June 13, 1933. O. Q. HINDS 1,913,883

ROAD GRADER

Filed May 25, 1931 2 Sheets-Sheet 1

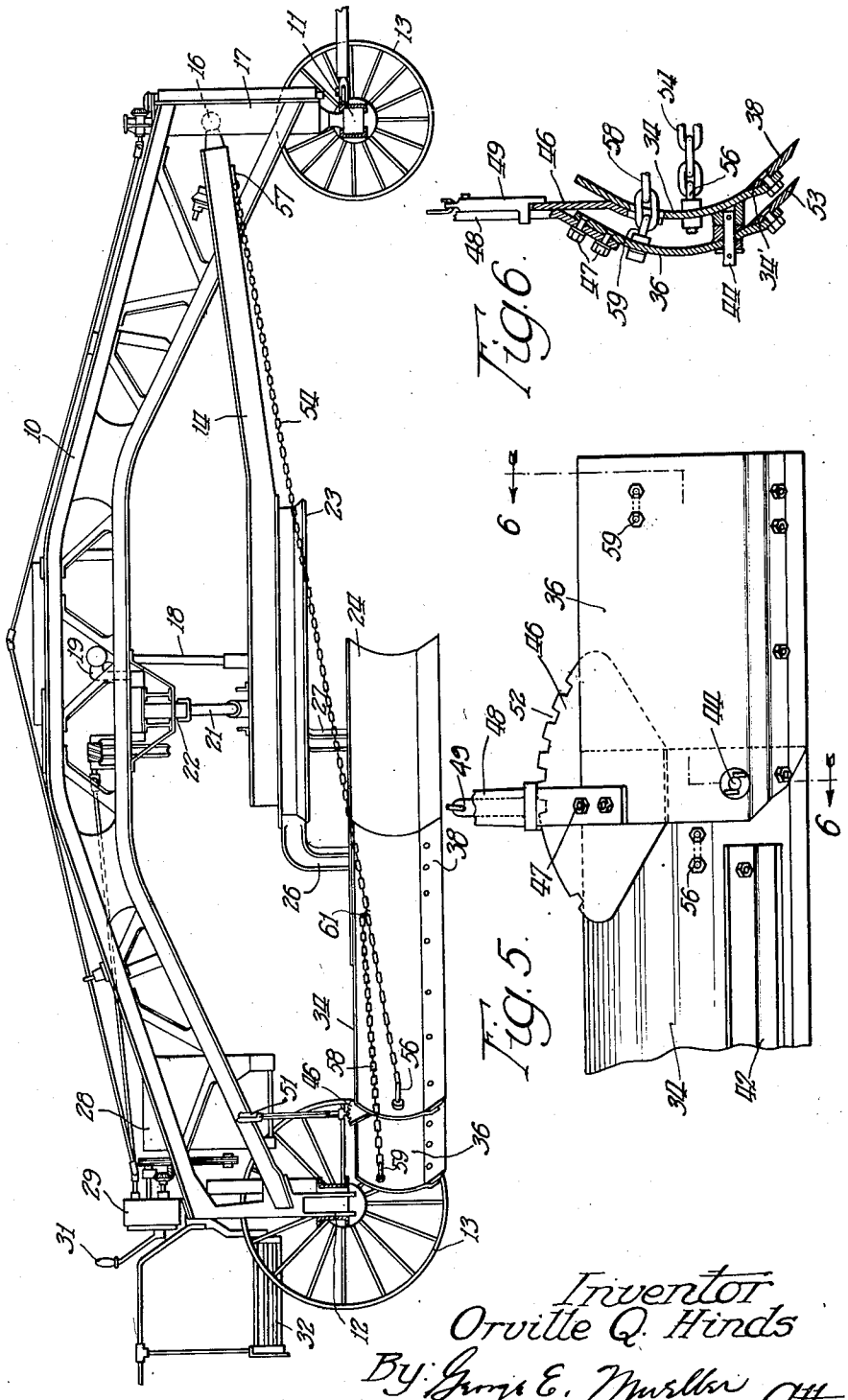


Fig. 1.

