end of the blade. The invention also seeks to provide novel means for applying draft to the machine and also to provide efficient means for holding the machine to the desired line of travel without imposing excessive strain upon draft animals or upon a tractor. The invention also seeks to provide novel means for connecting the blade to the frame, novel means for mounting one of the colters employed to hold the machine to a desired line of travel, to provide a novel pivotal mount for the blade and to improve generally the construction and arrangement of the parts of a grading machine to the end that the efficiency thereof may be increased and the life of the machine prolonged.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a grader embodying my improvements;

Fig. 2 is a plan view of the same;

Fig. 3 is a front elevation;

Fig. 4 is a rear elevation;

Fig. 5 is an enlarged side view of a colter and its mount;

Fig. 6 is a detail section of a portion of the colter-supporting means shown in Fig. 5;

Fig. 7 is a detail view of a portion of one of the blade-adjusting levers;

Fig. 8 is an enlarged detail section showing the means for securing the blade in any desired angular adjustment;

Fig. 9 is a detail showing the manner of pivoting the blade;

Fig. 10 is an enlarged end view of a blade having a slightly different construction from that illustrated in the other figures.

In carrying out my present invention, I employ a main frame bar 1 which is formed from a length of channeled metal having an upturned tongue 2 at its front end and provided intermediate its ends with a downwardly extended portion 3. A driver's seat 4 is carried by a standard 5 which is secured rigidly upon the main bar 1, near the rear end thereof, and, in advance of the seat standard 5, the bar is provided with an opening to receive the pivot of the blade, as will be presently fully described. A bracket 6 is secured upon the upper side of the bar 1, between the front end thereof and the downwardly and rearwardly extending portion 3, and this bracket 6 has an overhanging depending head 7 which is spaced from the main portion of the bracket and cooperates with the transverse web 8 of the bracket to provide a guide for the upstanding web 9 of a blade adjusting and locking frame. The said blade adjusting frame is of the arcuate form shown most clearly in Fig. 2, and includes a horizontally disposed web 10 projecting rearwardly from the lower edge of the vertical web 9 and resting upon the frame bar 1. The rear arcuate edge of the web 10 is provided with spaced notches 11 adapted to be engaged by a latch or locking bolt 12 mounted upon the frame bar whereby the blade-adjusting frame may be secured in a set position. It may be noted at this time that the formation of the downwardly and rearwardly inclined portion 3 in the main frame bar 1 sets the blade-adjusting and locking frame at a height at which it may be easily reached for adjustment, and also brings the rear portion of the main bar close to the blade so that a short pivot member will suffice to sustain the blade and resist the torsional strain put thereon by the blade when the machine is used. The latch 12 consists of a pin slidably fitted

through the upstanding ends 13 of an inverted U-shaped frame which is secured rigidly to the main bar 1 by rivets inserted through the base plate 14 of the bracket into the said bar 1 and the front end of the said pin is bent downwardly, as shown in Fig. 8, so that it will ride upon the upper side of the main bar and readily engage one of the notches 11 in the blade adjusting and locking frame. The rear extremity of the latch pin is threaded to be engaged by a handle 15 to which a withdrawing cable may be attached, said cable being extended from the latch to the driver's seat. This arrangement is an obvious expedient, however, and I have, therefore, omitted the releasing cable from the drawings for the sake of clearness in the showing of the parts illustrated. The latch is normally held projected so as to engage a notch 11 by a spring 16 coiled around the pin between the rear lug or member 13 and an abutment 17 upon the latch pin. It will be readily understood that if the pin be withdrawn against the tension of the spring the blade may be shifted to any desired angle and when the holding force is removed from the pin, the spring will automatically return the latch into engagement with a notch in the web 10 of the blade-adjusting frame.

