

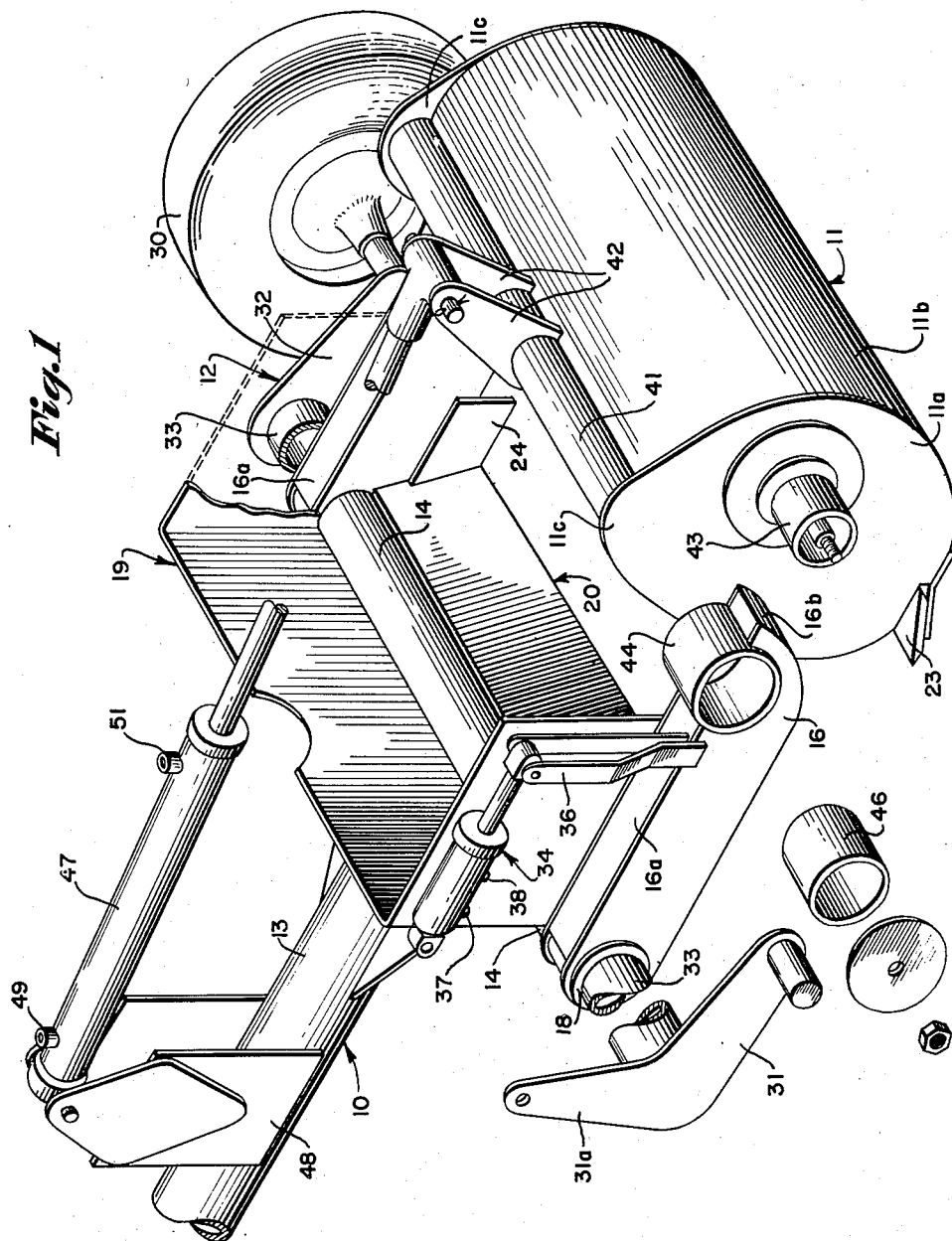
Jan. 8, 1952

R. R. HARMON ET AL
EARTH HANDLING IMPLEMENT

2,582,032

Filed May 29, 1947

5 Sheets-Sheet 1



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