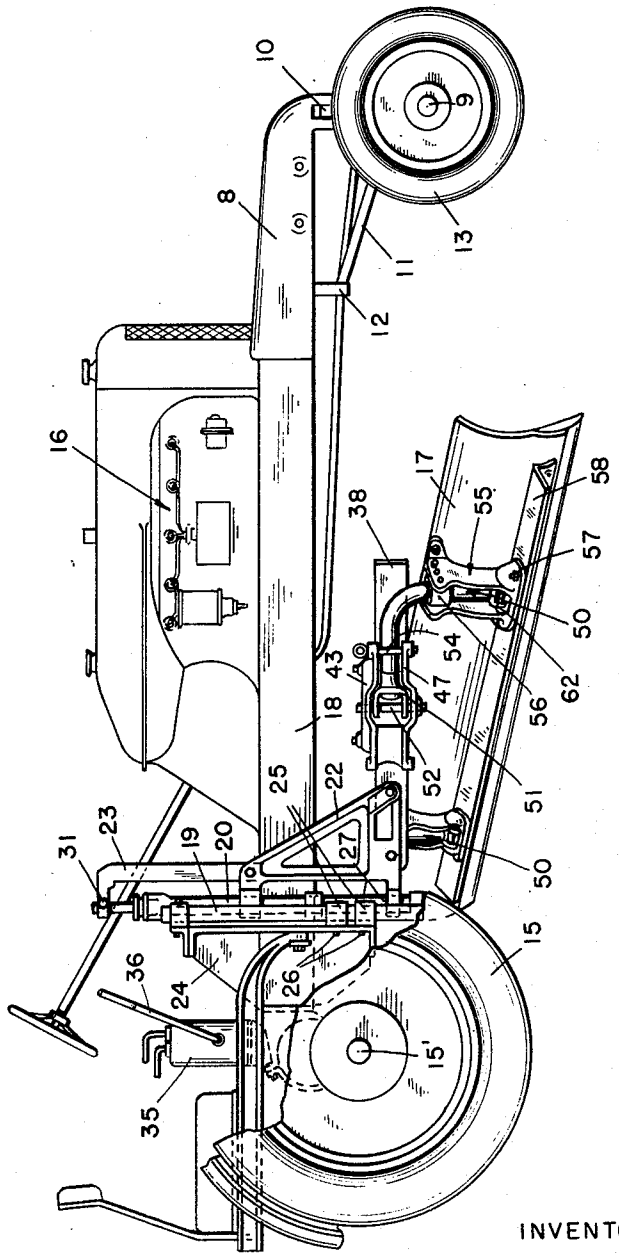
Jan. 21, 1941. J. H. KERBER 2,229,210

ROAD GRADER

Filed Dec. 30, 1938 3 Sheets-Sheet 1

FIG. 1.



