

Aug. 6, 1929.

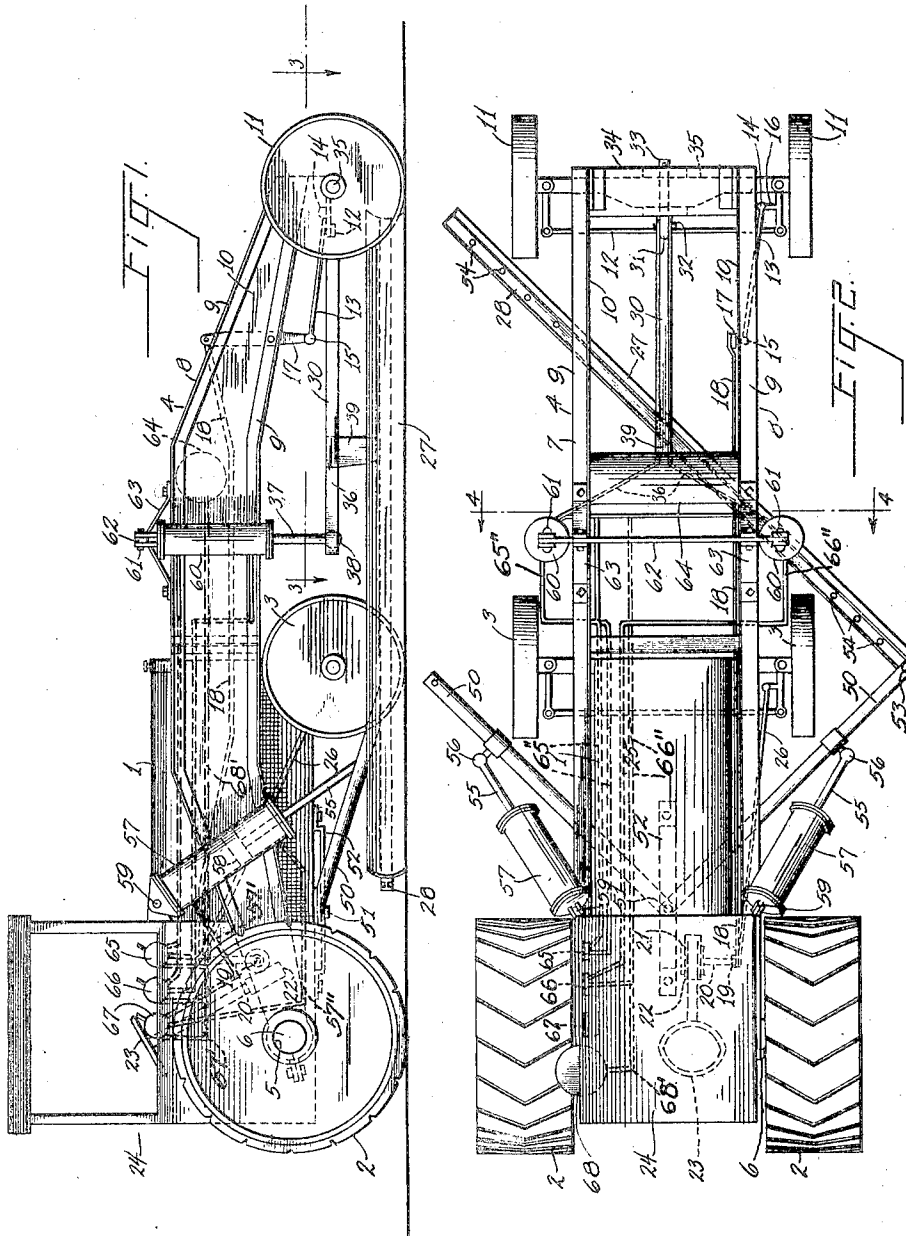
C. E. GILBERT

1,723,931

ROAD GRADER

Filed March 1, 1926

3 Sheets-Sheet 1



INVENTOR
C. E. GILBERT
BY *M. M. Leo*
ATTORNEYS

Aug. 6, 1929.