The extremities of the locking frame are turned downwardly to form hangers 18 which are secured to the rear side of the blade 19 adjacent the ends thereof and the upper edge of the same. The blade will thus be directly supported by the adjusting frame and will follow the movements of the same. The blade may be a single integral plate of tempered steel having its lower edge sharpened and having the usual concave front face. I may, however, provide the blade with a removable cutting edge and to this end will employ the construction illustrated in Fig. 10 in which the upper member 20 of the blade is offset at its lower edge to provide a flange 21 against which the upper edge of the cutting member 22 may seat, the front faces of the carrrying member 20 and of the cutting member 22 being flush, as clearly shown. The cutting member is removably secured in its seat and against the flange 21 by bolts or cap screws, as will be readily understood. Should the cutting member become dull so that it does not work with the desired efficiency it may be removed and resharpened and if it be desired to avoid the loss of time required to resharpen the blade, a new or different blade may be fitted in place.

Immediately adjacent the hanger members 18, I secure to the rear side of the blade brackets 23 having vertical sleeves or bearing members 24 in which are fitted shanks 25, the lower extremities of the said shanks being reduced and given a circular outline whereby they may rotatably receive the yokes 26 in the rear ends of which ground-engaging rollers 27 are mounted. Nuts 28 upon the lower ends of the reduced circular extremities of the shanks support the yokes 26 thereon and allow relative pivotal movement thereof. To the upper end of each shank 25, I pivot a link 29 which has its upper end pivoted to the rearwardly extending arm 30 of a hand lever 31 which is mounted at the end of the locking frame and may be conveniently manipulated by the driver upon the seat 4. It will be understood that the shank 25 with the roller carried thereby and the hand lever 31 with its connection to the shank are duplicated at the two sides of the machine and each lever is fulcrumed upon a bracket or fulcrum plate 32 which is secured to the extremity of the web 9 of the adjusting frame, the upper edge of the said fulcrum plate being provided with notches 33 and the hand lever being provided with the usual latch, indicated at 34, to engage any one of said notches whereby the lever may be held in a set position. It will be readily understood that the manipulation of the levers 31 will cause the rollers 27 to run at a higher or lower point and thus regulate the depth to which the cutting edge of the blade may penetrate the ground. The rollers may obviously be set at different elevations so that the blade will be tilted more or less transversely of the line of travel and the machine thereby set to produce the desired transverse grade or arch to a road or to form a terrace or one side of a ditch.

While the blade will be adjusted pivotally by the adjustment of the locking and adjusting frame, I prefer to employ a pivotal connection between the center of the blade and the main frame bar 1 as steadiness is thereby attained and the draft may be applied to the blade at its center as well as at points near its ends. To obtain the desired pivotal connection between the blade and the frame, I employ a post 35 provided at its lower end with wings or flanges 36 which are rigidly secured to the rear side of the blade at the top edge thereof and this post 35 extends up to and within the channel of the main bar 1, the upper extremity of the post being reduced, as shown at 37, to form a stud which projects through the web of the bar 1, as clearly shown in Fig. 9. This stud is, of course, cylindrical in form and is adapted to receive a retaining device, such as a pin 38, through its upper end whereby accidental detachment of the stud from the bar will be prevented.

Between the flanges of the bar 1, at the rear extremity thereof, I fit the upper end of a resilient hanger plate 39 and against the

under side of the end of said hanger I fit a plate 40 from which hanger brackets or arms 41 depend. The hanger plate 39 is bifurcated at its lower end, as shown at 42, and the extremities of the hanger are formed into or provided with eyes 43 receiving the axle 44 of the rear colter 45. The colter 45 is of the usual rolling disk type having a sharpened circumference and the axle 44 may be of any convenient or preferred form. Upon the axle, at the opposite sides of the colter disk, I provide rollers 46 which have smooth peripheries and are adapted by contact with the ground to limit the extent to which the colter may penetrate the same. The colter is thus prevented from cutting into the ground so as to cause the machine to drag unduly while at the same time it is permitted to obtain a sufficient hold in the ground to maintain the machine in the line of draft. The resiliency of the hanger 39 holds the colter to its work, while at the same time it permits it to yield to obstructions which it cannot push aside or cut through. To reinforce the resilient hanger, I provide the draft links 47 which are pivoted at their lower ends to lugs 48 on the under side of the hanger 39 and have their upper ends slidably fitted in bearings 49 formed in the bracket arms 41. Springs 50 are coiled around the upper ends of the respective links 47 between the front sides of the bearings 49 and abutments 51 on the links. Should the colter strike an obstruction which does not yield to the colter, the described mounting will permit the colter to ride up and over the obstruction and the spring action obtaining in the support will return the colter to its former relative position as soon as the obstruction has been cleared. When the colter is held back by the obstruction, the springs 50 will be compressed inasmuch as the links 47 will be drawn rearwardly through the bearings 49 and as soon as the colter clears the obstruction the springs will expand and return the parts to the former position relative to the main draft bar 1.