Fig. 6.

Fig. 5.

Inventor
Orville Q. Hinds
By: George E. Mueller Atty.

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Fig. 2.

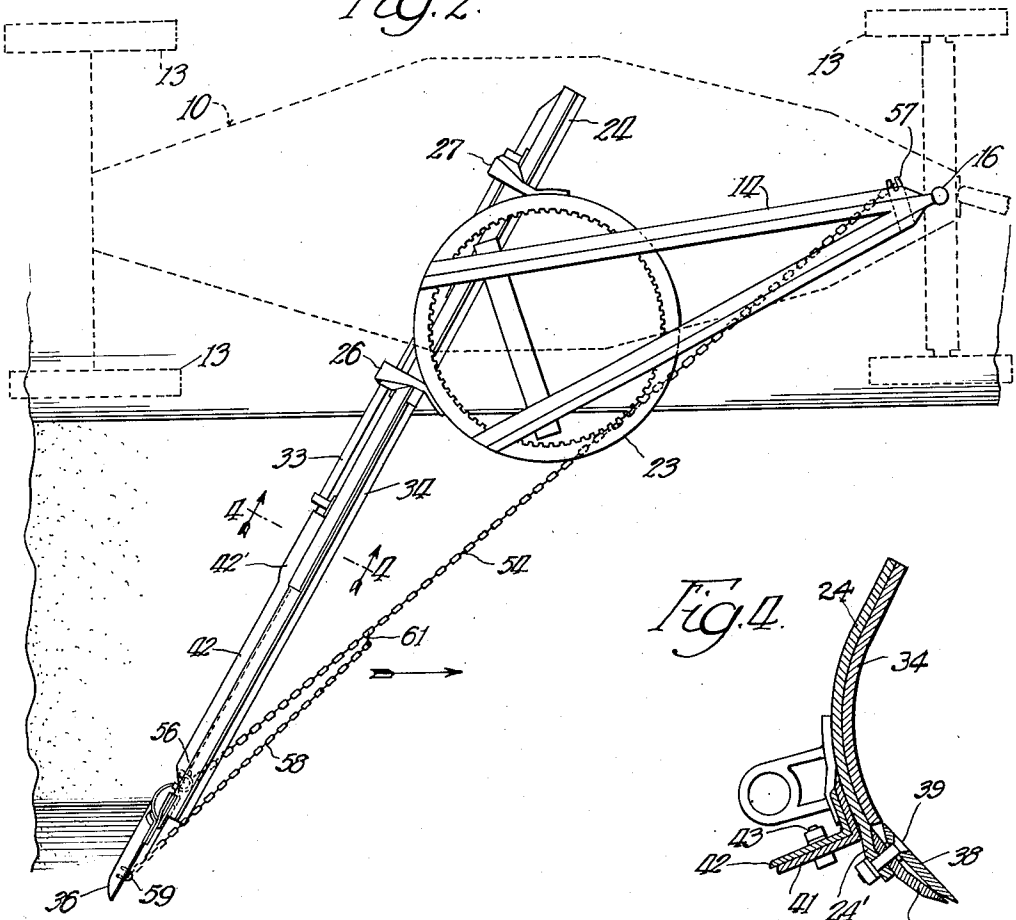
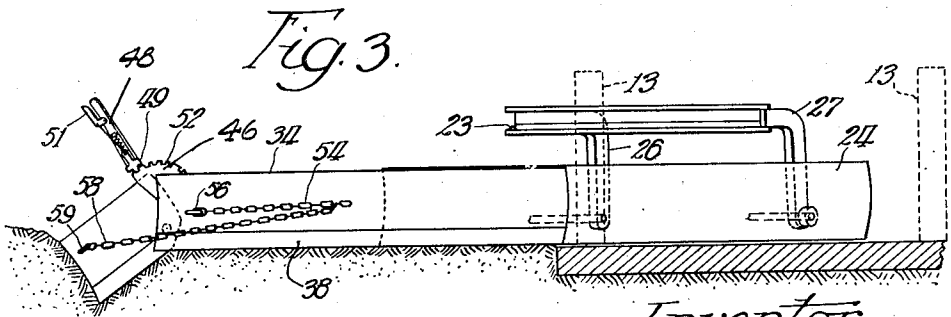


Fig. 4.

