

June 19, 1962

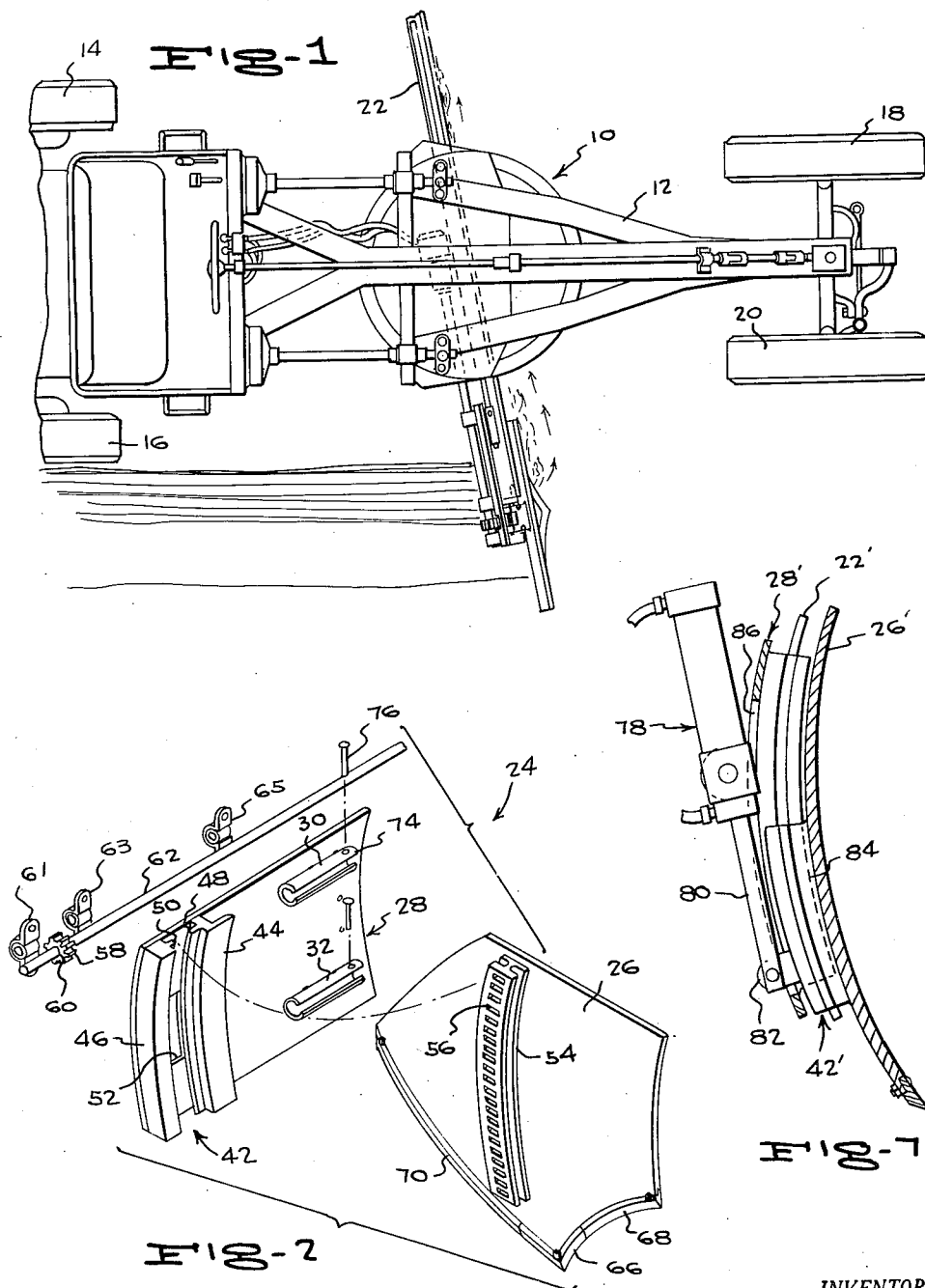
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3,039,209

