

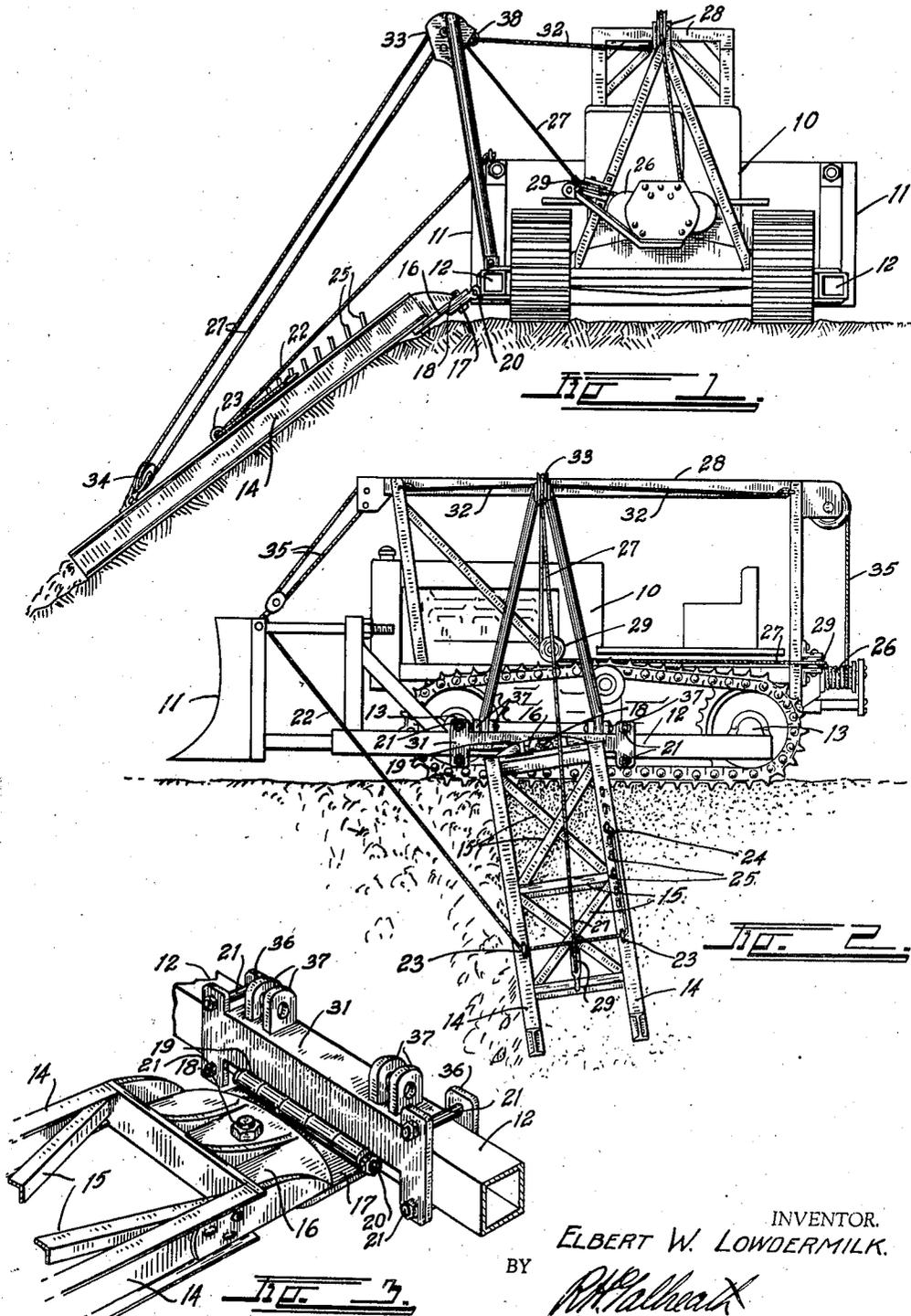
Feb. 23, 1943.

E. W. LOWDERMILK

2,312,255

GRADER

Filed March 13, 1941



INVENTOR.
ELBERT W. LOWDERMILK.