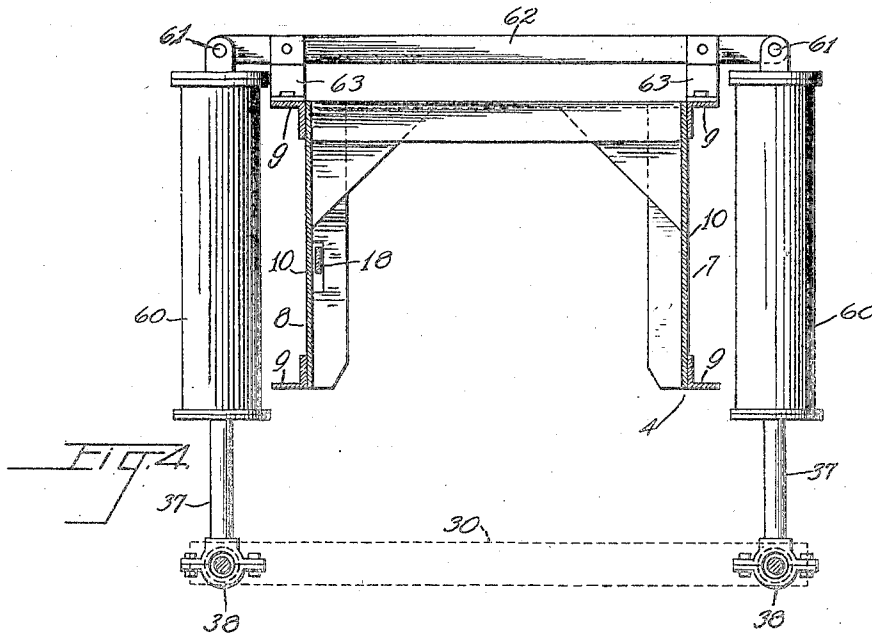
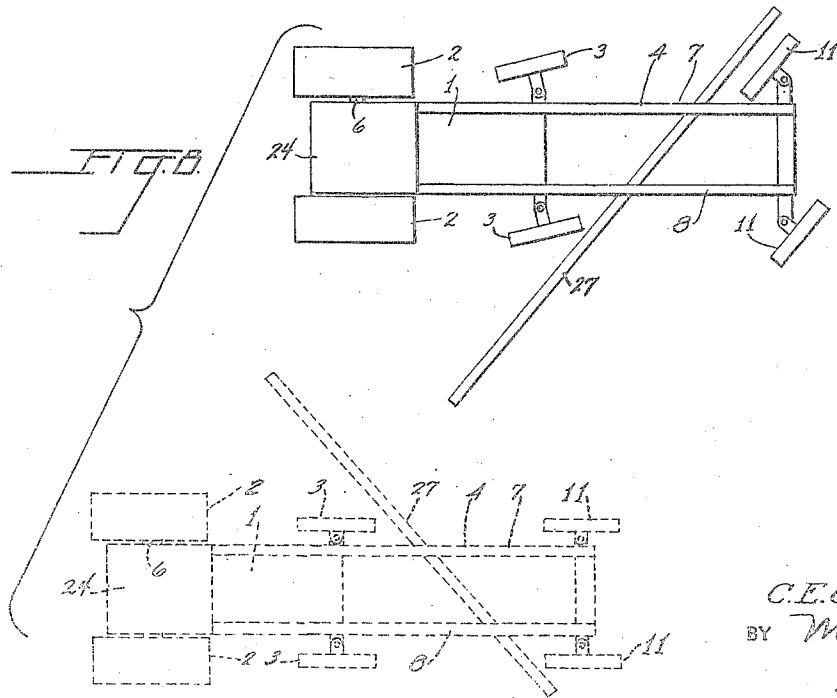
C. E. GILBERT

1,723,931

ROAD GRADER

Filed March 1, 1926

3 Sheets-Sheet 2



INVENTOR
C. E. GILBERT
BY *Murray & Co.*
ATTORNEYS

Aug. 6, 1929.

