

Jan. 13, 1931.

M. WOOLDRIDGE
EARTH MOVING IMPLEMENT

1,788,698

Filed March 3, 1928

2 Sheets-Sheet 1

Fig. 1.

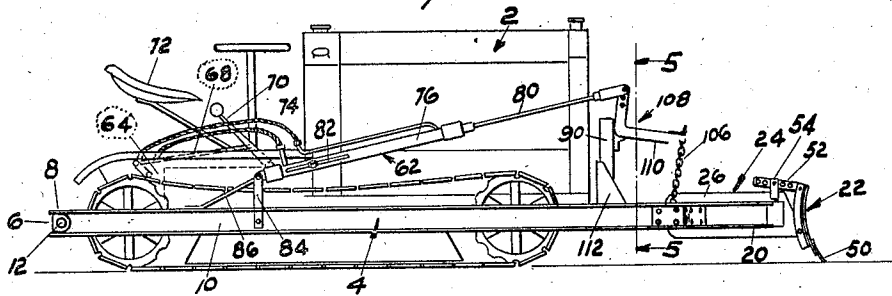


Fig. 2.

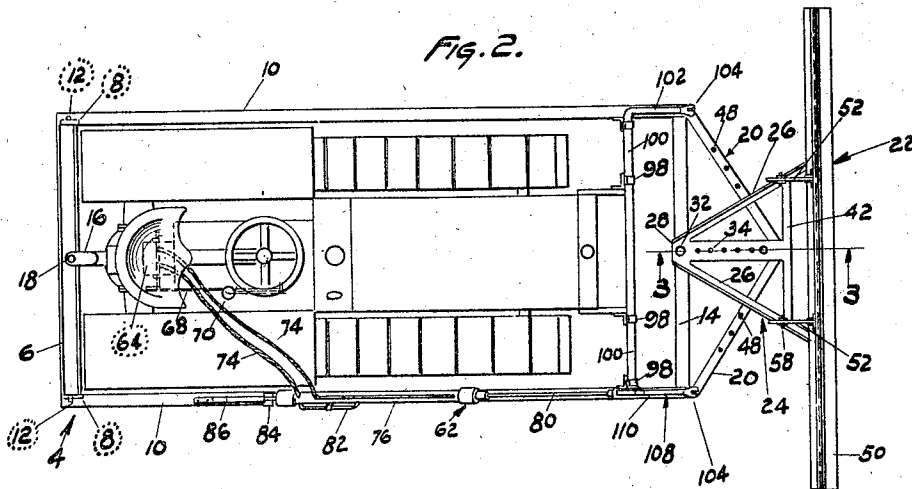
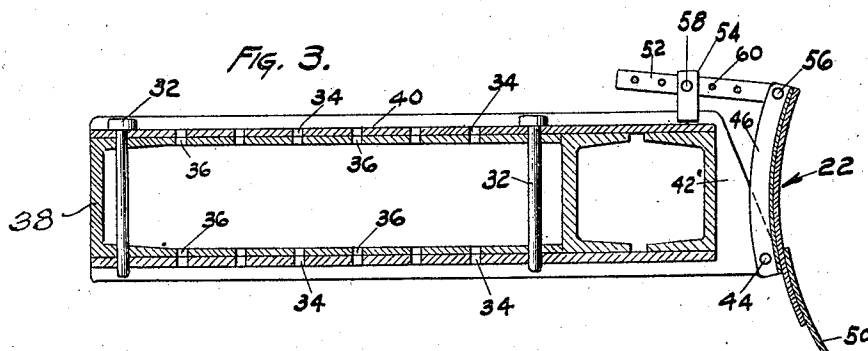


Fig. 3.