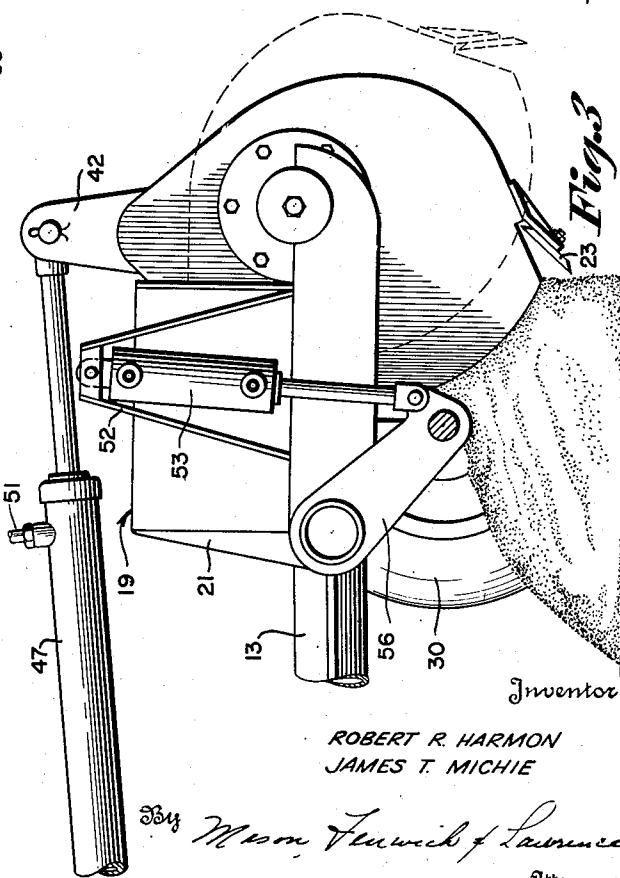
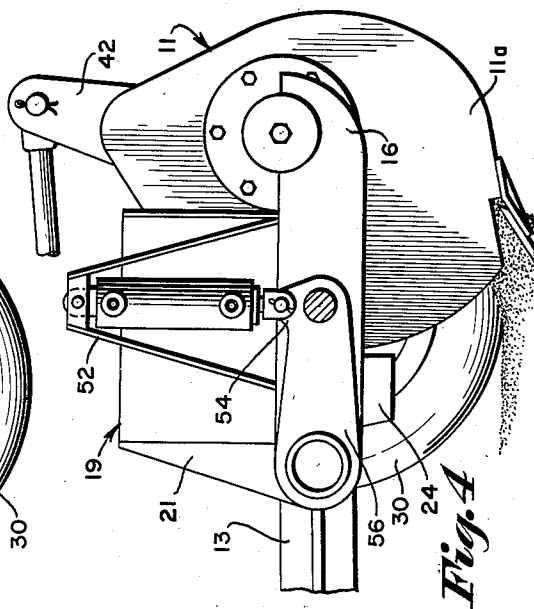
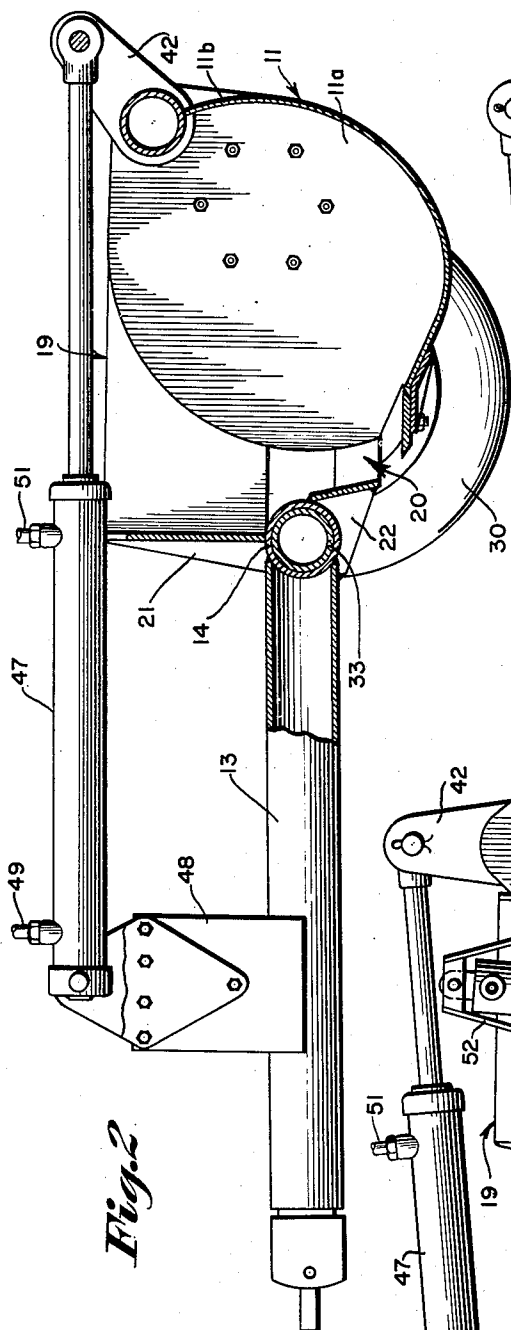
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Filed May 29, 1947