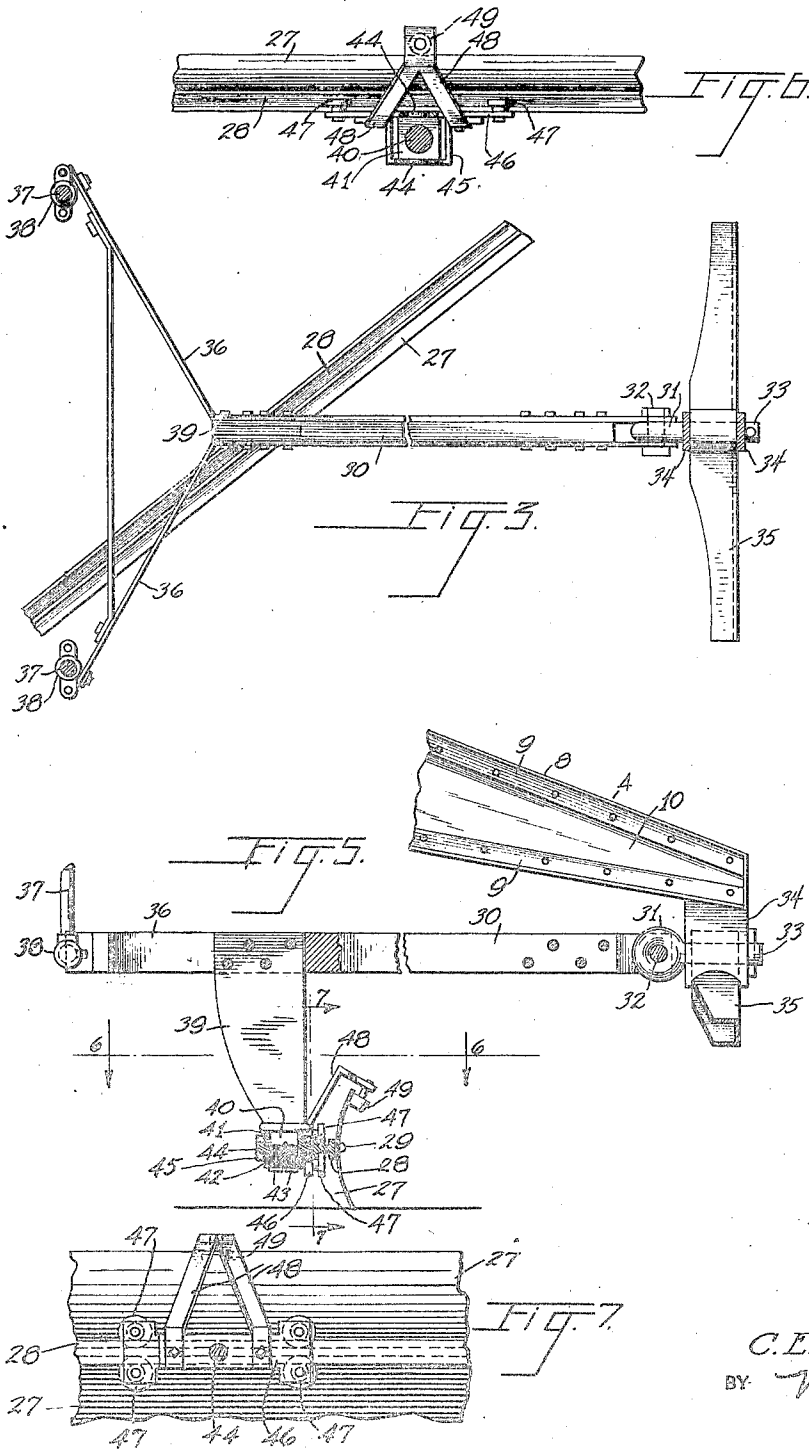
C. E. GILBERT

1,723,931

ROAD GRADER

Filed March 1, 1923

3 Sheets-Sheet 3



INVENTOR
C. E. GILBERT
BY: *Wm. H. Lee*
ATTORNEYS

UNITED STATES PATENT OFFICE.

CLARENCE EUGENE GILBERT, OF STILLWATER, MINNESOTA.

ROAD GRADER.

Application filed March 1, 1926. Serial No. 91,497.

My invention relates to improvements in road graders, and it consists in the combinations, constructions, and arrangements herein described and claimed.