DITCH FORMING ATTACHMENT FOR A ROAD GRADER

Filed March 13, 1959

2 Sheets-Sheet 1



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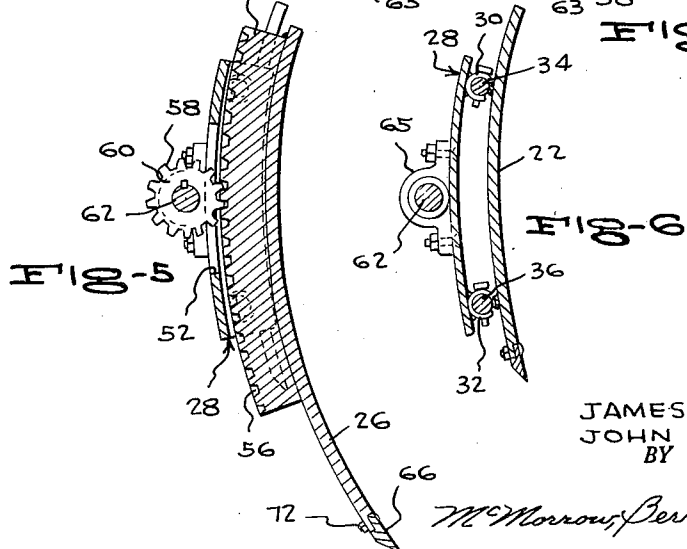
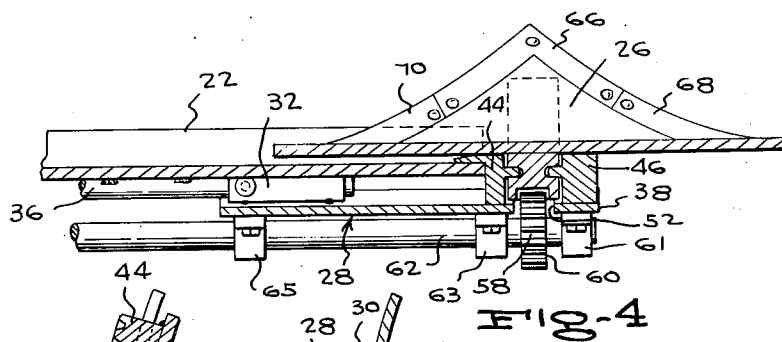
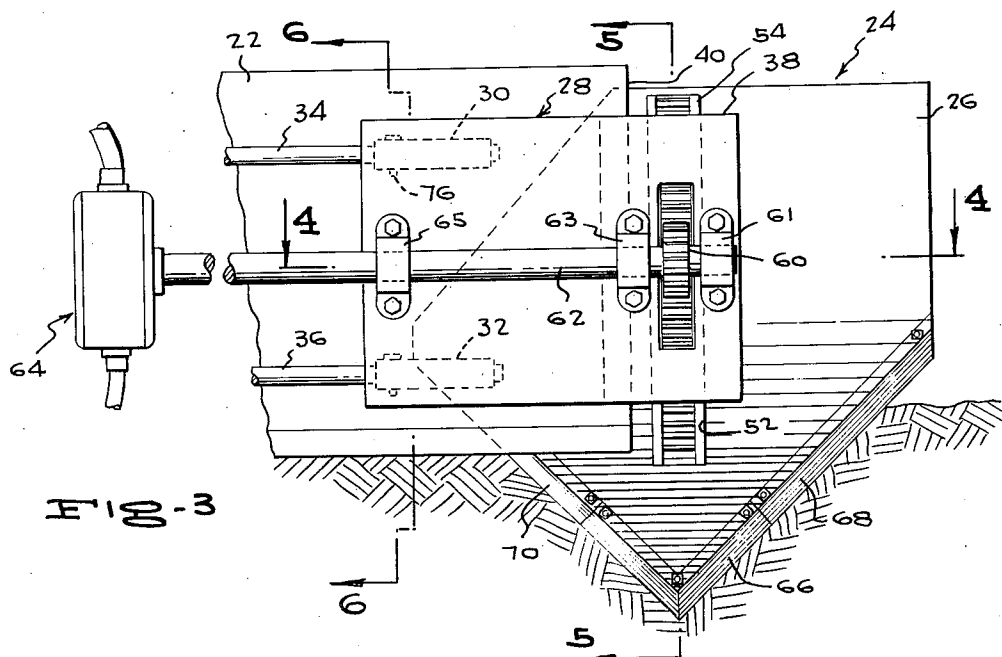
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DITCH FORMING ATTACHMENT FOR A ROAD GRADER

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Filed Mar. 13, 1959, Ser. No. 799,347

1 Claim. (Cl. 37-98)

The present invention relates to a ditch forming attachment for a road grader.