5 Sheets-Sheet 2



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2,582,032

Filed May 29, 1947

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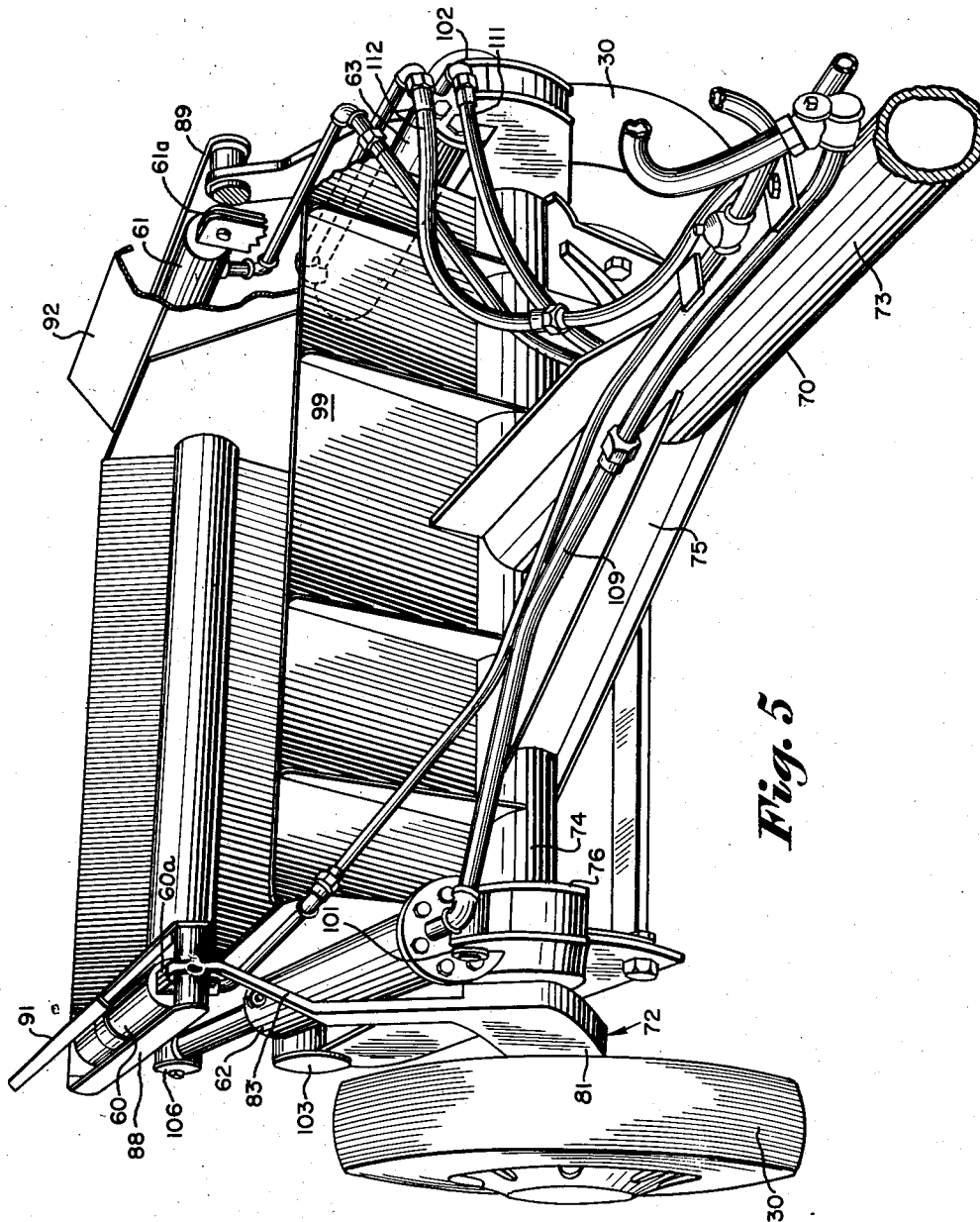