5 An object of my invention is to provide a road grader, in which the scraper blade may be changed from a position on one side of the machine to a position on the other side of the machine, whereby the machine is adapted to throw dirt on either side of the road. The device is designed especially to permit the scraper blade to be changed in its position by one man.

15 A further object of my invention is to provide a road grader, in which the blade is very long in proportion to the rest of the machine, whereby the device is capable of surfacing a wide stretch during one operation.

20 A further object of my invention is to provide a road grader, in which the frame for supporting the blade is designed primarily to be removably secured to a standard tractor, the blade being disposed in front of the tractor, whereby the operator can closely watch as the work progresses.

25 A further object of my invention is to provide a road grader, in which the position of the blade may be changed slightly with respect to the machine by novel means.

30 Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

35 My invention is illustrated in the accompanying drawings, forming part of this application, in which

Figure 1 is a side elevation of the device,

Figure 2 is a top plan view of the device,

40 Figure 3 is a section along the line 3—3 of Figure 1,

Figure 4 is a section along the line 4—4 of Figure 2,

Figure 5 is a side elevation of Figure 3,

45 Figure 6 is a section along the line 6—6 of Figure 5,

Figure 7 is a section along the line 7—7 of Figure 5, and

50 Figure 8 is a diagrammatic top plan view of the device, showing how the blade is changed from a position on one side of the machine to a like position on the opposite side of the machine, the latter position being shown by dotted lines.

55 In carrying out my invention, I make use of a tractor, this tractor being provided

with driving wheels 2 and steering wheels 3. To the tractor 1 is secured a frame 4. In Figure 1 it will be noted that the frame 4 has openings 5 for receiving the rear axle 6 of the tractor 1. The frame 4 consists of side members 7 and 8, these members straddling the tractor and extending quite a distance in front of the tractor. The side members 7 and 8 are made up of angle irons 9 and plating 10. The shape of the sides 7 and 8 is shown in Figure 1, and it will be noted from this figure that the front of the frame 4 is supported by steering wheels 11.

70 I will first describe the means for steering the wheels 11 and the wheels 3, whereby the device is guided in its course. In Figures 1 and 2 I show the wheels 11 as being connected to each other by a cross link 12, much in the same manner as a standard automobile construction. Movement is imparted to the cross link 12 by means of a link 13, and is connected by ball and socket joints 14 and 15 to an arm 16 and a lever 17 respectively. The lever is pivotally secured to the side 8, and is connected by means of a rod 18 to an arm 19. The arm, in turn, is mounted upon a shaft 20, and upon this same shaft a worm gear 21 is mounted. The worm gear meshes with a worm 22 which, in turn, is manually actuated by a steering wheel 23. The wheel 23 is disposed in the cab 24 of the tractor.

85 The wheels 3 are operatively connected to each other by a cross link 25, and are connected to the arm 19 by means of a link 26. The arrangement of the steering mechanism for the wheels 11 and the steering mechanism for the wheels 3 is such as to turn the wheels 11 through an arc approximately three times the size of the arc through which the wheels 3 are turned. In this way the device may be readily guided over the ground.

90 I will now describe the novel construction of the blade, and the means of supporting the blade to the frame 4. In Figures 3, 5, 6 and 7, I show a blade 27 which is secured to a rail 28 by means of bolts 29, or other like fastening means. The blade 27 is very long in proportion to the rest of the machine. This permits the device to scrape a large portion of the road at a single operation. A blade of this length is very unwieldy to handle, and I have therefore provided air controlled means for changing the angle of the blade with respect to the device, and I

have also provided novel means for permitting the blade to be completely swung into a position where it will convey the dirt to the opposite side of the machine from which it formerly conveyed it.

The means for supporting the blade consists of a movable frame 30 (see Figure 3). This frame is pivotally secured to an eye 31 at 32. The eye 31 forms a part of a pin 33, this pin being rotatably mounted in a casting 34 and in the front axle 35 of the device. The opposite end of the frame 30 is provided with flared-out portions 36, these portions being connected to piston rods 37 by ball and socket joints 38. The means for moving the piston rods 37 will be hereinafter described.

