Aug. 11, 1936. G. C. DILLARD 2,050,282

ATTACHMENT FOR ROAD GRADERS

Filed Sept. 30, 1933 2 Sheets-Sheet 1

Fig. 1.

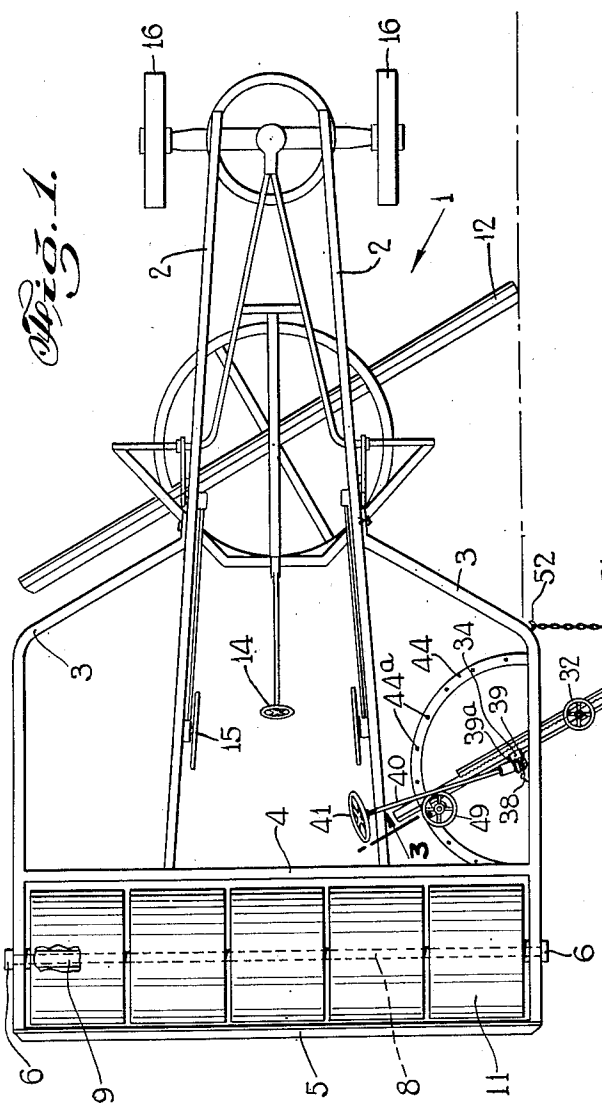
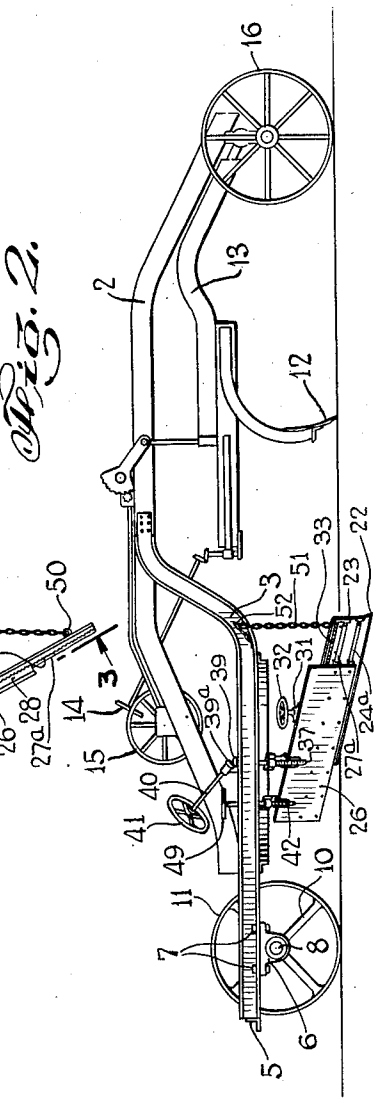


Fig. 2.