In the maintenance of unpaved roads, road graders are generally employed in the smoothing, cutting, and filling of a road surface. The road grader is employed also in smoothing and shaping the shoulder area on each side of the roadway. Frequently, a drainage ditch is desirable along a side of the roadway or along the edge of a shoulder area. Road maintenance men in the past have attempted to cut or clean such a ditch and have employed the scraper blade of a road grader by extending the blade out to the side of the road grader and disposing the blade at an angle to the horizontal in order that the end of the blade be enabled to cut into the earth surface and form a ditch as the road grader travels along or beside the roadway. The use of the scraper blade of a road grader to cut or form a ditch alongside a roadway is inefficient for many reasons. Usually, when cutting a ditch and employing the scraper blade of a road grader, the rear wheel of the road grader on the side of the grader adjacent the ditch follows in the ditch as the ditch is being cut. This tilts the road grader to a position in which the operator is subject to considerable annoyance and also to chance for injury and makes difficult the adjustment of the scraper blade relative to the frame of the road grader. Additionally, a ditch dug alongside a roadway by the scraper blade of a road grader may be wider than desired and of a lesser depth than is practical. Also, the dirt removed from the ground surface while digging such a ditch is carried by the scraper blade to one side of the ditch and requires a further operation to position the dirt for removal from the road surface or shoulder area.

An object of the present invention is to provide a ditch forming attachment for a road grader which effectively and efficiently forms a ditch alongside of a roadway or shoulder area adjacent the roadway with removal of the dirt from the ditch to a point on the roadway where it is easily and with facility loaded on a disposing vehicle.

Another object of the present invention is to provide a ditch forming attachment for a road grader which lends itself to attachment with ease and facility to the scraper blade of a road grader, one which is readily adjusted for cutting or forming ditches of various depths, and one which may be shifted from an operative position to an inoperative position at the will of the operator.

A further object of the present invention is to provide a ditch forming attachment for a road grader which is sturdy in construction, one simple in structure, one adaptable for attachment to the scraper blades of all makes of road scrapers, and one which is economically feasible.

These and other objects and advantages of the present invention will be more fully apparent from the following description when taken in conjunction with the annexed drawings, in which:

FIGURE 1 is a plan view of a road grader showing the ditch forming attachment installed thereon, portions of the rear wheels of the grader being shown broken away;

FIGURE 2 is an isometric exploded view of the attachment according to the present invention, shown removed from the grader;

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FIGURE 3 is an elevational view as seen from the rear of the attachment of the present invention, shown installed upon an end portion of a scraper blade of a road grader, a portion of the adjusting drive shaft being shown broken away;

FIGURE 4 is a view taken on the line 4-4 of FIGURE 3;

FIGURE 5 is a view taken on the line 5-5 of FIGURE 3;

FIGURE 6 is a view taken on the line 6-6 of FIGURE 3; and

FIGURE 7 is a view similar to FIGURE 5, showing a modified form of the mounting means and depth adjustment means of the attachment according to the present invention.

Referring in greater detail to the drawings in which like numerals indicate like parts throughout the several views, in FIGURE 1 the reference numeral 10 designates generally a road grader having a frame 12 supported on rear wheels 14 and 16 and on front wheels 18 and 20.

Intermediate the forward and rearward ends of the grader 10 is an upstanding leveling blade 22 positioned beneath the frame 12 intermediate the ends and disposed so that it extends in a direction generally crosswise of the frame 12.

The ditch forming attachment according to the present invention is designated generally by the reference numeral 24 and is shown in FIGURE 1 to be attached to the scraper blade 22 on the one end of the latter which is forwardly of the other end. This is a normal position at which the scraper blade 22 is disposed when the attachment 24 of the present invention is employed to form a ditch alongside the roadway on which the grader 10 is traveling.

The ditch forming attachment 24 comprises a ditch forming element 26, in the form of an arcuately curved plate, positioned forwardly of the front face of the blade 22 and connected to the blade 22 for up and down movement.

The means connecting the ditch forming element 26 to the blade 22 for up and down movement includes a mounting plate 28 positioned rearwardly of the rear face of the blade 22 and adjacent the end of the latter which is forwardly. The mounting plate 28 is detachably secured to the blade 22 by means of a pair of vertically spaced horizontally disposed split sleeves 30 and 32 which slidably receive spaced guides 34 and 36, respectively, which project from the rear face of the blade 22, as shown in FIGURE 3.

The guides 34 and 36 on the blade 22 are part of the means by which the blade 22 is shifted from one side to the other of the grader 10. One of such guides 34 and 36 is shown cylindrical in cross-sectional configuration. The guides on the blades of other graders may be of different cross-sectional configuration. Therefore, the sleeves 30 and 32 are only a single form of the means for attaching the mounting plate 28 to the blade 22 and when the attachment of the present invention is employed with the scraper or leveling blade of another grader having other guide means, suitable attaching means will be substituted for the sleeves 30 and 32.

As will be seen in FIGURE 3, the mounting plate 28 has a portion 38 adjacent one end projecting outwardly of the end 40 of the blade 22. The front face of the projecting portion 38 of the mounting plate 28 is provided with a vertically disposed trackway 42. As shown most clearly in FIGURE 2, the trackway 42 is fabricated from pieces 44 and 46 having tongues 48 and 50, respectively, on their confronting faces, of the pieces 44 and 46 being arranged in lateral spaced relation and each being arcu-

ately curved to conform to the curve of the mounting plate 28.