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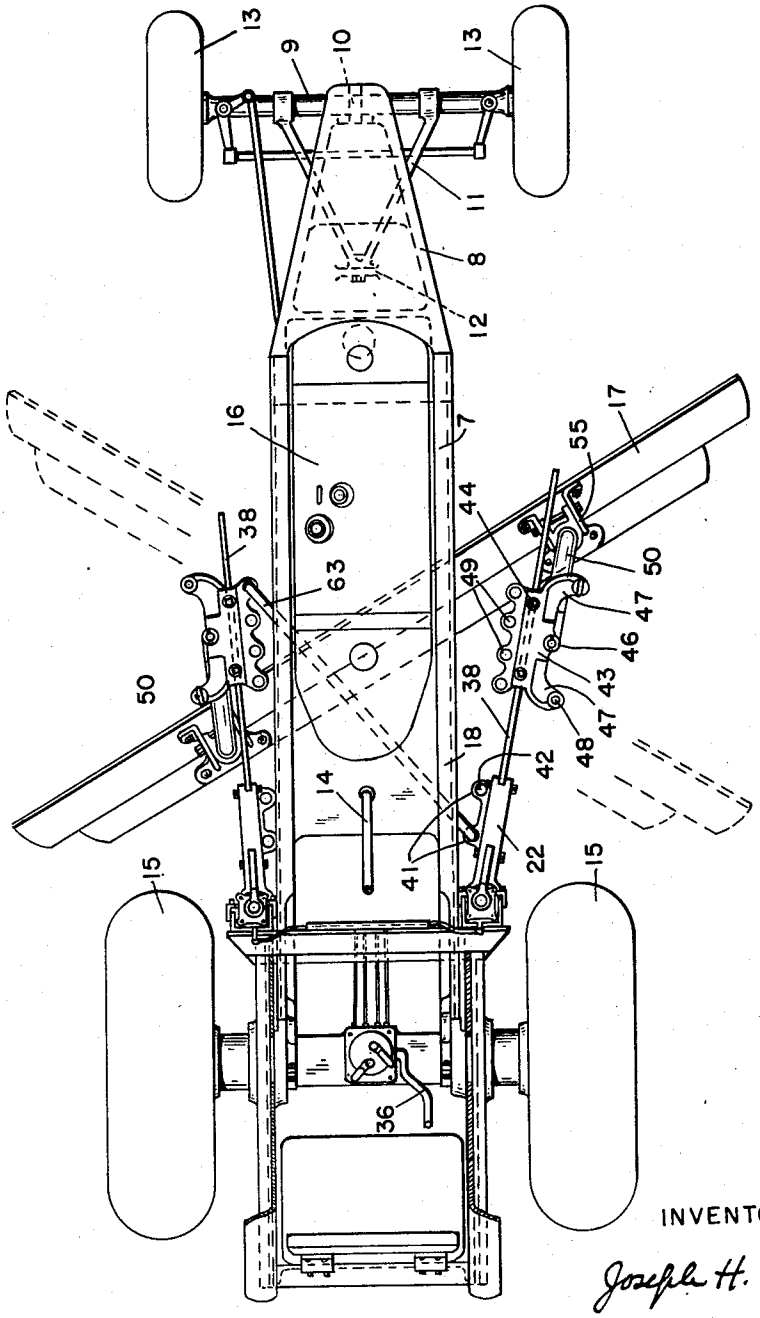
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FIG. 2.



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FIG. 3.