Fig. 3.



Inventor
Orville Q. Hinds
By: George E. Mueller Atty.

Patented June 13, 1933 1,913,883

UNITED STATES PATENT OFFICE

ORVILLE Q. HINDS, OF CHICAGO, ILLINOIS, ASSIGNOR TO ALLIS-CHALMERS MANUFACTURING COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF DELAWARE

ROAD GRADER

Application filed May 25, 1931. Serial No. 539,746.

My invention relates to road graders. It relates more in particular to a road grader for cutting a shoulder at the side of a road, while the grader itself travels on the finished roadway.

The principal object of the invention is to adapt a standard type of road grader to perform a new grading function.

Another object is to grade the road shoulder with a road grader employing the finished road surface as a guide.

Another object is the provision of an improved mold board attachment.

Another object is to fit a conventional type of grader for cutting a road shoulder.

Another object is to operate on a very high bank at the side of the road.

Another object is the provision of an improved means for mounting a mold board extension onto the end of a mold board.

Other objects and features of the invention will be apparent from a consideration of the following detail description taken with the accompanying drawings, wherein

Fig. 1 is a side elevational view of a road grader showing my invention applied thereto,

Fig. 2 is a plan view thereof, parts of the grader being indicated schematically by dotted lines,

Fig. 3 is an elevational view of the mold board with the extension applied thereto and showing one manner in which it may be used,

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 2 showing the way the extension is attached to the mold board,

Fig. 5 is an enlarged fragmentary rear elevational view of a part of the mold board extension, and

Fig. 6 is a sectional view taken approximately along the line 6—6 of Fig. 5 looking in the direction of the arrows.

In general I employ a conventional or standard type of road grader with my invention, such as is usually used for grading operations along a road right-of-way. While many different specific constructions of road grader of this general character can be used with some success, I prefer a road grader of the character described in Patent Number 1,815,252, granted to O. E. Grigsby July 21, 1931. In this type of grader the frame and wheels can be leaned by the application of power controlled adjusting mechanism, and these features enhance the value of my present invention when employed therewith.

In Fig. 1 I show a commercial form of grader constructed in accordance with the patent mentioned, this grader comprising a main frame 10 pivotally connected to front and rear axles 11 and 12, and designed to be shifted to either side of such axles. The axles have wheels 13 designed to be leaned with respect to the axles. A draw bar 14 is connected by means of a universal joint 16 to a front post 17 forming a part of the frame and is suspended from a pair of links 18 adjustable by cranks 19. A third link 21 has its lower end connected to the draw bar and its upper end adjustable along a transversely disposed track 22. The draw bar carries a circle frame 23 from which a mold board 24 is suspended by means of brackets 26 and 27.

In this type of grader the adjustable elements are power operated from a continually running internal combustion engine 28, this engine having a drive connection to a gear box 29, whence by means of a plurality of shifting levers 31, the movement of the engine is transmitted through shafting, gears and the like to the adjustable element. An operator's platform 32 is disposed conveniently adjacent the levers 31, whereby the operator facing the direction of movement of the grader has the adjustable elements thereof entirely under his control at all times and can move the grader parts quickly and accurately, due to the use of machine power.