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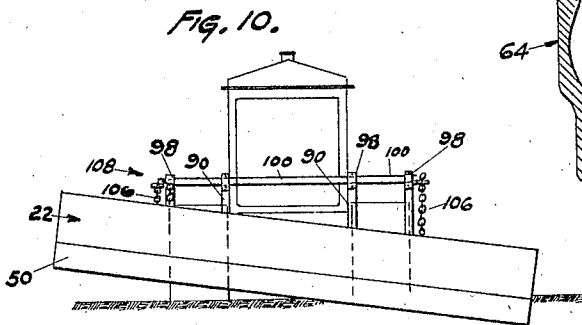
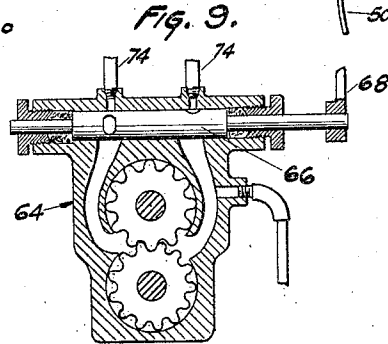
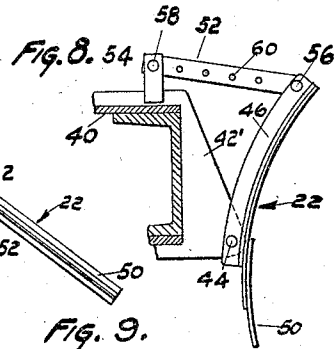
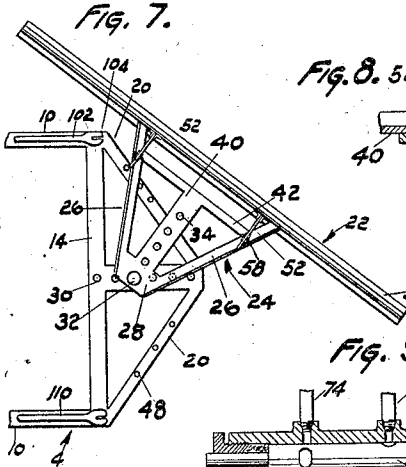
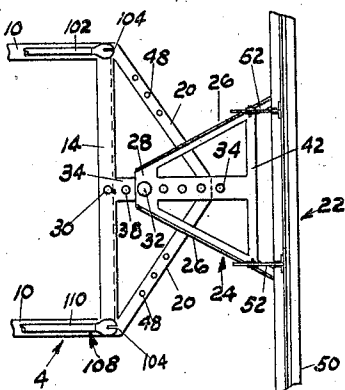
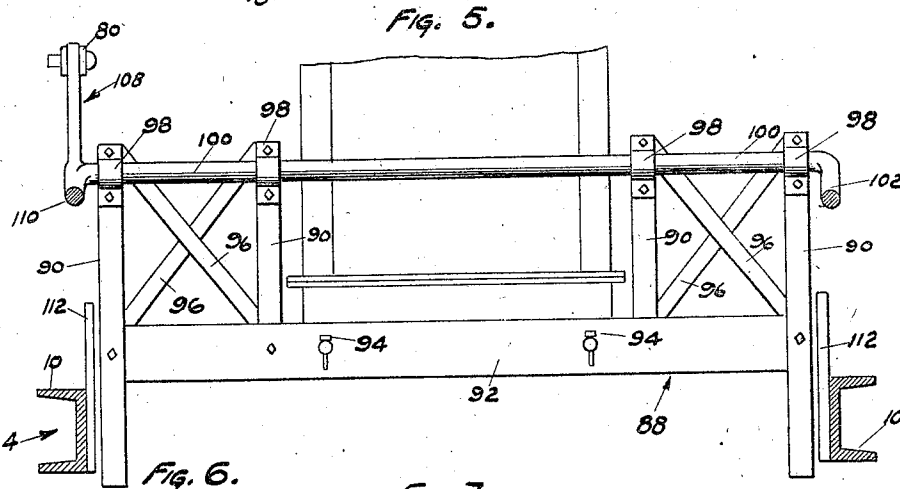
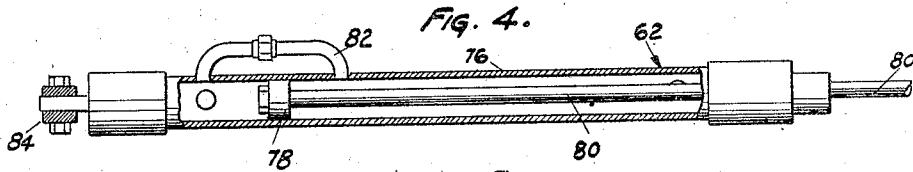
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UNITED STATES PATENT OFFICE

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EARTH-MOVING IMPLEMENT

Application filed March 3, 1928. Serial No. 258,761.

My invention relates to a mechanism whereby the raising, lowering and adjusting of the scraper blade associated with back fillers, bulldozers, graders, scrapers, snow plows, or the like may be accomplished in an expeditious and speedy manner, the raising and lowering of said blade being accomplished automatically, and without any effort whatever upon the part of said operator, by the operation of the motor of the machine of the above noted character, either when said machine is stationary and its motor in operation, or when said machine is moving by its own power.

It accordingly is an object of my invention to provide a novel form of raising and lowering mechanism in which a fluid pressure means, preferably of the by-pass type, and operable by means of a suitable pump, actuated by the motor of the machine, with which the mechanism is associated, coacts with a movable frame to raise and lower a scraper blade.

A further object of my invention is to provide a means whereby the scraper blade may be tilted at any desired angle to vary the inclination of the transverse cut, means being also provided to adjust the even depth of cut of the blade, and further means for varying the angle of the blade with respect to the raising and lowering mechanism, it being also within the province of my invention to provide means for adjusting the distance the scraper blade extends on both sides of said mechanism, as well as a vertical variation of the height of said blade, insuring great flexibility of adjustment, suited to all conditions of said operations.