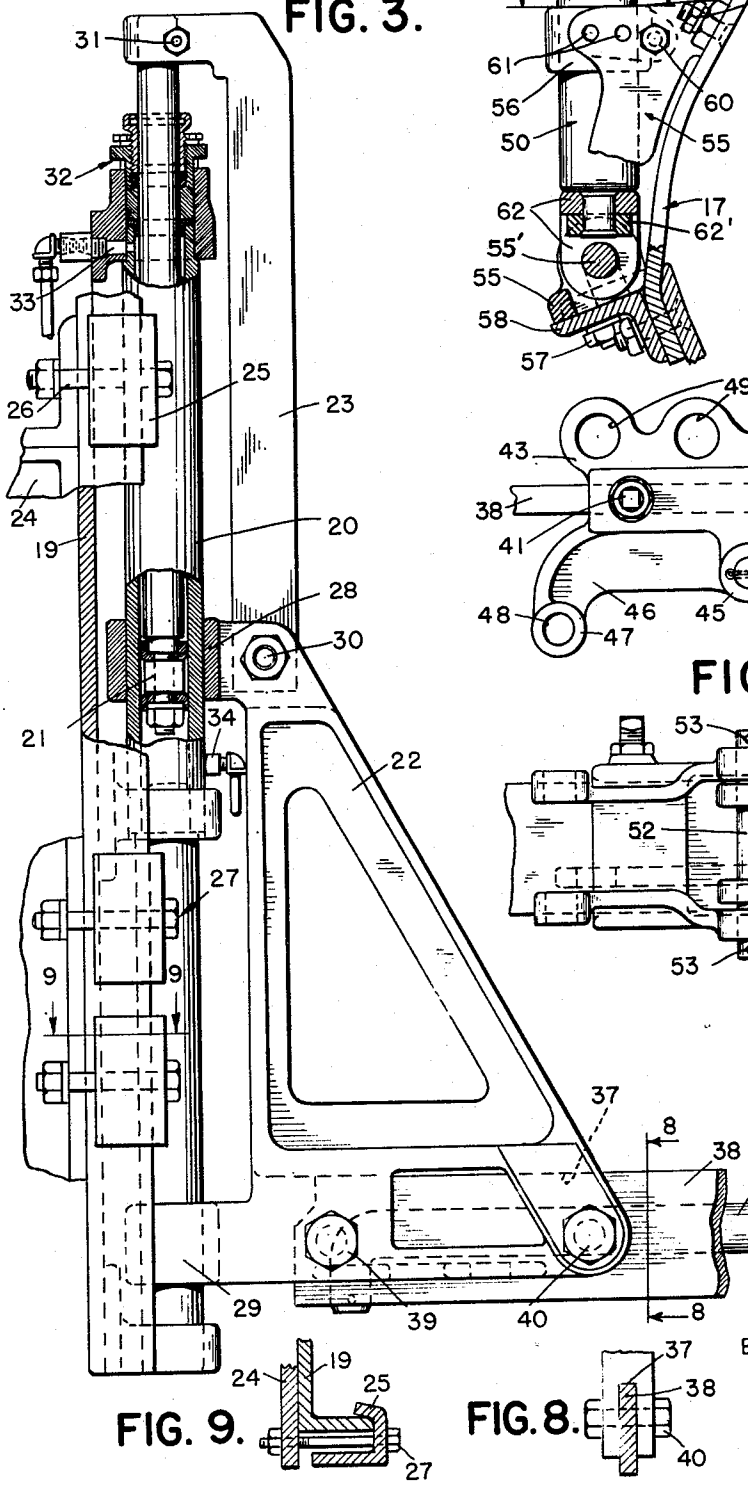


FIG. 6.

FIG. 5.

FIG. 4.

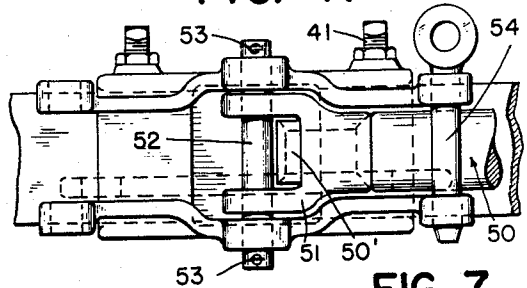


FIG. 7.

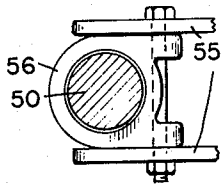


FIG. 9.

FIG. 8.

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Patented Jan. 21, 1941 2,229,210

UNITED STATES PATENT OFFICE

2,229,210

ROAD GRADER

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

Application December 30, 1938, Serial No. 248,440

7 Claims. (Cl. 37—155)

The invention relates to road graders.

The object of the invention is to provide a grader attachment that may be readily applied to relatively light weight tractors of standard construction but having an elongated wheel base to better adapt them to grader work.

A further object of the invention is to provide a grader attachment comprising a pair of blade-supporting units which include hydraulically operated means for raising and lowering the blade.

A further object of the invention is to provide a grader attachment comprising a pair of blade-supporting units with interconnections between said units adjustable to vary the angle the blade makes with the line of draft, said connections also providing for reversing the position of the blade.

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

Fig. 1 is a side elevation view of an apparatus embodying the invention, parts being broken away;

Fig. 2 is a plan view of the apparatus, parts being broken away;

Fig. 3 is a detailed elevation view of a part of one of the blade supports, parts being shown in section;

Fig. 4 is a detailed side elevation view of a part of one of the blade supports;

Fig. 5 is a plan view of parts shown in Fig. 4;

Fig. 6 is a detailed side elevation view of the connection between the blade support and the blade.

Fig. 7 is a detailed sectional view taken on the line 7—7 of Fig. 6;

Fig. 8 is a detailed sectional view taken on the line 8—8 of Fig. 3;

Fig. 9 is a detailed sectional view taken on the line 9—9 of Fig. 3.

Referring to the drawings, the numeral 7 designates generally a tractor of standard construction but which has its wheel base extended by providing a front end extension 8 to which the front axle 9 is swivelled at its central portion 10 and to which it is also connected by a yoke 11 having a swivelled connection with it at 12. The axle 9 has the dirigible front steering wheels 13 mounted thereon and controlled through the usual connections which connect the steering knuckles of said wheels with the steering column 14. The rear wheels 15 are suitably mounted on the rear axle or axles 15' which is or are driven through suitable transmission mechanism from the engine 16.

