May 27, 1941. J. H. KERBER 2,243,564

ROAD GRADER

Filed Dec. 20, 1940 3 Sheets-Sheet 1

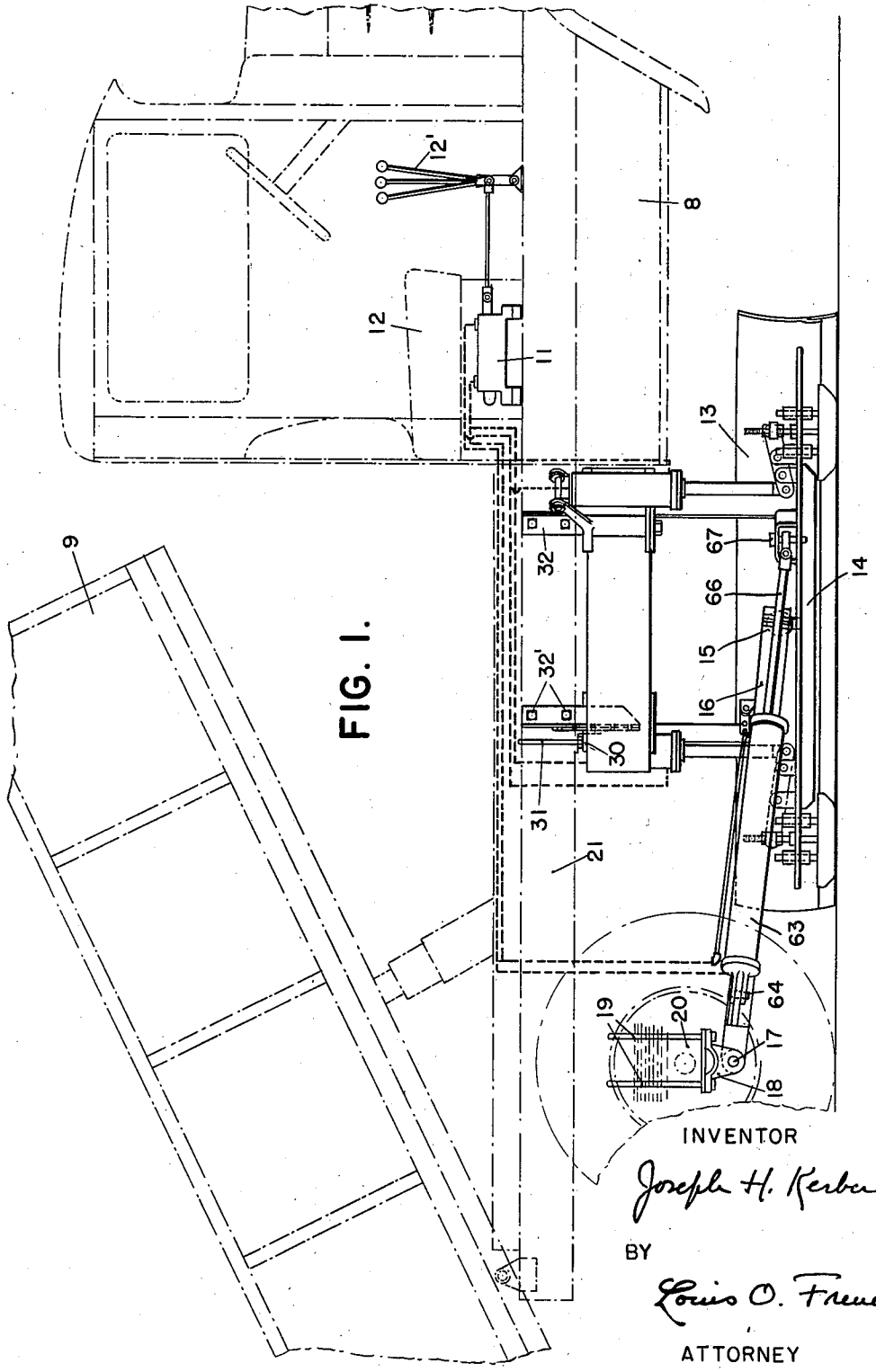


FIG. 1.