INVENTOR

Guy Conway Dillard

BY Hammond & Littell

ATTORNEYS

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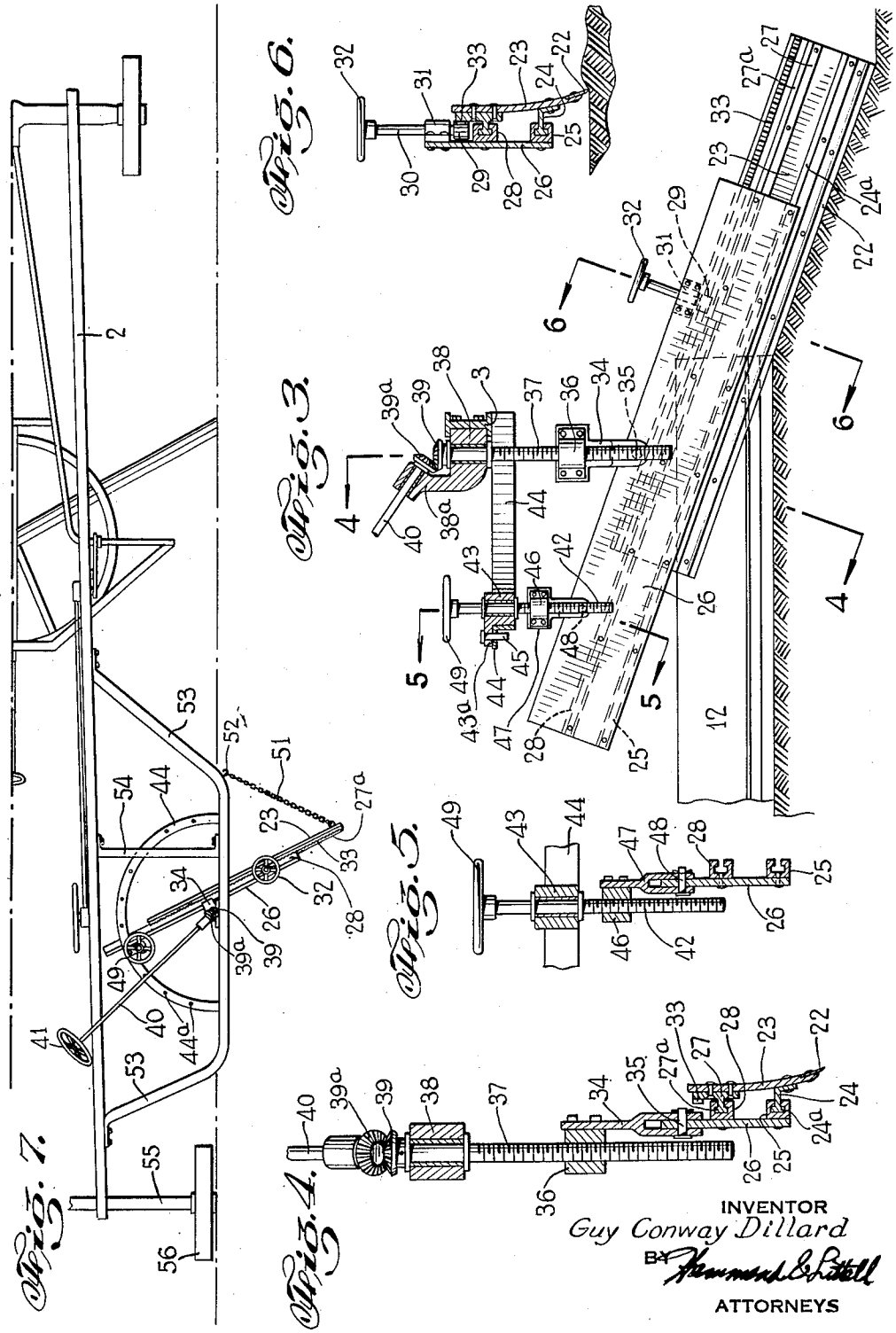


Fig. 7.

Fig. 6.

Fig. 3.

Fig. 5.

Fig. 4.