The scraper or grader blade 17 is supported from the frame of the tractor by two similar supporting units mounted on opposite sides of the frame 18 of the tractor.

Each blade-supporting unit includes a frame member 19 which carries a hoisting mechanism including a cylinder 20 in which a piston or ram 21 is slidably mounted, said piston having a frame member 22 secured thereto by a bar 23. The frame member 19 is secured to frame members 24 by clamps including the clips 25 and bolts 26, said members 24 being secured to the side frame members of the tractor.

The cylinder 20 has a rod 27 aligned with and projecting into the lower end thereof, the lower end of said rod being secured to the frame member 19.

The frame member 22 is of generally triangular shape having apertured bosses 28 and 29 in its top and bottom ends, the top boss 28 being slidably mounted on the cylinder 20 and the lower boss 29 being slidably mounted on the rod 27. The upper end of said frame member 22 is secured by a bolt 30 to the lower end of the bar 23 which is clamped at its upper eyed end by a bolt 31 to the exposed end of the rod of the piston 21.

The rod of the piston 21 works through a stuffing box 32, hydraulic fluid being introduced into the upper end of the cylinder through a pipe 33 from a suitable source of pressure supply and being introduced into the lower end of the cylinder on the opposite side of the piston through a pipe 34, said pipes being connected to a suitable pumping apparatus 35 which may, for example, be like that of my application for U. S. patent Serial No. 128,338, filed March 1, 1937. In this form of apparatus there are separate control valves with operating handles 35' shown in the drawings, and each of these valves controls the supply of pressure fluid through the pipes 35'' to one of the hoists. Thus when pressure fluid is introduced into the cylinder 20 above the piston, the blade-supporting frame including the frame member 22 is lowered, and when said fluid is introduced into said cylinder below said piston, the blade supporting frame including the frame 22 is raised, and with the pumping apparatus above described the shifting of the lever 36 from upright neutral position to one side or the other thereof will cause said raising or lowering action of said hydraulic means.

The frame member 22 has a longitudinally ex-

tending slot 37 in its lower side in which one end of a bar 38 is mounted and clamped in position by bolts 39 and 40. The frame member 22 also has spaced lugs 41 projecting from the inner side thereof and provided with apertures 42.

A bracket member 43 is adjustably slidably mounted on the outer end of the bar 38 and is secured in adjusted position by the set screws 44. On one side said member 43 is provided with a set of centrally located apertured ears 45 and with arms 46 having apertured ears 47 at the ends thereof, the apertures 48 being laterally offset relative to the ears 45. On the other side of the member 43 there are a series of spaced apertures 49.

The blade 17 is secured to an arm 50 which has an angularly adjustable connection with said blade and swivelled connection with a hinge member 51 vertically pivotally mounted on a hinge pin 52 mounted in the apertured ears 45 secured in position by cotter pins 53. The arm 50 is held either in a forward or rearward position by a retaining pin 54 which is insertable in either the forward or rearward apertured boss 47. For forming the swivel connection the reduced end of the arm 50 fits in the bracket 52 and has a cap member 50' secured thereto.

The angularly adjustable connection between the arm 50 and the blade is formed by bracket members 55 and 56. The bracket 55 is secured by bolts 57 to an angle bar 58 bolted or otherwise suitably secured to the blade 17 and at its upper end by bolts 59 to said blade. The bracket 56 is connected to the arm 50 and adjustably connected to the upper end of the bracket 55 by a bolt 60 insertable in a hole in the bracket 56 and in one of a series of angularly spaced holes 61 in said bracket 55. The lower end of the arm 50 has a pin end pivoted in a clevis 62 which is held in position by a collar 62' and is pivotally mounted on a pin 55' removably mounted in the bracket 55.

The angular adjustment in the line of draft is determined by a tie bar 63 which has angularly bent ends, one of which is insertable in one of the apertures 42 of the member 22 of one unit and the other of which is insertable in one of the apertures 49 of the member 43 of the other unit, so that the blade may be angularly disposed for scraping either in the full line position for forward travel or in the dotted line position for rearward travel as shown in Fig. 2, it being noted that the reversal of the blade is accompanied by a reversal of the tie bar 63. It is also to be noted that in making individual angular adjustments the member 43 of one of the units may be moved longitudinally of its supporting bar 38 so as to accommodate the tie bar 63.