INVENTOR

Joseph H. Kerber

BY

Louis O. French

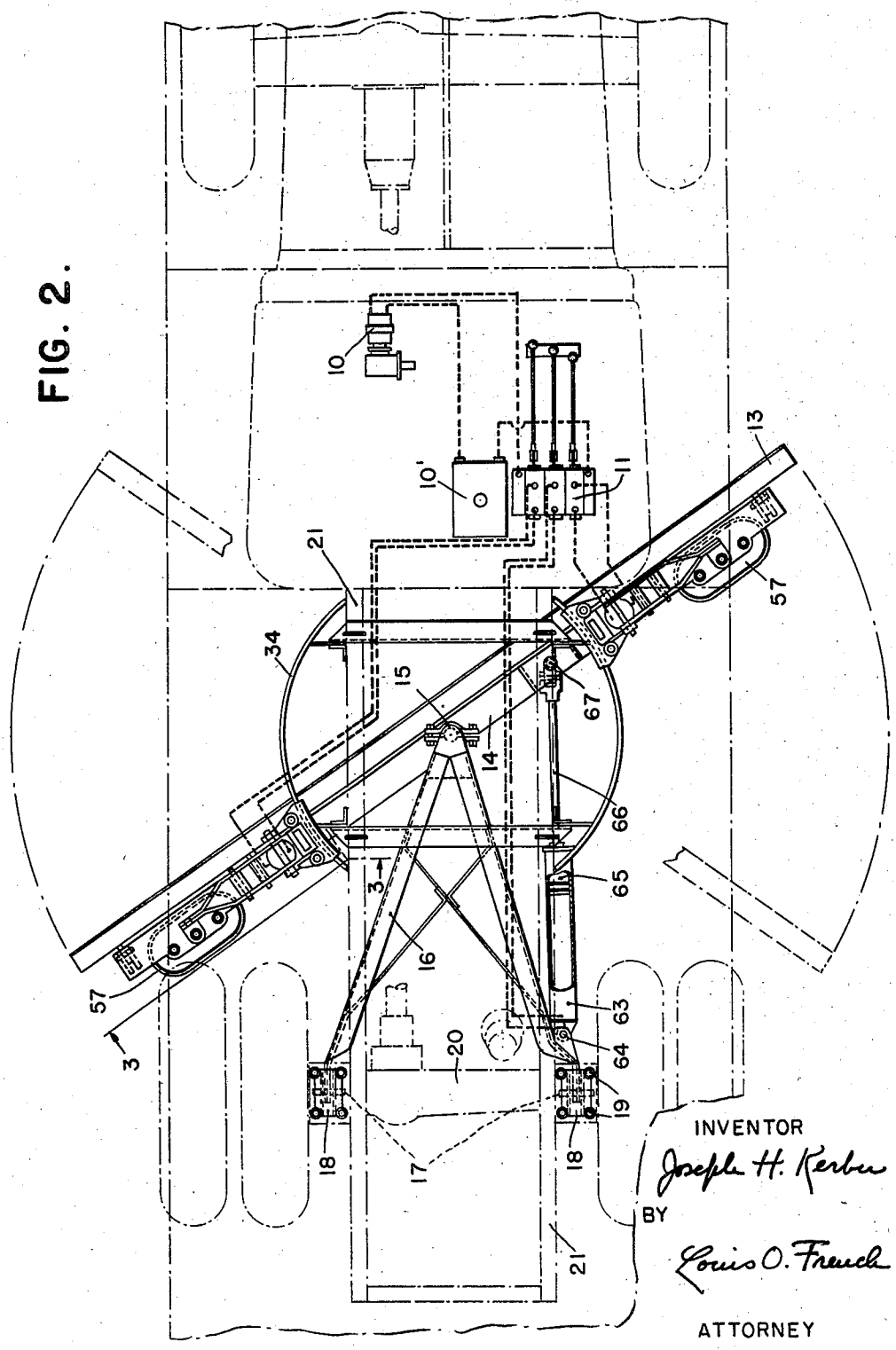
ATTORNEY

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FIG. 2.



INVENTOR

Joseph H. Kerber

BY

Louis O. French

ATTORNEY

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FIG. 3.