INVENTOR
Guy Conway Dillard
BY Townsend & Townsend
ATTORNEYS

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ATTACHMENT FOR ROAD GRADERS

Guy Conway Dillard, Waco, Tex.

Application September 30, 1933, Serial No. 691,621

6 Claims. (Cl. 37—155)

This invention relates to highway and embankment construction and maintenance machines, and to certain improvements thereto, viz: (1) A rotating and adjustable side-slope blade operating in conjunction with any conventional type of four-wheel grader; and (2) The same blade operating in conjunction with any conventional type of grader with a roller attached in rear;—the roller operating in the rear of a main service grader blade and functioning in lieu of rear wheels in supporting the weight of the machine and in facilitating its transit. These improvements are so designed that they may be operated concurrently with the grader,—or, each may be operated in connection with a grader alone, as may be desired or as the character of the work requires.

An object of the invention is to provide improved facilities for use in conjunction with the operations of conventional types of road graders and maintainers engaged in construction of highways, earthen dams, levees, etc., which will construct, shape, dress and maintain the crown, shoulders and slopes of the surface treatments of road beds and pavements in such a manner that such crown, shoulders and slopes will conform accurately to the elevations, grades, widths, slopes and cross-sections as prescribed in the specifications and as disclosed on the plans of a project or improvement.

An object of the combined grader with roller is that the operations of both are confined to one operation,—the roller being used to crush large portions of earth and to compact the loose layer of material which the grader blade has passed over.

Another object of the grader having a roller attached, is to secure smoother, steadier, and added performance in the operation of the grader,—which is brought about by increased length in wheel base, and by removal of more weight from the center of the grader back towards the rear, holding the machine in more perfect alignment with the shoulder of the road, dump or embankment.

Another object of the rotating side-slope blade used in conjunction with either the four-wheel grader or a grader with a roller attached, is to secure more extended control of the material being moved within the limits of the machines by means of the positions of the grader blade and the side-slope blade, each being changeable or adjustable at the will of the operator of the machine.

The foregoing objects, except as to rear roller and rolling, for the four wheel grader remain the same as above, the scope and usefulness of the combined grader with side slope blade not being limited to any particular type of construction or work. It is noted, however, that the combination of grader, rear roller and side-slope blade may be more practically employed on high fills in highway construction, earthen dams and levees where the dumps are put up in lifts for blading, rolling and finishing.

Another object of the grader and side slope blade is to more completely equip the machine to maintain the shoulders and slopes of all hard-surfaced roads; the grader blade being used between the edges of the pavement and shoulders, while the side slope blade dresses the slopes.

This invention will be best illustrated and understood from a consideration of the following detailed description, in view of the accompanying drawings forming a part of the specifications; nevertheless it is to be understood that the invention is not confined to the disclosures, being susceptible of such changes and modifications as shall define no material departures from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a top plan view of a combination of grader with roller attached and the side slope blade;

Figure 2 is a side view of the grader shown in Figure 1 with roller attached and the side slope blade;

Figure 3 is a vertical section taken on the line 3—3 of Figure 1 and showing the side slope blade in enlarged view;

Figures 4, 5 and 6, are detail sectional views taken on the lines 4—4, 5—5 and 6—6 of Figure 3, and,

Figure 7 is a partial top plan view of a side slope blade attached to a modified form of grader shown in dotted outline.

Referring more particularly to the drawings: 1 designates the grader and two beams 2—2, which are the main I beams of the grader and are securely connected in any approved manner to I beam 4 of the roller frame.

The principal means of support between the grader and roller are: I beams 3—3, which are bolted or riveted to I beams 2—2 in or near the center of the grader frame, and they extend to the rear of roller. I beam 4 is the front support of roller frame and lies between I beams 3—3 and is securely connected to same in any approved manner. Angle 5 is welded to

each of the ends of beams 3—3, and is used as mud guard and brace.