I am not primarily concerned in the present invention with the application of power, except to point out that the use of power control is an advantage when a mold board with the extension arrangement to be described, can be controlled by means of power. The various power connections, including shafting and the like are disclosed in a general way in Fig. 1, but for a more particular description thereof those skilled in the art are re-

ferred to the prior Patent No. 1,815,252 above set out, and other road grader patents owned by the assignee of said patent.

Referring now more particularly to the mold board, in the standard construction thereof as herein shown, a bar 33 is secured to the back of the mold board by means of suitable brackets and extends through the brackets 26 and 27, whereby the mold board is adjustable longitudinally of its support. This in itself provides for some considerable operation of the mold board outside the line of draft of the grader, but in addition thereto I provide a mold board extension 34, preferably with a wing extension 36, pivotally connected to the extension 34, and this specific arrangement will now be described.

Fig. 4 is a sectional view taken through the mold board extension and wing extension and shows the manner in which the wing extension is secured in place. The mold board 24 has a removable cutting edge 37 extending the full length thereof and secured thereto by means of bolts. The extension 34 has a removable cutting edge 38. As Fig. 4 shows, the cutting edge in each instance is in line with the earth engaging face of the mold board so as to form a continuous arcuate earth moving surface. This is accomplished by means of the offset 24′, which permits the cutting edge 37 to be secured with its front face in line with the front face of the mold board. In the major portion of the extension 34 this same construction is employed, but in order to permit the mold board and mold board extension to be nested closely together to obtain the effect of an integral body, the portion 34′ (Fig. 6) is missing on the portion of the extension which overlaps the mold board proper. As Fig. 4 shows, the mold board and mold board extension are then capable of being nested closely together and fastening bolts 39 extending through both cutting edges 37 and 38 aid in holding the parts in firm engagement. I wish to point out that the openings through which the bolts 39 extend are the same openings which are employed for securing the cutting edge to the mold board. In other words, no special construction of the mold board itself is required to attach the extension thereto.

I also employ fastening means on the back of the mold board and this is obtained in the following way. The mold board as constructed has a reinforcing member 41 in the form of an angle iron. I provide a corresponding reinforcement 42 on the extension, but at 42′ where the two members overlap the reinforcement on the extension is offset so as to lie over the top of the reinforcement 41 as Fig. 4 shows. Nuts and bolts 43 are then employed to inter-connect the two reinforcements. Where the offset portion 42′ connects with the main portion 42, a shoulder is provided (Fig. 2) which serves as a stop and against which the reinforcement 41 bears, thereby facilitating the accurate lining up of the parts and also tending to strengthen the construction.

I can construct the extension 34 with or without the adjustable wing 36, although the value of the extension is enhanced by the use of the wing. Referring now particularly to Figs. 5 and 6, a pivot 44 is provided between the wing 36 and the extension 34 by means of which the wing can be adjusted, for example to cut a berm as shown in Fig. 3. As to controlling the adjustment, I provide a segment 46 secured to the extension 34; an adjusting arm 48 is secured to the wing extension by bolts 47 and it has a pawl 49 controlled by a hand piece 51 for engaging in slots 52 carried by the segment. By releasing the pawl the wing can be swung to any one of a number of positions determined by the number of slots 52, and the pawl allowed to enter a contiguous slot 52 to hold the wing in the position to which it has been moved. It will be understood that the pawl 49 can be operated by a suitable spring tending to force it into the slots when it has been removed therefrom by the actuation of the hand piece. The wing 36 is provided with any suitable cutting edge such as a removable cutting edge 53.