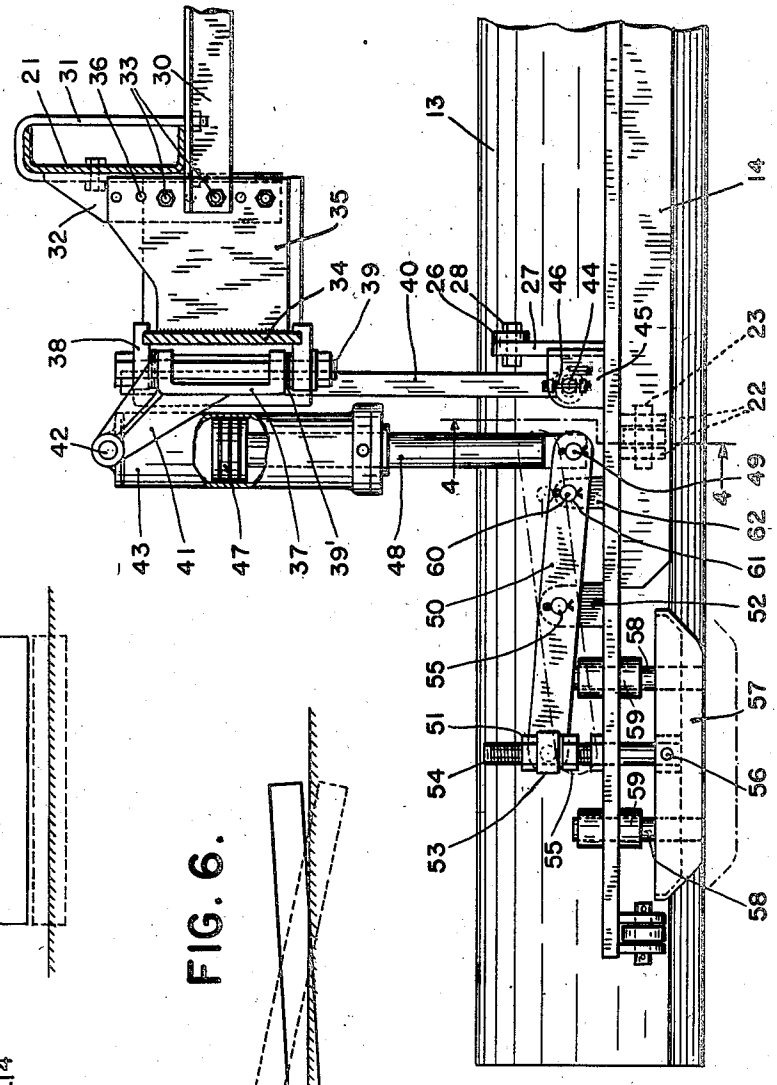
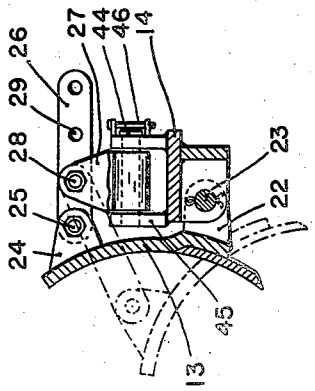


FIG. 5.

FIG. 6.

FIG. 4.



INVENTOR

Joseph H. Kerber

BY

Louis O. French

ATTORNEY

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2,243,564

UNITED STATES PATENT OFFICE

2,243,564

ROAD GRADER

Joseph H. Kerber, Milwaukee, Wis., assignor to Hi-Way Service Corporation, Milwaukee, Wis., a corporation of Wisconsin

Application December 20, 1940, Serial No. 370,979

5 Claims. (Cl. 37—159)

The invention relates to road graders.

The general object of the invention is to provide a road-treating blade attachment that may be readily applied to an industrial truck, so that such truck can be used for road patrol work and provide the motive power for operating the scraper blade, and thus save the expense of a special tractor grader. More particularly, the invention is designed to simplify and improve the road grader shown and described in my co-pending application Serial No. 272,491, filed May 8, 1939, for "Truck grader," and in this connection the mounting of the blade from the truck frame has been simplified, and the height of the blade is directly controlled by a pair of independently operable hydraulic cylinders which may be directly connected to the blade or indirectly through shoes having a lever connection with the blade.

The invention further consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings:

Fig. 1 is a side elevation view of a grader structure embodying the invention;

Fig. 2 is a plan view of the improved grader structure, parts being broken away and parts being shown in section;

Fig. 3 is a detailed sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a detailed sectional view taken on the broken line 4—4 of Fig. 3;

Fig. 5 is a diagrammatic view of parallel mold board adjustments;

Fig. 6 is a view similar to Fig. 5 showing angular mold board adjustments.

Referring to the drawings, I have shown the device embodying the invention applied to a motor driven truck 8 of conventional form and having a dump body 9 and provided with an hydraulic pump 10 furnishing hydraulic fluid from a supply tank 10' and under suitable pressure to a system including a control valve mechanism 11 mounted adjacent the truck operator's seat 12, so that the operating handles 12' for said valve mechanism are within easy reach of the driver of the vehicle.