Further objects and advantages of my invention, as will hereinafter more fully appear, I attain by the mechanism described in the specification and illustrated on the drawings, forming a part of my application.

Reference is had to the accompanying drawings, in which similar reference characters denote similar parts. In the drawings,

Fig. 1 is a side elevational view of my invention applied to a caterpillar tractor,

Fig. 2 is a top plan view of Fig. 1, show-

ing the scraper blade in position for forward movement for an even cut on both sides and in front of the tractor,

Fig. 3 is an enlarged vertical cross-sectional detail view, taken on the line 3—3, Fig. 2,

Fig. 4 is an enlarged fragmentary detail view of the by-pass fluid pressure means, parts being broken away to disclose the internal construction,

Fig. 5 is an enlarged fragmentary elevational view, partly in section, taken on the line 5—5, Fig. 1, parts being broken away and other parts omitted,

Fig. 6 is a fragmentary top plan view on a somewhat reduced scale, of a scraper blade adjustably connected to the frame.

Fig. 7 is a plan view illustrating how the scraper blade may be swung to either side to form a varying angle with the tractor,

Fig. 8 is a fragmentary vertical cross-sectional detail view showing the vertical adjustability of the scraper blade,

Fig. 9 is an enlarged vertical cross-sectional view of one form of fluid pressure pump operated by the motor of the tractor, for actuating the piston of the pressure means shown in Fig. 4, and

Fig. 10 is a front elevational view of Fig. 1, but showing how the scraper blade may be adjusted so as to make a transverse angular cut.

Describing my invention more in detail, it is my purpose to provide a novel form of scraper blade, raising, lowering and adjusting mechanism, whereby great flexibility of operation of said blade is obtained, suitable to all road conditions encountered, and all manner of cuts may be had, the raising and lowering of said blade being accomplished automatically and without any effort whatever upon the part of the operator.

In the drawings, 2 denotes generally a machine, such as a back-filler, grader, scraper, snow plow, bull dozer, or the like, the machine being shown as a tractor of the caterpillar type, but which in practice may be any preferred. Since said machine enters only into the combination with my inven-

tion it need not be further described or illustrated.

Associated with the tractor 2, is a frame 4, comprising a rear member or cross bar 6, having portions 8 by which the cross bar 6 is permanently and rigidly secured to the side frame members 10, the front of which is conjoined by cross bar 14. The rear cross bar 6 is pivotally secured to the clevis 16, which is connected to the drawbar of such tractor 2, by securing means 18.

Secured to the front bar 14 in any suitable manner are the inclined bars 20, which bars move with the front bar 14 when the frame 4 is moved in the manner presently to be described, and with said front bar 14, and the inclined bars 20 are associated the means for connecting the frame 4 to the scraper blade 22, and the adjusting means, also presently to be described.

The blade connecting means, designated generally by the reference numeral 24, comprises a triangular member (see Figs. 2, 6 and 7) made up of inclined angle irons 26, preferably integral with the pivot plate 28, adapted to be pivoted either to the front bar 14, by means of the hole 30 and detachable pivot pin 32, or in a series of perforations 34 adapted to align with similar perforations 36 contained in the open-sided box-like extension 38 secured to and projecting forwardly from the front bar 14. See more particularly Figs. 2, 3, 6 and 7.

Slidable on the extension 38 is the complementary box-like structure 40, preferably integral with the plate 28 and the cross bar 42 (Figs. 2, 6 and 7), connecting the inclined angle iron 26, the said box-like structure 40 having extensions 42' (Figs. 3 and 8) pivoted as at 44 to suitable curved ribs 46, associated in any preferred manner with the blade 22, for a purpose presently to be described.

The triangular adjusting means 24, with the box-like structure 40 is oscillatable on or slidable on the stationary box-like structure 38, after the pivot pins 32 are removed, so that the arc or angle of movement of the blade 22 may be adjusted. This may be done by merely removing the pin 32 and inserting same in the other holes 34 and 36 for any arc desired. When the front pivot pin 32 (Fig. 3) is removed, the means 24 may be swung to the right or left on the rear pivot 32, the bars 20 being provided with perforations 48 to receive stop pins so that the distance of angular movement of the blade 22 may be limited as desired.

The front pivot pin 32 is used only in bulldozing, where straight ahead movement of the blade 22 is desired, said pin functioning as a locking means.

To provide for cutting unequal distances on both sides of the machine 2, the front pin or bolt 32 (Fig. 3) is removed and inserted in the other holes as just described, but for

a greater angular movement said means 24 is pulled forward until the proper holes 34 and 36, for the cut desired, are in alignment, after which the rear pin 32 is inserted in said holes. See Figs. 6 and 7.