Axle housings or bearings 6—6 are connected securely to I beams 3—3 by means of bolts 7—7. Axle 8 extends the entire length of roller between bearings 6—6. The roller proper is composed of several rollers 11, each having a set of spokes 10. Collars 9—9 fit over or around axle 8, between each of the bearings 6—6 and the hubs of the outside spokes 10.

The roller grader also usually carries a grader blade 12 carried by suitable I beams 13, such blade being operated in any desired manner as by control wheels 14 and 15. This grader is normally carried between the front wheels 16 and the roller 11 in the rear and is adapted for grading the main part of the road.

In addition to the usual grader blade, and constituting a principal feature of my invention, I provide a side slope blade 22 which is attached to the mold board 23 in any desired manner as by suitable nuts and bolts. The mold board 23 is in turn secured by angle member 24 having flanged head portion 24a to guide 25 carried on stationary plate 26. Near the top of mold board 23 is a similar angle member 27 having flanged head 27a operating in the guide 28 also secured to the stationary plate 26. The angle members may be welded or secured in other desired manner to the mold board. Both guides extend substantially the full length of the plate 26 and permit longitudinal movement of the side slope blade 22 and mold board 23 with respect to the stationary plate 26.

One form of apparatus for moving the mold board with respect to the plate is shown in Figure 6. Preferably the stationary plate 26 is provided with a pinion gear 29 carried on pinion shaft 30 and supported by bearing 31 which is suitably secured to the stationary plate 26. The pinion gear is conveniently rotated by a hand wheel 32 or any other desired mechanism. The pinion gear 29 cooperates with a rack 33 carried on the mold board 23 near the top. By rotation of the hand wheel 32, the mold board and side slope blade may be adjusted to any desired extent.

The stationary plate 26 is pivotally mounted near its center as shown in Figure 3. A special Y shaped member 34 fits over the top of the plate 26 and is secured thereto by a bolt or loose rivet 35, which acts as the pivot point for the blade. This Y shaped or forked member 34 is secured to the threaded bracket 36 which operates on screw 37. The screw 37 in turn is secured against vertical movement in the bracket 38 which is preferably carried on I beam 3 of the auxiliary frame. This locates the side slope blade between the front wheels and the roller and preferably, for practical operation, between the center of the machine and the rear support. Gears 39 and 39a are secured in turn to the upward extension of the screw 37 and to an operating shaft 40 held at the lower end in bracket extension 38a. A hand wheel 41, as shown in Figure 2 rotates the operating shaft 40 and thus controls the vertical height of the center of the mold board and side slope blade by the operation of screw 37 and bracket 36.

One end of the side slope blade is desirably controlled in a positive manner and preferably, this is the inside end so that the outer end may be deflected the desired amount. I provide in one form of device, a screw and hand wheel control as shown in Figures 3 and 5. This includes screw 42 which is carried in bearing 43. Bearing 43 has an extension 43a which extends over and is carried by curved angle bar 44 as shown in Figure 1. This angle bar is of generally circular shape and is provided with a plurality of apertures 44a with which bolt 45 extending through the bracket extension 43a cooperates. It will thus be possible to vary the angularity of the side slope blade as desired. The angle bar 44 may be attached at any desired horizontal level thus permitting the blade to have sufficient vertical movement.

The screw 42 operates the bracket 46 which is secured to a Y shaped or forked member 47 which is pivotally secured to the stationary plate 26 by a bolt or loose rivet 48 near the inner end. The hand wheel 49 operates this control and will either raise or lower the inner end of the stationary plate depending on the direction of rotation. This movement will simultaneously lower or raise the projecting end of the side slope blade 22.

An eye bolt 50 as shown in Figure 1 may be attached to the mold board and a suitable chain 51 secured in adjustable manner to hook 52 carried by the I beam 3. This will brace the end of the side slope blade as pressure is applied.