The scraper blade or mold board 13 is connected to a carrying frame 14 which at its center is connected through a ball and socket swivel joint 15 to an angular push frame 16, the legs of which at their base end are each, respectively, pivotally connected at 17 to a bracket 18 which is clamped by U-bolts 19 to the rear axle housing 20 of the truck at a point outside the side frames 21 of said truck. The blade is vertically angularly adjustably mounted on the frame 14 by ears 22 at its lower part connected to said member by pins 23 and by ears 24 at its upper part connected by bolts 25 to links 26 which in turn are adjustably connected to the frame 14 by brackets 27 which at their upper ends are pivotally connected by bolts 28 that are adapted to engage in any one of a series of holes 29 in the links 26, the blade being shown in full in Fig. 4 in one angular position and being shown in dotted in said figure in another position. The frame is hung from the truck frame as hereinafter described.

Transversely extending frame members 30 are secured in spaced relation to the side bars 21 of the truck by U-bolts 31. Vertically disposed angled brackets 32 are secured by bolts 32' to the front faces of the side bars adjacent the ends of the frame members 30 and are provided with a plurality of vertically spaced holes, one of which is adapted to take one of the bolts 33 which also passes through the extended end of the member 30. Arcuate supporting members 34 are vertically adjustably connected to the brackets 32 by bracket parts 35 adjustably connected to the brackets 32 by the bolts 33 adapted for insertion in holes 36 in said bracket parts and selected holes in the brackets 32, one of the bolts 33 as noted above also extending through a hole in the frame member 30. The members 34 are on a radius which forms a turntable mounting for the blade.

Hoist cylinder and guide mounting brackets 37 are adjustably guided on the arcuate members 34 by arcuately grooved plates 38 clamped to said brackets 37 by bolts 39 and a series of shims 39' which are individually removable for the purpose of taking up wear of grooved portions of said plates. Thus the brackets 37 are free to slide along the turntable parts 34, and they have a guide bar 40 extending vertically through them, and their arms 42 carry a pivot pin 42 which passes through a pivot boss formed on the top of the hoist cylinder 43. Each guide bar 40 is pivotally connected at its lower end to the frame 14 so as to permit said frame and mold board to swing in a vertical plane thereto by a pivot pin 44 mounted in spaced ears 45 on the frame 14, said pin being removably held in said ears by a removable cotter pin 46.

Each hoist cylinder 43 is a double acting type cylinder with the piston 47 working therein having a rod 48 working through the usual stuffing box (not shown) in the lower end of said

cylinder, the lower outer end of said rod being operatively connected by a pivot pin 49 to one end of a lever 50 which is pivotally mounted intermediate its ends on pivot pin 51 carried by a boss 52 on the frame 14. The lever 50 is formed by a pair of spaced members which straddle the rod 48 and the boss 52 but are connected together at their other end to provide a laterally extending apertured portion 53 through which a threaded stud 54 loosely passes, said stud being secured in different positions of vertical adjustment relative to the lever 50 by nuts 55 vertically adjustably mounted on said stud. The stud is vertically pivotally connected at its lower end 56 to a metal shoe 57 which is provided with vertically mounted guide pins 58 that are loosely mounted in guide bosses 59 in the frame 14.

With the above construction raising of the piston 47 by hydraulic fluid introduced into the cylinder 43 on the lower side thereof causes it to swing the inner end of the lever 50 connected thereto upwardly and hence the outer end thereof downwardly so as to move the shoe 57 downwardly relative to the blade 13 and thus elevate the blade while the reverse movement of the piston 47 by hydraulic fluid introduced into the cylinder above the piston causes the shoe 57 to be raised with a corresponding lowering movement of the blade 13. Thus through the controls 11 provided for the hydraulic fluid both ends of the beam may be raised or lowered simultaneously to bring the blade 13 out of or into scraping position, as shown diagrammatically in Fig. 5, or one end of the blade may be lowered while the other is raised as shown diagrammatically in Fig. 6. From the above it will be noted that the shoes 57 act as depth gauges for the blade. Where the gauging action of the shoes 57 is not desired, they may be held in an inoperative position by locking pins 60 that are inserted through holes 61 in the levers 50 and an aligned hole in bosses 62 on the frame 14.