BY

R. P. Palmett

ATTORNEY

UNITED STATES PATENT OFFICE

2,312,255

GRADER

Elbert W. Lowdermilk, Denver, Colo.

Application March 13, 1941, Serial No. 383,083

4 Claims. (Cl. 37—178)

This invention relates to a grader for finishing the banks of fills or cuts in the building of roadways and has for its principal object the provision of a simple, highly efficient device which can be quickly and easily attached to any suitable vehicle so as to extend either downwardly or upwardly at the side of the vehicle for the purpose of smoothing and filling the banks of cuts and fills along the roadway.

Another object is to so construct the device that the desired angle of the bank can be accurately preset by the operator so that the bank will be cut to an accurate finished angle.

Further objects of the invention are to provide a device of this character which can be attached to the arm of a road machine of the "bulldozer" type so that the operator can regulate the operating angle of the invention by use of the regular "bulldozer" controls; and to so construct the device that it cannot twist about its longitudinal axis when in use so that an absolutely accurate and smooth bank will be obtained regardless of soil conditions.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a rear view of a typical grader of the "bulldozer" type illustrating the invention in place thereon as it would appear when finishing the bank of a roadway fill;

Fig. 2 is a side view thereof; and

Fig. 3 is a detail perspective view of the attachment hinge and pivot.

In the drawing a typical road tractor is illustrated at 10 with its "bulldozer" blade at 11 and its "dozer" arm at 12. A tractor so equipped is called a "bulldozer" and is employed for pushing earth, rock, etc. by means of the blade 11. The dozer arms 12 carry the blade at their forward extremities and extend rearwardly to suitable pivots 13. The tractor is equipped with two cable reels 26 at the rear driven from the tractor engine through suitable control transmissions. It is also equipped with an overhead frame 28. The bulldozer blade 11 is raised and lowered by means of a cable 35 extending from the blade 11 over suitable sheaves on the frame 28 to one of the

drums 26. Therefore, the angle of the dozer arms and the height of the blade 11 is always within control of the operator. This invention makes use of the dozer arms 12 and thereby obtains the advantage of the operator's control of these arms.

The invention comprises a drag frame consisting of two longitudinally extending drag beams 14 held in rigid, spaced, parallel relation by means of intermediate frame members 15. The drag frame is fixedly connected at one extremity to a table plate 16 which is pivoted on a hinge plate 17 by means of a suitable pivot bolt 18. The bolt 18 clamps the table plate 16 and the hinge plate 17 together so that they cannot rotate or twist about the longitudinal axis of the drag frame.

The hinge plate 17 is hingedly connected to an angle member 31 by means of a suitable hinge 19 and hinge bolt 20. The angle member lies against and is detachably connected to one of the dozer arms 12 by means of suitable clamp bolts 21 extending through clamp plates 36. The drag frame is free to be raised or lowered at its outer extremity about the hinge bolt 20 and it can be swung forwardly and backwardly about the axis of the pivot bolt 18. If the operator raises or lowers the blade 11, the incline of the dozer arms 12 will be changed and the axis of the hinge bolt 20 will be tilted.

The drag frame is prevented from swinging rearwardly beyond a predetermined angle by means of a tie cable 22 which extends from a connection with the frame of the dozer blade 11 rearwardly and outwardly through rings 23 on the drag members 14 terminating in a terminal loop 24. The loop 24 is slipped over any one of a plurality of projecting pins 25 on the rearward drag member 14. Thus, by changing the position of the loop 24 on the pins 25, the operating angle of the drag frame can be varied. The vertical angle or bite of the drag frame to accommodate any operating angle, is constantly under the control of the operator of the bulldozer 10 through his control of the dozer arms 12.

An A-shaped hoist boom 30 is hinged on suitable hinge ears 37 projecting from the upper side of the angle member 31. The hoist boom 30 is supported at an outwardly inclined angle by means of a fixed cable guy 32. A lifting cable 27 is extended from the second drum 26 about suitable sheaves 29 on the frame 28, around a sheave 33 at the apex of the hoist boom 30, outwardly and downwardly about a sheave 34 on the drag frame, thence back to a fixed connection on the

hoist boom 30. Thus, it can be seen that the operator can by operation of the second drum 26 raise or lower the outer extremity of the drag frame.