Fig. 5

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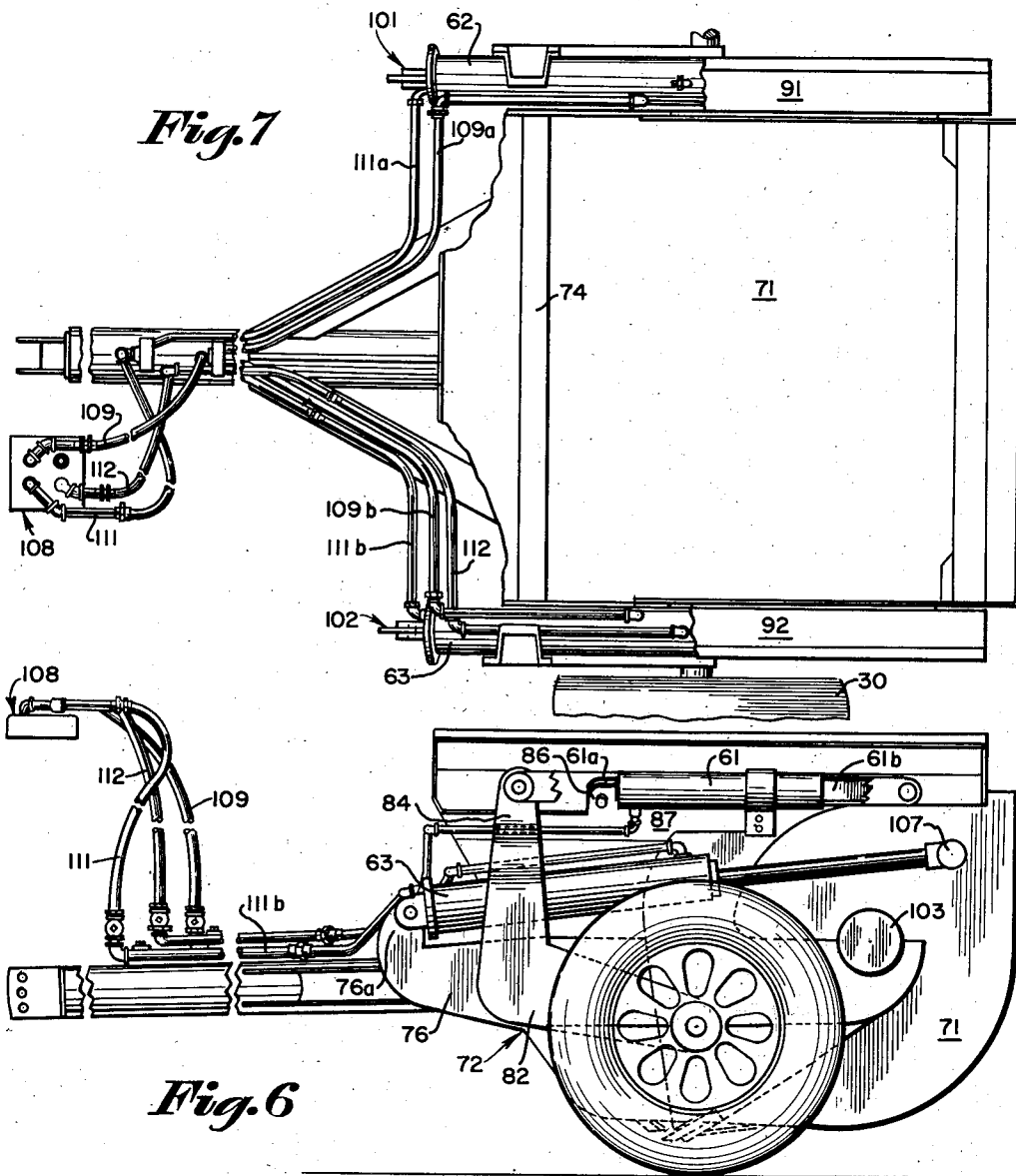
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2,582,032