With a mold board extension of this character I am able to cut a shoulder in excess of ten feet in width, not including the portion cut by the wing 36. This of course places considerable load on the extreme end of the extension, and, while for some purposes this can be carried entirely by the grader without the use of auxiliary draft means, I have constructed and use a draft connection to the extreme end of the mold board extension to facilitate the application of the extension to heavy duty use on the road shoulder. In this connection I provide a draft chain 54 having one end connected to the mold board extension at 56 and the opposite end connected in a slot in a bracket 57 carried by the front end of the draw bar. It is seen by this arrangement that I am able to adjust the mold board and extension to the proper cutting position and then by pulling the draft chain 54 taut and passing the front end into the slot on the bracket 57, produce draft means adapted for use, independent of the position of the mold board. That is to say, the draft means can readily be adapted to the position in which the mold board is carried during a grading operation. A draft chain 58 is also provided for the wing 36, one end being secured to the wing at 59 and the other end provided with a hook 61, which hook can be dropped into any one of the links of the draft chain 54, thus affording adjustable draft means also for the wing 36. While I describe 54 and 56 as chains, it is obvious that I can use other flexible draft means such

as a steel cable or the like. I prefer the chain, however, because it is readily handled and is nonextensible, and can easily be repaired in case of injury thereto.

I have found that with this arrangement the grader can be moved along and operate on a road shoulder under many conditions without making it necessary to brace the wheels against the load by leaning them or to adjust the weight in any way by leaning the frame. When difficult grading conditions are encountered, however, I can lean the wheels as well as the frame and brace the grader against the work under all conditions. Although the present invention is adapted particularly for operating on the road shoulder, I find that I can secure very good results in cutting an extremely high bank at the side of a road. By leaning the frame and adjusting the wheels properly, the entire mold board including the extension can be placed in a substantially vertical position outside the line of draft of the wheels, and since the extension will reach up to an extreme height, banks on which it was impossible to operate with a grader heretofore can be cut down or graded off without difficulty.

The extension herein described is shown as attached to the right hand side of the grader. It is understood that the same construction may be employed for the left hand side of the grader without modification, except as to modifying the extension. The mold board as normally constructed will take an extension on either side when constructed in accordance with this invention.

There are many advantages in the use of my invention which those in the art will understand readily. One very good feature is in connection with the use of the wing. The grader wheels can be run along the edge of the pavement, and the wing will then be set to define the outer limits of the shoulder, without requiring any staking out.

What is claimed is:—

1. In a road grader, a main frame, a mold board adjustably carried by the grader below the main frame, a mold board extension secured to the mold board at one end thereof so as to form substantially a single cutting member therewith, and a wing cutter adjustably pivoted to the end of the mold board extension.

2. In a road grader, a main frame, a mold board adjustably carried by the grader below the main frame, a mold board extension secured to the mold board at one end thereof so as to form substantially a single cutting member therewith, a wing cutter adjustably pivoted to the end of the mold board extension, and an auxiliary draft element having one end secured to the mold board extension and wing, and the other end secured to the grader at a point in advance of the mold board.

3. In a road grader, a main frame, a mold board adjustably carried by the grader below the main frame, a mold board extension secured to the mold board at one end thereof so as to form substantially a single cutting member therewith, a wing cutter adjustably pivoted to the end of the mold board extension, and a chain having one end secured to the mold board extension, and the other end adjustably secured to the grader at a point in advance of the mold board.

4. In a road grader, a main frame, a mold board adjustably carried by the grader below the main frame, a mold board extension secured to the mold board at one end thereof so as to form substantially a single cutting member, a wing cutter adjustably pivoted to the end of the mold board extension, and a chain having one end secured to the mold board extension, the other end adjustably secured to the grader at a point in advance of the mold board, and a second chain having one end secured to the wing cutter and the other end adjustably secured to the first mentioned chain.

5. In a road grader, a main frame, a draw bar having its front end adjustably secured to the main frame, adjustable suspension means connecting the rear end of the draw bar to the frame, a mold board carried by the draw bar near the rear end thereof, a mold board extension secured to one end of the mold board so as to form substantially a single cutting member adapted to extend a relatively great distance at the side of the grader, a wing cutter adjustably supported at the end of the mold board extension, a chain having one end secured to the mold board extension, and a bracket secured to the front end of the draw bar for adjustably supporting the opposite end of the chain.