The cable guy 32 is secured at its two extremities adjacent the front and back of the overhead frame 28. Intermediate its extremities this cable passes through a sheave or ring 38 on the hoist boom 30 to support the latter. This arrangement allows the upper extremity of the hoist boom to swing forward and back with the movements of the dozer arm 12 without affecting the supporting function of the cable 32.

The use of the device is believed to be clearly apparent from the above description. When forming the side slopes of fills, the drag frame is lowered to the specified angle of the fill and the bulldozer is driven along the roadway above as shown in Fig. 1. The operator can change the incline of the drag frame to cause it to cut more earth or to dump collected earth by simply raising or lowering the bulldozer blade 11 which changes the horizontal angle of the drag frame 14. Should the slope being finished be shorter than the length of the drag frame, the effective length thereof can be shortened by simply changing the position of the cable 22 on the pins 25 to allow the frame to swing further rearward so as to approach more closely the side of the road.

The device is similarly used for smoothing the inclined banks in roadway cuts for which use it is elevated to an upwardly extended angle at the side of the bulldozer.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A roadside grading attachment for tractors comprising: an attachment member; means for attaching said member to a tractor; a substantially horizontally disposed, elongated hinge on said member; a flat hinge plate extending from said hinge; a flat table plate resting against said hinge plate; a single pivot bolt clamping said two plates together; a drag member secured to and projecting from said table plate; a hoist hingedly mounted on and arising from said attachment member; a guy cable attached at its extremities to said tractor; means on said hoist slidably engaging said guy cable to support the hoist yet allowing free forward and back movement thereof; hoisting means extending from said hoist to said drag member to raise or lower the latter about the axis of the hinge; and adjustable means for limiting the rearward swing of said drag member about the axis of said pivot bolt.

2. A roadside grading attachment for a bulldozer of the type having vertically swinging

dozer arms comprising: an attachment member; means for attaching said member to a dozer arm of said bulldozer; a universal hinge on said member; a drag member hinged at its inner extremity on said universal hinge; a hoist boom mounted on and arising from said attachment member; hoisting means extending from said hoist boom to said drag member to raise or lower the latter about the axis of the hinge; means for limiting the rearward swing of said drag member about the axis of said hinge; a cable secured at its forward and rearward extremities adjacent the forward and rearward extremities of said bulldozer; and a cable engaging member carried by said hoist boom and movably engaging said cable to support the hoist boom yet allowing free forward and back movement thereof along said cable as said dozer arm is raised and lowered.

3. A road side drag attachment for the dozer arm of a bulldozer of the type described comprising: two longitudinally extending drag beams; means for holding said beams in fixed parallel relation; a table plate fixed to and projecting from said beams at their inner extremity; a hinge plate; a pivot member securing said hinge plate against said table plate; an elongated hinge extending across the inner edge of said hinge plate; a vertical plate hingedly mounted along said hinge and rising therefrom; means for clamping said vertical plate against the outer face of said dozer arm; a horizontal flange along the upper edge of the vertical plate overlying the upper face of said dozer arm to maintain said hinge parallel with said dozer arm so that it will follow the movements of the latter; and means for maintaining said drag beams at any desired vertical and horizontal angle.

4. A road side drag attachment for the dozer arm of a bulldozer of the type described comprising: two longitudinally extending drag beams; means for holding said beams in fixed parallel relation; a table plate fixed to and projecting from said beams at their inner extremity; a hinge plate; a pivot member securing said hinge plate against said table plate; an elongated hinge extending across the inner edge of said hinge plate; a vertical plate hingedly mounted along said hinge and rising therefrom; means for clamping said vertical plate against the outer face of said dozer arm; a horizontal flange along the upper edge of the vertical plate overlying the upper face of said dozer arm to maintain said hinge parallel with the dozer arm so that it will follow the movements of the latter; hinge members on said flange; an A-shaped hoist boom arising from said latter hinge members; a guy supporting said boom at an outwardly inclined angle; a cable extending from said boom to support the outer extremity of said drag beams; and means for limiting the rearward swing of said drag beams.

ELBERT W. LOWDERMILK.