EARTH HANDLING IMPLEMENT

Filed May 29, 1947

5 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,582,032

EARTH HANDLING IMPLEMENT

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Application May 29, 1947, Serial No. 751,497

7 Claims. (Cl. 37-129)

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This invention relates to earth handling implements and more particularly to those of the wheeled-type for scraping, hauling and leveling.

This is a continuation-in-part of our application Serial No. 703,130, filed October 14, 1946, now abandoned.

Devices of the general type to which this invention relates in which earth or dirt handling scoops, carried on wheels, having digging, loading, carrying and dumping positions, are already known. In devices of this type which are particularly adapted to be pulled by a tractor which also serves as the suspension point for the front end of the scraper carriage, it is usual to provide a bulky, heavy and complicated frame lifting and scraper bowl tilting mechanisms.

In many of the devices of this general type the scraper bowl is usually carried in front of the rear wheels of the scraper carriage and means are provided for independently lowering the front end and the rear end of the scraper bowl. When the scraper bowl is so arranged, it is necessary to have somewhat complicated mechanism for controlling the bowl and it is also necessary to have a bulky and heavy overhead beam construction to support the controlling mechanism and provide the necessary strength to resist the forces encountered in the various operations of the scraper. Also in such prior devices, in order to obtain the necessary mechanical advantage in operating the scraper, it is necessary that the controlling devices, which are usually hydraulically operated, must have a very long travel. This necessarily complicates the control mechanism and necessitates the use of bulky hydraulic mechanism. The present invention provides an extremely simple, rugged, lightweight implement in which the travel of the hydraulic lifting and scraper bowl tilting mechanism is kept to a minimum and in which the cutting operation of the scraping bowl is more readily responsible to the power control mechanism. The relation of the mounting of the wheels and the scraper bowl to each other is such that a very great range of vertical movement may be had. The general arrangement is such that it makes it possible to dispense with the usual heavy overhead construction and is such that the scraper bowl may be raised and lowered and tilted with a minimum of shift of the center of gravity and of the change of the moments due to the different operations. Also the construction is such that the lifting and lowering of the wheels can be readily coordinated at all times with the tilting of the scraper bowl to effect the desired angle of penetration of the

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scraper blade. The present construction also makes it possible to provide a very large road clearance.