With the above arrangement since each hoisting unit is separate from the other it may be raised and lowered independently, one end of the blade may be raised relative to the other end, that is, the blade may be canted or tipped longitudinally, as permitted by the swivel connections between the arms 50 and the brackets 43, to accommodate the crown or curvature of the road, and it is to be noted that either or both ends of the blade 17 may be raised or lowered while the tractor is moving.

It is further noted that the pumping unit 35 is adapted to be driven from the propelling motor of the tractor in any suitable manner.

It is also to be noted that the operating units for the blade are relatively simple mechanisms that may be readily applied to tractors of standard construction.

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

What I claim as my invention is:

1. In a device of the character described, the combination with a tractor having a frame, of a scraper blade, and a pair of supporting units for said blade mounted on said frame, each of said units including a hydraulic hoist having a piston, a carrying frame connected to said piston and including a bar, a bracket adjustably mounted on said bar, an arm having swivelled connection with said bracket and connected to said blade, and adjustable means for tying together the carrying frames of said units in different angular positions.

2. In a device of the character described, the combination with a tractor having a frame, of a scraper blade, and a pair of supporting units for said blade mounted on said frame, each of said units including a hydraulic hoist having a piston, a carrying frame connected to said piston and including a bar, a bracket mounted on said bar, an arm vertically pivotally connected to said bracket and also having swivelled connection with said bracket and connected to said blade, means for holding said arm when swung to either a forward or rearward position relative to said bar to provide for the mounting of said blade in a forward or rearward position, and brace means connecting together said carrying frames in either of the operating positions of said blades.

3. In a device of the character described, the combination with a tractor having a frame, of a scraper blade, and a pair of independent supporting units for said blade mounted on opposite sides of said frame, each of said units including a hydraulic hoist, means for independently controlling said hoists to vary the inclination of said blade, and adjustable brace means for connecting said units together in different angular positions.

4. In a device of the character described, the combination with a tractor having a frame, of a scraper blade, and a pair of supporting units for said blade mounted on said frame, each of said units including a hydraulic hoist having a piston, a carrying frame connected to said piston and including a bar, a bracket adjustably mounted on said bar, an arm connected to said blade and pivotally connected with said bracket intermediate the ends thereof and having a swivelled connection therewith, and means at the ends of said bracket for engaging said arm to hold it in one of its operating positions.

5. In a device of the character described, the combination with a tractor having a frame, of a scraper blade, and a pair of supporting units for said blade mounted on said frame, each of said units including a hydraulic hoist having a piston, a frame member connected to said piston and provided with spaced apertured lugs, a bar secured to said frame member, a bracket adjustably mounted on said bar and provided with a plurality of spaced apertures, means for suspending the blades from said brackets, and a tie bar engageable in one of the apertured lugs of said frame member of one of said units and one of the apertures of the bracket of the other unit to determine the angular position of the blade relative to the line of draft.

6. In a device of the character described, the combination with tractor having a frame, of a scraper blade, and a pair of supporting units for said blade mounted on said frame, each of said units including a hydraulic hoist and blade connecting means carried by said hoist, each blade connecting means including a bracket, an arm having swivelled connection with said bracket and adjustably pivotally connected to said blade in different positions of vertical adjustment.

7. In a device of the character described, the combination with a tractor having a frame, of a scraper blade, and a pair of independent supporting units for said blade mounted on opposite sides of said frame, each of said units including a hydraulic hoist, means for independently controlling said hoists to vary the vertical inclination of said blade, said units each having a carrying frame, a bracket adjustable lengthwise along said frame, an arm vertically pivotally mounted on and having a swivelled connection relative to said bracket at one end and horizontally pivotally mounted relative to said blade at its other end, means for holding said blade in adjusted vertical inclination relative to said horizontal pivot, means for holding said arm to said bracket so as to project either forward or rearward thereof for determining the direction of inclination of said blade relative to the side of the road, and means for also holding said carrying frames together at different angles relative to each other to vary the angular adjustment in the line of draft of said blade.

JOSEPH H. KERBER.