To further aid in holding the machine to the line of draft and to relieve the draft animals of the weight of the machine, I provide a colter 52 to support the front end of the bar 1 and this colter 52 is similar in construction to the colter 45. The said colter is fitted rotatably upon an axle 53 which is carried by the lower rear ends of a yoke 54 and rollers 55 are provided at the sides of the colter to ride upon the ground in the same manner that the rollers 46 ride thereon and for the same purpose. The upper end of the yoke 54 is secured to a bracket 56 having upwardly extending arms 57 at its ends which fit between the flanges of the channeled bar 1 and are firmly secured to the web of said bar. The rear member 57 may be secured to the bar 1 by the same bolts or rivets that secure the bracket 6 thereto while the front member 57 may be conveniently secured to the bar 1 by the same rivets or bolts that secure a draft bracket 58 thereto. The said draft bracket 58 comprises a vertical plate 59 bearing against and secured to the upturned tongue 2 of the bar 1. Projecting forwardly from the plate 59 on the central vertical line of the same is a clevis plate 60 having a vertical series of openings 61 therethrough so that the draft-applying elements may be attached at any desired height and the draft thereby regulated according to the work the machine is called upon to do and determined by the nature of the soil in which it is to operate.

Having thus described the invention, what is claimed as new is:

1. In a grading machine, the combination of a main frame bar, a blade pivotally connected with the bar, an arcuate locking frame having a flat web slidably resting on the bar in advance of the blade and an upstanding web rising from the convex edge of the flat web, hangers depending from the ends of said frame and secured to the blade, a latch mounted on the bar to engage the flat web of said frame and secure it in a set position, and a guiding bracket secured upon the bar in advance of said frame and having an overhanging portion engaging over the upper edge of the upstanding web of said frame.

2. In a grading machine, the combination of a main frame, a blade pivotally connected with said frame, a blade adjusting frame slidably supported on the main frame and connected at its ends with the blade, vertically disposed sleeves secured upon the blade adjacent the ends thereof, shanks slidably fitted in said sleeves, rolling supports carried by the lower ends of said shanks and having pivotal movement about the same, fulcrum plates secured upon the ends of said adjusting frame and extending across the plane of the blade, angle levers mounted upon the said fulcrum plates and having upstanding and rearwardly projecting arms, means on the upstanding arms of the levers for locking the levers to the said plates in a set position, and links connecting the rearwardly projecting arms of the levers with the upper ends of the respective shanks.

3. In a grading machine, the combination of a main frame bar, a blade pivotally connected with said bar, means for pivotally adjusting the blade and securing it in a set position, a resilient hanger secured to the rear end of said bar and projecting downwardly and rearwardly therefrom, a rolling colter carried by the rear end of said hanger, and a link pivotally attached at its rear end to said hanger and having a yieldable slidable connection with the frame bar at its front end.

4. In a grading machine, the combination of a main frame bar, a blade pivotally connected with said bar, means for pivotally adjusting the blade and securing it in a set position, a resilient hanger secured to the rear end of the bar and projecting rearwardly and downwardly therefrom, a rolling colter carried by said hanger, a bracket secured to and depending from the rear end of the bar, a link pivotally attached at its rear end to the hanger and having its front end slidably mounted in said bracket, and means bearing upon said link and the bracket and yieldably holding the link in its forward position.

In testimony whereof I affix my signature.

HENRY L. DEVER. [L. S.]