In prior devices, it has been common to use hydraulic means of fixed capacity and to use suitable linkage to obtain the necessary mechanical advantage to provide the maximum force required. This means that the large quantity of hydraulic fluid required to produce the maximum power must be moved in both directions when controlling the bowl and wheel positions. In accordance with the present invention, a pair of hydraulic cylinders, one at each side of the bowl, is provided for rotating the latter; one of the hydraulic cylinders being double-acting while the other is single-acting. With this construction the single-acting hydraulic cylinder and one end of the double-acting cylinder provide the necessary capacity to hold the scraper bowl in the proper position during the loading operation, while the other end of the double-acting cylinder provides the necessary capacity to move the scraper bowl to the dumping position. Since it is desirable that the movement toward the dumping position be faster than the movement toward the loading position, this construction reduces the time required to dump and consequently reduces the size of the hydraulic pump required because it is necessary to supply fluid from the pump to only one hydraulic device during the dumping operation.

Accordingly, one of the major objects of the invention is to provide an earth handling implement of the type described which will be extremely simple, rugged, of lightweight construction and economical to manufacture, and in which the usual bulky, heavy frame construction is unnecessary.

A further object is to provide an earth handling scraper implement of the type described having a transverse tube with an axle rotatable within said transverse tube, the axle being provided with longitudinal arms on which wheels are mounted and in which the raising and lowering of the scraper frame is effected by relative rotational movement between the axle and the transverse tube.

A still further object is to provide an earth moving implement of the type described having a longitudinal beam or tube attached to a transverse member provided with offset longitudinally extending side members and in which the scraper bowl is pivotally supported on the rear end of the offset members with the axis of the wheels adjustable for up and down movement about a

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pivotal axis substantially at the front edge of the dirt-carrying hopper.

A still further object is to provide an earth handling implement of the type described, in which hydraulic means of large capacity is used to move the scraper bowl to, and hold it in, the loading position and hydraulic means of lesser capacity is used to move the bowl to the dumping position, thus reducing the time required to operate the bowl from a pump of any given capacity.

It is also an object to provide an earth handling implement of the type described, in which the bowl is operated by direct acting hydraulic means without the interposition of the usual linkages necessary to obtain mechanical advantage thereby keeping to a minimum the travel of the hydraulic means and eliminating the usual heavy frame structure and in which the scraper bowl is provided with a double acting hydraulic cylinder at one side thereof and with a single acting hydraulic cylinder at the other side thereof in such manner that both of the hydraulic cylinders are utilized to move the scraper bowl to, and hold it in, the holding position and in which the single-acting hydraulic means is utilized to move the bowl to the dumping position.

Other and further objects will become readily apparent from the following description when considered in connection with the accompanying drawings, illustrating an embodiment of the invention, and in which:

Figure 1 is a exploded perspective view of an earth moving implement made in accordance with the present invention;

Figure 2 is a partial sectional elevation of Figure 1;

Figure 3 is a partial elevation with the near wheel removed showing the scraper bowl in earth leveling position in solid lines and the open position of the bowl in broken lines and also showing a modified form of the hydraulic means for raising and lowering the wheels;

Figure 4 is a further elevational view of Figure 3 with the near wheel removed and the scraper bowl shown in digging or penetrating position;

Figure 5 is a perspective view of a modified form of an earth moving implement made in accordance with the present invention;

Figure 6 is a partial side elevation of Figure 5 with parts broken away;

Figure 7 is a partial plan view of Figure 6;

Figure 8 is an enlarged partial plan of the left hand side of the modification of Figure 5; and

Figure 9 is a perspective view of Figure 5 as viewed from the rear.