It will be noted that the loose connections between the frame 14 and the shoes 57 and the pivotal connections of the guide bars 40 with the frame 14 and the pivotal connections of the cylinders 43 permit inclination of one end of the mold board 13 relative to the other.

For swinging the mold board angularly in a generally horizontal plane about its pivot 15, an hydraulic cylinder 63 carried by the frame 16 and pivotally connected at 64 thereto has a piston 65 working in said cylinder with its rod 66 working through a stuffing box in said cylinder and pivotally connected to the frame 14 by a vertically disposed pivot pin 67. With this construction introduction of hydraulic fluid into the head end of the cylinder and relief of fluid from the other end causes the mold board to be swung from its dotted to the full line position shown in Fig. 2, and of course, by checking the flow of fluid the piston 65 may be stopped in any intermediate position so as to vary the angular position of the mold board to any position within the two extremes shown, and reversal of the position of said blade from its full to dotted line position is affected by the introduction of hydraulic fluid at the back of the piston 65 and relief of hydraulic fluid from the front end of the cylinder 63, the passage of the hydraulic fluid being under the control of the control valve mechanism 11. It will, of course, be understood that while the mold board is being swung to the desired angular position, the bolts 39 are loosened so as to allow the brackets 37 and plates 38 to turn freely relative to the turntable mounted on the truck frame.

It will be noted from Fig. 2 that the shoes 57 are located immediately back of the mold board 13 and extend lengthwise thereof and have relatively flat bottoms adapted to slide along the top of the roadway.

I desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except in so far as such limitations are included in the claims.

What I claim as my invention is:

1. The combination with a motor driven vehicle provided with a turntable, of a scraper blade, means for hanging said scraper blade from said vehicle for vertical and horizontal angular movement relative thereto including hydraulic hoist cylinders mounted for angular movement on diametrically opposite sides of said turntable and provided with pistons, levers pivotally carried by said scraper blade intermediate their ends and operatively connected at one end to said pistons, and road engaging shoes operatively connected to the other end of said levers whereby vertical adjustment of said pistons will act on the shoes to vary the vertical position of said blade relative to the roadway.

2. The combination with a motor driven vehicle provided with a turntable, of a scraper blade, means for hanging said scraper blade from said vehicle for vertical and horizontal angular movement relative thereto including hydraulic hoist cylinders mounted for angular movement on diametrically opposite sides of said turntable and provided with pistons, levers pivotally carried by said scraper blade intermediate their ends and operatively connected at one end to said pistons, road engaging shoes operatively connected to the other end of said levers whereby vertical adjustment of said pistons will act on the shoes to vary the vertical position of said blade relative to the roadway, and manually operated means for locking said levers to said blade with the shoes in a retracted position.

3. The combination with a motor driven vehicle provided with a turntable, of a scraper blade, brackets slidably mounted relative to said turntable and adapted to be clamped thereto in different positions of angular adjustment relative to the line of draft of the vehicle, hydraulic hoist cylinders pivotally carried by said brackets and having pistons operatively connected to said blade to control the vertical adjustment thereof, and guide means also extending between said blade and brackets and vertically slidably mounted in the latter.

4. The combination with a motor driven vehicle provided with a turntable, of a scraper blade, brackets slidably mounted relative to said turntable and adapted to be clamped thereto in different positions of angular adjustment relative to the line of draft of the vehicle, hydraulic hoist cylinders pivotally carried by said brackets and having pistons, road-engaging shoes, levers carried by said blade and operatively connecting said pistons with said shoes to vary the vertical adjustment of said blade relative to the roadway, and guide means pivotally connected to the blade and vertically slidably mounted in said brackets.

5. The combination with a motor driven vehicle having a rear axle and provided with a turntable including arcuate supporting rails, diametrically disposed brackets having clamping

plates slidably mounted on said rails and clamping bolts for said plates for securing said brackets in the desired radial angle position relative to said turntable, a grader blade, an hydraulic hoist cylinder pivotally hung from each bracket and having a piston operatively connected to said blade to control the vertical adjustment thereof, guide bars pivotally connected to said blade and vertically slidably mounted in said brackets, a push frame operatively connected to the central portion of said blade and pivotally connected to the rear axle, and an hydraulic cylinder and its piston connected to said push frame and to said blade at a point offset from the central connection of said push frame with said blade and adapted to swing said blade in either direction in a generally horizontal plane about said central connection.

JOSEPH H. KERBER.