6. In a road grader, a main frame, a draw bar having its front end adjustably secured to the main frame, adjustable suspension means connecting the rear end of the draw bar to the frame, a mold board carried by the draw bar near the rear end thereof, a mold board extension secured to one end of the mold board so as to form substantially a single cutting member adapted to extend a relatively great distance at the side of the grader, a wing cutter adjustably supported at the end of the mold board extension, a chain having one end secured to the mold board extension, a bracket secured to the front end of the draw bar for adjustably supporting the opposite end of the chain, and a second chain having one end secured to the wing cutter, and the opposite end provided with a hook for engagement in a link of the first mentioned chain.

7. In a road grader, a mold board having a main earth moving portion of general arcu-

ate cross section, an offset portion along the bottom edge of said earth moving portion, a cutting edge bolted to the offset portion and forming a continuous earth moving surface with the main earth moving portion, and a mold board extension having the same general construction as the mold board, including the offset portion and cutting edge, no offset portion of the extension being provided where the extension overlaps the mold board, whereby the mold board and extension are closely nested to facilitate fastening of the extension to the mold board.

8. In a road grader, a mold board having a main earth moving portion of general arcuate cross section, an offset portion along the bottom edge of said earth moving portion, a cutting edge bolted to the offset portion and forming a continuous earth moving surface with the main earth moving portion, an angular reinforcement on the back of the mold board, and a mold board extension having the same general construction as the mold board, including the offset portion and cutting edge, no offset portion of the extension being provided where the extension overlaps the mold board, whereby the mold board and extension are closely nested to facilitate fastening of the extension to the mold board, an angular reinforcement on the back of the extensison, and bolts securing the two reinforcements together.

9. In a road grader, a mold board having a main earth moving portion of general arcuate cross section, an offset portion along the bottom edge of said earth moving portion, a cutting edge bolted to the offset portion and forming a continuous earth moving surface with the main earth moving portion, an angular reinforcement on the back of the mold board, and a mold board extension having the same general construction as the mold board, including the offset portion and cutting edge, no offset portion of the extension being provided where the extension overlaps the mold board, whereby the mold board and extension are closely nested to facilitate fastening of the extension to the mold board, an angular reinforcement on the back of the extension, bolts securing the two reinforcements together, the overlapping portion of the extension reinforcement lying along the mold board reinforcement, and the non-overlapping portion of the extension reinforcement being substantially in line with the main mold board reinforcement.

10. In a road grader, a mold board having a main earth moving portion of general arcuate cross section, an offset portion along the bottom edge of said earth moving portion, a cutting edge bolted to the offset portion and forming a continuous earth moving surface with the main earth moving portion, and a mold board extension having the same general construction as the mold board, including the offset portion and cutting edge, no offset portion of the extension being provided where the extension overlaps the mold board, whereby the mold board and extension are closely nested to facilitate fastening of the extension to the mold board, and a wing cutter adjustably secured to the end of the mold board extension.

11. In a road grader, a mold board, a mold board extension having its inner end overlapping and secured to an end of said mold board, a wing cutter pivoted to the outer end of the extension, a segment secured to the mold board extension near the point of pivot of the wing, an adjusting arm secured to the wing cutter, and means associated with the arm for engaging the segment to hold the wing in the position to which it has been adjusted by the arm.

12. In a road grader, a mold board, a mold board extension having its inner end overlapping and secured to an end of the mold board, a wing cutter pivoted to the outer end of the extension, a segment secured to the mold board extension near the point of pivot of the wing, an adjusting arm secured to the wing cutter, means associated with the arm for engaging the segment to hold the wing in the position to which it has been adjusted by the arm, a chain having one end secured to the extension, and having its opposite end adjustably secured to the grader in advance of the mold board, and a second chain having one end secured to the wing cutter, and the opposite end provided with a catch for engaging the first mentioned chain.

In witness whereof, I hereunto subscribe my name this 20th day of April 1931.

ORVILLE Q. HINDS.