The scraper blade 22 may in practice take any form desired, but is preferably curved as shown more particularly in Figs. 3 and 8 and is provided with a cutting element 50 associated with the body of said blade as desired.

It is sometimes desirable to adjust the blade 22 vertically. For this purpose the perforated side bars 52 and uprights 54 are provided, the bars 52 being pivoted at 56 (Figs. 3 and 8) to the ribs 46 of the blade 22. By removing the pins 58 and inserting them in the holes or perforations 60, the vertical adjustments of the blade 22 may be accomplished as desired.

It will of course be understood that the various parts may be welded together, riveted or secured in any manner desired, and still remain within the province of my invention.

The means for raising and lowering of the blade 28 will now be described. The lifting of the heavy frame 4 by hand would of course entail quite an effort upon the part of the operator. To do this automatically, I provide the fluid pressure by-pass means 62 (see Figs. 1 and 4), and the pump 64, which may be of the conventional geared piston type, shown in Fig. 9, operated by the power of the machine and controlled by the valve 66 (Fig. 9) which valve is operable by the rod 68 and hand lever 70, operable at the driver's seat 72. Since this specific structure is conventional and forms no part of my invention, except in combination therewith, it need not be further described.

Connected to the pump 64 and the fluid pressure means 62 are the preferably flexible pipes 74, which are adapted to convey the fluid to and from the cylinder 76 of the by-pass means 62, the piston 78 with rod 80 operating within said cylinder, which is provided with the conventional by-pass connection 82. Since this construction is old and well-known, it need not be further described.

As shown more particularly in Fig. 1, the cylinder 80 is suitably mounted on one end upon a support 84 secured as desired on the side bar 10 and movable with frame 4, a bracing means 86 (Figs. 1 and 2) being preferably provided to assist in holding said support in position.

As shown in Fig. 5, a stationary frame work 88, composed of uprights 90 and a base bar 92, is secured to the tractor structure by means of the pins 94, said uprights being secured in position by means of the cross-braces 96, these features, of course being in practice variable as desired, the various parts

being bolted, welded or otherwise secured in position.

Each of the uprights 90 is provided with a bearing 98 in which the lifting or operating rod 100 is adapted to be oscillated, and one end of said rod has associated therewith the arm 102, slotted or cut away as at 104 to hold the chain 106, the lower end of which is secured to the front bar 14. The slot 104 permits the vertical adjustment of said chain.

The other end of the operating rod 100 is provided with an arm 108, (Fig. 1) which is adjustably connected by any suitable means to the piston rod 80. The crank arm 110 is provided with a slot 104 similarly as is its companion arm 102, the slots being adapted to receive the links of chain connections 106, which may be inset in the respective slots so that the lengths of the respective chain connections will be the same or different. When different, that is, when the chains are of unequal lengths, obviously a tilting of the frame and its associated blade to one side or the other will be produced, it being noted that the frame at the rear is pivotally attached to the tractor to permit of such tilting.

As seen in Figs. 1 and 5, a guiding means in the shape of a pair of plates 112, secured by any means to the side bars 10, is provided to provide an even up and down movement of the frame 4.

While I have thus described my invention with great particularity, it will be clear that the same may be modified throughout a wide range. I accordingly do not propose to be limited to the exact details of construction shown and described, but reserve the right in practice to make any and all modifications thereof that fall within the scope of the appended claims.

I claim as my invention:

1. The combination with a machine of the class described including a movable frame and a scraper blade connected thereto, a cylinder mounted at one end on said frame, a piston operable in said cylinder, frame operating means connected to said piston, hydraulic means, operable by said machine for causing said piston to raise and lower said frame, and means on the fore part of said frame whereby each end of said blade may be selectively tilted.

2. The combination with a machine of the class described having a movable frame and a scraper blade carried by the frame, of a stationary frame work on said machine, a bell crank on the fore part of and at one side of said frame work, frame lifting and tilting means connected to one arm of said bell crank and said frame, and hydraulic means for operating said bell crank to raise and lower said frame.

3. The combination with a machine of the

class described having a movable frame and a scraper blade carried by said frame, a stationary frame work mounted on the fore part of said machine, movable elements on each end of said frame work, adjustable means associated with said movable elements whereby said frame and said blade may be tilted transversely to said machine, and hydraulic means for operating said movable elements.

4. Scraper blade raising and lowering means adapted for special use in connection with a machine of the class described, comprising a movable frame, a scraper blade connected to said frame, a stationary frame work, an oscillatable member mounted on one end of said frame work, fluid pressure by-pass means for oscillating said member so that said frame may be raised and lowered, and means on the fore part of said frame whereby each end of said blade may be selectively tilted.

In testimony whereof I have signed my name to this specification.

MACK WOOLDRIDGE.