An embodiment of the present invention is represented in the drawing as comprising a frame 10, a scraper bowl 11 and a wheeled carriage 12. In the form of the invention illustrated in the drawings, the frame is made from steel fabrications welded together and comprises a longitudinal drawbar tubular member 13 in the form of a cylindrical tube which is welded to a transverse tubular member 14 in a T-formation. At each side of the carriage there are pairs of longitudinally extending steel side-plates 16 which are apertured at the front end thereof to surround the transverse member 14 and are welded thereto by annular welds 18. Suitable steel plates 16a, 16b are welded to the upper and lower edges, respectively, of the side-plates 16 to constitute rigid hollow box frame members. An upstanding shield or apron construction 19, is welded to the transverse member 14 and to the innermost longitudi-

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nal steel side-plates 16. A depending skirt construction 20 comprises a transverse plate welded to the transverse member 14 and longitudinal plates 24 welded to the frame side-plates 16. Suitable gusset plates 21 and 22 are welded to the frame members 14 and 16 and to the apron construction 19 and the skirt construction 20, respectively. The apron 19 and skirt 20 serve to reinforce the frame and also cooperate with the scraper bowl 11 to constitute a hopper for receiving, holding and transporting dirt picked up by the scraper blade 23. As shown in Figure 2, when the bowl 11 is in closed position the plane of the blade 23 will be substantially parallel to the lower edge of the skirt 20 and spaced a small distance therefrom.

It will also be apparent as set forth in more detail later, that the scraper bowl 11 is pivotally mounted on side-plate frame members 16 substantially on a level with the axis of the longitudinal drawbar tongue member 13, so that the pull from the tractor is direct and there will be a minimum stress applied to the member 13 during the digging and loading operations of the scraper.

The construction and arrangement of the hopper is such that it is substantially balanced with respect to the axis of the wheels 30. To this end, the wheels are suitably journaled on stub shafts on arms 31 and 32 which are welded to the ends of a transverse tube 33. The tube 33 extends through the transverse tube 14 and is suitably journaled therein. The construction constitutes a transverse axle with the tube 33 constituting an offset central portion thereof. Suitable hydraulic mechanism is provided for rotating the tube 33 thereby raising and lowering the ends of the arms 31 and 32 and thereby raising and lowering the axis of the wheels with respect to the hopper. In the form of the invention shown in Figure 1, the arm 31 is one part of a bell crank which has an integral arm 31a extending at right angles to the arm 31 and extends upwardly from the latter. The cylinder of hydraulic mechanism 34 is pivoted to the upper end of arm 31a and the piston rod thereof is pivotally connected to a suitable bifurcated bracket 36 welded to the outermost longitudinal side-plate 16. Suitable fluid conduits 37 and 38 are provided for operating the hydraulic cylinder to raise and lower both wheels. If desired in the large size earth handling implements, a second hydraulic mechanism can be provided on the opposite side of the implement to operate a similar bell crank carried by the other end of the tube 33.

The scraper bowl 11 is of substantially conventional construction of the shape as shown and having suitable sideplates 11a and an arcuate back member 11b, the side members and back member being welded together. The end plates 11a have projections 11c extending upwardly from the bowl proper between which a suitable transverse tubular member 41 is welded. The tubular member 41 is also welded to the upper edge of the back member 11b of the scraper bowl. This tubular member 41 is provided with an upstanding bracket 42 in the form of two spaced plates welded to the member 41.

The scraper bowl is provided with suitable trunnions 43 fixed to the opposite side plates 11a thereof and form the pivotal support for the bowl. Suitable bearing cylinders 44 are welded in recesses in the rear ends of side members 16, and are adapted to receive suitable bearing sleeves 46 in which the trunnions 43 are adapted

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to be journaled. It will be noted that the centers of the trunnions 43 are so positioned on the sides of the bowl so that when the bowl is in the closed position the center of gravity of the latter will be forward of the center of the trunnions. The center of gravity of the dirt in the bowl and the apron, which together constitute the dirt carrying hopper, will be substantially over the axis of the wheels 30. When the force is applied by the hydraulic mechanism 34 to raise and lower the wheels 30, there will be substantially no shift in the position of the center of gravity with respect to the axis of the wheels. Because of this construction there will be a minimum of stress applied to the longitudinal tubular tongue member 13. It will also be noted that by reason of the pivotal mounting of the bowl substantially on the axis of the tubular tongue member 13, there will be a minimum of stress applied to this member 13 as a result of turning moments acting on the scraper bowl during the digging and loading operations.