To the frame 30 I secure a supporting member 39. This member is provided with a cylindrical portion 40, which is rotatably mounted in a sleeve 41. The sleeve 41 is secured to the member 40 by means of a disc 42 and bolts 43. The sleeve 41 carries trunnions 44 which project at right angles to the longitudinal axis of the member 40. In Figure 6, I show how the trunnions 44 are rotatably disposed in a bracket 45. The bracket 45, in turn, is secured to a blade guiding member or carriage 46.

The blade guiding member 46 is connected to the rail 28 by means of guide rollers 47, which are disposed above and below the rail 28. These guide rollers connect the blade 27 to the frame 4, whereby movement of the device will drag the blade over the ground in the usual manner.

The blade 27 is prevented from pivoting about the rail 28 when the blade contacts with the ground. The means for accomplishing this consists of uprights 48 which are secured to the bracket 45 and which carry a guide and retaining roller 49, this roller being secured in a position to contact with the upper portion of the scraper 27.

It will be seen from the construction just described, that the blade guide member 46 may be moved along the rail 28. The connection between the blade 27 and the supporting member 30 is such as to permit the blade to pivot about the lower end of the supporting member. The blade, of course, will be moved into various angular positions with respect to the supporting member 39, when coming into contact with the road.

The blade has one end connected to the body of the tractor 1, whereby the blade is held in adjusted position with respect to the frame 4 as the blade is moved over the ground. The connecting means is shown in Figures 1 and 2, and it will be noted in Figure 2 that an arm 50 has one end pivotally connected at 51 to the body of the tractor and to a supporting brace 52. The other end of the arm 50 is connected by means of a bolt 53 to the rail 28. As shown in Figure 2, I provide a number of openings 54 in the

rail 28 for permitting the adjustment of the scraper 27 with respect to the frame 4. The connections at 51 and 53 are such as to permit the arm 50 to be swung in a horizontal plane, and to also be raised and lowered slightly. The arm 50 is adapted to be moved by means of a piston rod 55, this rod being connected to the arm by a ball and socket joint 56. The piston rod 55 extends into a cylinder 57 and carries a piston 58 at its inner end. The upper end of the cylinder 57 is pivotally connected at 59 to the tractor 1. This construction permits a universal connection between the tractor and the scraper. In Figure 2, I show the opposite side of the frame 4 as being provided with a cylinder 57, the piston rod 55, the ball and socket joint 56, and the arm 50, these being similar to the parts already described.

The blade 27 may be raised and lowered with respect to the ground by means of the frame 30. As heretofore stated, the frame 30 is supported by the bolt 32 and by the piston rods 37. In Figure 4, I show how the piston rods 37 are mounted in cylinders 60, these cylinders having their upper ends pivotally connected at 61 to a cross piece 62. The cross piece 62 is secured to the frame 4 by brackets 63.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. The cylinders 57 and 60 are placed in communication with a storage tank 64 (see Figure 2), and with control valves 65, 66, and 67, these valves being disposed in the cab 24, where they are readily accessible to the operator. A compression pump 68 is connected by a pipe 68' with the storage tank 64, and keeps the air or oil in the storage tank at a predetermined pressure. Pipes 65', 66' and 67' lead from the storage tank to the three valves 65, 66, and 67, and lead from these valves to the cylinders 57 and 60. The valves 65 and 66 are for controlling the flow of air into and out of the cylinders 60 through pipes 65'' and 66'', whereby the frame 30 may be raised and lowered and may also be slightly swung about its longitudinal axis; as, for example, when one of the piston rods 37 projects a greater distance from its cylinder 60 than does the other piston rod. Of course, the bolt 32, connecting the frame 30 to the eye 31, is loose enough to permit this slight movement. The pipes connecting the valves 65 and 66 with the cylinders 60 are adapted to convey the air into the tops of the cylinders or in the bottoms of the cylinders for driving the pistons in either direction. The valve 67 is connected by pipes 67' and 67'' to the cylinders 57, and controls the flow of air into these cylinders for moving the piston rods 55 in either direction with respect to the cylinders.