The mounting plate 28 is provided with a closed ended slot 52 in that portion of the mounting plate 28 between the pieces 44 and 46 and intermediate the upper and lower edges of the plate 28.

On the rear face of the ditch forming element 26 is a vertically disposed support member 54, of H-shaped cross-sectional configuration, having on the exterior of one of its flanges spaced openings 56 which receive the teeth 58 of a gear 60 mounted on a horizontally disposed shaft 62. The shaft 62 is journaled in supporting bearings 61, 63, and 65, fixedly secured to the rear face of the mounting plate 28 intermediate the upper and lower ends of the latter.

The portions of the support member 54 between adjacent openings 56 constitute rack teeth engaged by the teeth 58 of the gear 60, the teeth 58 of the gear 60 projecting through the slot 52 in the mounting plate 28.

The end of the shaft 62 remote from the gear 60 is operatively connected to a hydraulic motor 64 for rotating the shaft 62 in opposite directions to raise and lower the ditch forming element 26.

The lower end portion of the ditch forming element 26 is V-shaped and is provided with replaceable cutting blades 66, 68 and 70. The cutting blades 66, 68, and 70, are secured by conventional nut and bolt assemblies 72 provided on the edge portion of the element 26.

The sleeves 30 and 32 are provided with vertically aligned openings 74, as shown in FIGURE 2, with respect to the sleeve 32, through which is received an attaching pin 76.

In FIGURE 7, a modified form of the means for lowering and raising the ditch forming element 26' is seen to consist in a hydraulic cylinder assembly 78 having its actuating arm 80 operatively connected and pivotally connected to a lug 82 which projects from the rear face of a support member 84 carried on the back face of the ditch forming element 26'. The lug 82 extends through a slot 86 provided in the mounting plate 28'. The support 84 is slidable in a trackway 42' having pieces similar to the pieces 44 and 46 of the trackway 42, each of such similar pieces being provided with appropriately arranged tongues received in the grooves provided in the sides of the support member 84 in a like manner as the connection of the support member 54 to the pieces of the trackway 42.

In use, the scraper or leveling blade 22 of the grader 10 is positioned so that one end is forwardly of the other end and holes are provided in the adjacent end portions of the guides 34 and 36. The mounting plate 28, 28' is then positioned adjacent the rear face of the blade 22 adjacent the forward end and the sleeves 30 and 32 are slipped over the adjacent guides 34 and 36 and the pins 76 inserted through the holes 74 in the sleeves 30 and 32 and through the holes provided in the guides 34 and 36. This detachably secures the mounting plates 28, 28' to the blade 22. Next, the ditch forming element 26, 26' is

connected to the respective mounting plate 28, 28' by insertion of the support member 54, 84, in the trackway 42, 42'.

In the first form of the invention, the hydraulic motor 64 on the end of the shaft 62 rotates the shaft 62 in one direction or the other to raise or lower the ditch forming element 26 to the desired position relative to the blade 22 for cutting into the ground surface adjacent the end of the blade 22 to thereby form a ditch. In the form of the invention shown in FIGURE 7, actuation of the hydraulic cylinder assembly 78 to extend or retract the actuating arm 80 effects the upward and downward movement of the blade forming element 26' to position the latter relative to the blade 22', as desired.

Upon traveling movement of the grader 10, the ditch forming attachment 26, 26', when extended below the lower edge of the blade 22, 22', will effectively remove dirt from the ground surface and shift the dirt on to the adjacent part of the blade 22, 22' for piling of the dirt on the roadway or shoulder area outwardly of the rearward end of the blade 22, 22' for removal therefrom by an appropriately arranged loader or other means.

What is claimed is:

The combination with a wheeled frame having a forward end and a rearward end, and an upstanding leveling blade positioned beneath said frame intermediate the ends so that it extends in a direction crosswise of said frame with one of its ends nearer the forward end of said frame and the other of its ends nearer the rearward end of said frame, of a ditch forming attachment comprising a mounting plate positioned rearwardly of the rear face of said leveling blade adjacent the forward end and detachably secured to said leveling blade, a vertically disposed trackway carried by said mounting plate, a ditch forming element embodying an arcuately curved plate having the lower end portion provided with a V-shaped cutting blade and positioned forwardly of said mounting plate and connected to said trackway for movement therealong, a rack disposed in alignment with said trackway and carried by said ditch forming element, and drive means operatively connected to said rack for effecting the movement of said ditch forming element.

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