In applying the same side slope blade to any conventional four wheel grader the structures are identical with that of the above, excepting the roller and its frame in the rear of the grader. The carriage frame for the blade is of course different as shown in Figure 7, and is as follows: I beam 53 is bolted on to the main frame I beam 2 in or near the center of grader frame and extends back to the rear of the same I beam 2. The main frame of any grader is elevated in and along its mid-section to give room for the operations of its adjustable blade and it serves as a vertical brace for the side slope blade and its frame. I beam or angle bar 54 extends from I beam 2 down to I beam 53 and is securely attached to both beams in any approved manner. This gives added vertical strength to the frame. The angle bar 44 acts in a similar manner as in the previous form to engage the rear support of the side slope blade, the parts of which are numbered in a manner similar to the same parts in the previous modification. The rear axle 55 in this construction is supported by two rear wheels 56 in the usual manner.

By the foregoing method of construction of the side slope blade with all of its parts it is readily seen that by such construction it may be easy to operate, reinforced enough to withstand much hard usage, and may be tilted at any vertical angle either above or below horizontal, and also moved in a horizontal arc, thus giving a wide range of operation.

It will be seen from an inspection of the drawings that the side slope blade may be brought in, to comply with the same length of stationary plate, and also be raised high enough not to interfere with the workability of the grader with roller attached, or of the four-wheel grader.

It will also be noted that the two blades may be adjusted and operated at any angle desired independently of each other.

While I have described a preferred form of embodiment of my invention, I am aware that modifications may be made thereto and I therefore desire a broad interpretation of my invention within the scope and spirit of the description herein and of the claims appended hereinafter.

What is claimed is:

1. A wheel grader of the class described having

a main frame, a supporting plate and a side slope grader blade carried by said supporting plate and projecting beyond the side of the main frame, an inverted Y-shaped member loosely pivoted to the center of said side supporting plate, and means to adjust the vertical position of said inverted Y-shaped member, and a second Y-shaped member loosely pivoted to one end of the supporting plate, means to vertically adjust said Y-shaped member, and means to change the horizontal position of said adjusting means whereby the side slope grader blade may be varied in azimuth.

2. In a machine of the character described a grader comprising a main frame, a plurality of supporting wheels, a main grader blade carried by said main frame, a supplemental frame, a supporting plate, a mold board slidable thereon and a side slope grader blade carried on said mold board and projecting beyond the side of the grader and means to separately control the elevation, azimuth and inclination from the horizontal of the supporting plate with respect to the main grader blade whereby the intersecting position of a side slope formed by the side slope grader blade may be varied with respect to a shoulder formed by the main grader blade.

3. In a machine of the character described a grader comprising a frame, a plurality of supporting wheels for said frame, a side slope grader blade and means to support said blade with respect to said frame and projecting beyond the side of the grader, said means including a supporting plate, means to separately control the position of the supporting plate including means to pivot and control the center of the supporting plate, means to control the angularity of said plate about said pivot and means to control the angularity of said plate in a horizontal plane, said grader blade being slidably secured to said supporting plate and means to slide said blade longitudinally with respect to said plate.

4. In combination with a roller grader of the class described having a frame, a side slope grader blade projecting beyond the side of the grader, means to support said side slope grader blade, and separate means to independently adjust said side slope blade in extended position and in angular relation to the horizontal position, said blade supporting means including a curved angle bar, and means extending from one of said adjusting means engaging with said angular bar to hold the side slope blade in a predetermined azimuth position.

5. In a machine of the character described a grader comprising a main frame, a plurality of supporting wheels, a main grader blade carried by said main frame, a supplemental frame, a side slope grader blade carried thereby and projecting beyond the side of the grader and means on the supplemental frame to separately control the horizontal angle position of the side slope grader blade, independent of the main grader blade, said side slope blade being movable longitudinally, and means to move said blade to or from any extended position.

6. In a machine of the character described a grader comprising a main frame, a plurality of supporting wheels, a main grader blade carried by said main frame, a supplemental frame, a side slope grader blade, means to support said side slope blade, means to adjust said side slope blade in elevation and azimuth with respect to said supplemental frame, said side slope grader blade projecting beyond the side of the grader and means to separately control the extended position of the side slope grader blade.

GUY CONWAY DILLARD.