Assume that the operator desires to swing the blade 27 from the position shown in Figure 2 into a position exactly opposite; in other words, that he wishes to connect the free end of the blade to the free end of the arm 50. In doing this, he first disconnects the bolt 53 from the rail 28, and then turns the front wheels 11 in the manner shown in Figure 8. The tractor is now backed up, and, as shown in Figure 8, the wheels 11 will travel along beside the scraper 27, thus causing the carriage 46 to slide along the rail 28. As soon as the carriage nears the end of the rail 28, the operator causes the tractor to move forwardly, and in doing this, he turns the front wheels in a manner to cause the blade 27 to pivot about the member 40. This movement will take place because the longer end of the blade is heavy and rests upon the surface of the ground with sufficient force to cause the free end to act as a pivot for the entire blade. The forward movement of the tractor is continued until the longer end of the blade comes adjacent to the free end of the arm 50. The arm 50 may now be connected to the rail in the manner heretofore described, and it will be noted that the blade is now changed into an angle which is exactly opposite to its former position.

The device is efficient for scraping wide roads. The special construction for permitting the blade to be swung from one side of the machine to the other permits a very long scraper to be used, and also permits the blade to be changed in position by one operator.

I claim:

1. In a device of the type described, a frame, wheels for supporting said frame, a blade carrying frame adjustably connected to said first named frame, means for moving said blade frame with respect to said first named frame, a blade supporting member connected to said blade frame and being slidably connected to said blade, said member permitting the blade to rock about said member as a pivot, and means for rigidly connecting one end of said blade with said first named frame.

2. In a device of the type described, a frame, wheels for supporting said frame, a blade carrying frame adjustably connected to said first named frame, means for moving said blade frame with respect to said first named frame, a blade supporting member connected to said blade frame and being slidably connected to said blade, said member permitting the blade to rock about said member as a pivot, and means for rigidly connecting one end of said blade with said first named frame, said last named means being adjustably secured to said blade.

3. A road grader comprising a frame re-

movably connected to a tractor, a blade, a blade supporting member slidably connected to said blade, means for raising and lowering said blade supporting member with respect to said frame, an auxiliary means for connecting said blade with said frame, said auxiliary means being adapted to move said blade into different angular relations with respect to said frame.

4. A road grader comprising a frame re- movably connected to a tractor, a blade, a blade supporting member slidably connected to said blade, means for raising and lowering said blade supporting member with respect to said frame, auxiliary means for connecting said blade with said frame, said auxiliary means being adapted to move said blade into different angular relations with respect to said frame, and control means disposed adjacent to the steering device of the tractor for actuating said blade supporting means and said auxiliary means.

5. In a device of the type described, a frame movable over the ground, a blade supporting member, a blade secured to said member, cylinders carried by said frame, pistons mounted in said cylinders and being operatively connected to said blade supporting member, an auxiliary cylinder, a piston rod in said auxiliary cylinder and being connected to said blade, and control means for controlling the movement of said pistons in said cylinders, whereby the blade may be moved with respect to said frame.

6. A road grader, a frame and wheels for supporting the same, a scraper, and means for slidably connecting the scraper with said frame and being adapted to be moved independently of the scraper and substantially the entire length of the latter when the frame is moved, whereby the scraper may be swung to vary the angular position with respect to the line of draft by the movement of said frame.

7. In a road grader, a frame and wheels for supporting the same, a scraper, means for slidably connecting the scraper with said frame and being adapted to be moved independently of the scraper and substantially the entire length of the latter when the frame is moved, whereby the scraper may be swung to vary the angular position with respect to the line of draft by the movement of said frame, and removable means for supporting the scraper in an adjusted position.

8. A road grader comprising a movable frame having a scraper movably connected therewith, and means for slidably connecting the scraper with the frame and movable independently of the scraper substantially the entire length of the latter, whereby the angular position of the scraper with respect to the frame may be varied by the movement of the frame.

9. The combination with a tractor, of a scraper may be swung to vary the angular
frame attached thereto, wheels for support- ing the frame, a scraper, means for slidably movement of the latter, and adjustable 10
connecting the scraper with respect to the means carried by the tractor for rigidly
5 frame and being adapted to be moved sub- connecting either end of said scraper with
stantially the entire length of the scraper the tractor.
when the frame is moved, whereby the

CLARENCE EUGENE GILBERT.