Bracket 42 constitutes the lever arm through which the necessary forces are applied by suitable hydraulic mechanism 47 to rotate the scraper bowl 11 or to hold the latter in the desired positions during the digging, loading, carrying, dumping and earth leveling operations. To this end, a suitable upstanding bracket 43 is welded to the member 13. As shown, the bracket 43 is in the form of two spaced plates welded to the sides of the tongue member 13. The cylinder of the hydraulic mechanism 47 is pivotally connected to the upper end of the bracket 43 and the piston rod of the mechanism is pivotally connected to the bracket 42.

Suitable fluid connections 49, 51 are provided at opposite ends of the cylinder of the hydraulic mechanism 47 for connecting the latter with any suitable conventional source of hydraulic fluid pressure. It will be readily apparent that during the operation of the scraper implement the position of the wheels 30 and the position of the scraper blade 23 and the bowl 11 will be properly coordinated by the operator skilled in the operation of such devices so that the scraper blade will be presented at the proper angle to the ground in order to obtain the proper digging and loading action. As soon as the bowl is loaded the latter may be rocked to the closed position, shown in Figure 2, and the wheels may be lowered to raise the frame and hopper of the implement as a whole, to a hauling position. In Figure 2 the bowl is shown in the closed position before the wheels have been lowered.

In both Figure 3 and Figure 4 the modified form of the mechanism for raising and lowering the wheels is shown. In this form of the invention a suitable inverted V-shaped bracket 52 is suitably secured to the frame of the scraper implement to which the cylinder of a hydraulic mechanism 53 is pivoted. The piston rod of the hydraulic mechanism 53 is pivotally connected to a boss 54 on an arm 56 welded to the transverse tube 33 instead of the bell crank shown in Figure 1. In this modified form the force of the hydraulic mechanism 53 acts directly in line with the axis of the wheels 30 since the pivotal connection is adjacent the wheel journals.

In the position shown in Figure 3, the wheels 30 are shown in the lowered position and the bowl 11 is shown in the position for partially emptying the bowl and leveling the dirt. In the dotted line, the bowl is shown in the completely open position.

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In Figure 4, the wheels 30 are shown in the raised position and the scraper bowl 11 and blade 23 are shown in the position for digging and filling the scraper bowl.

A further modified form of the invention is shown in Figures 5, 6, 7, 8 and 9. In this form of the invention, which is particularly adapted to the larger capacity scrapers, a separate hydraulic mechanism 60 and 61 is provided on the opposite sides of the frame for cooperating in unison to rotate the axle about its central offset portion for the purpose of raising and lowering the wheels 30 of the scraper. Also, a separate hydraulic mechanism 62 and 63 are provided on the opposite sides of the scraper for rotating the scraper bowl. The construction and arrangement of the hydraulic mechanisms in this form of the invention, as will be pointed out in greater detail later, are such that the hydraulic cylinders are arranged substantially in the vertical planes of the side frame of the scraper carriage so that the hydraulic cylinders act directly against the operated element without the interposition of cumbersome mechanical advantage linkage.

The arrangement of the component elements of this form of the invention are in general similar to the construction of the other embodiment of the invention shown in Figures 1 to 4, inclusive, and this latter modification departs therefrom only in such details that are necessary to lend the added strength to the unit as a whole.

This latter embodiment as represented in Figures 5 to 9, inclusive, comprises a frame 70, a scraper bowl 71 and a wheel carriage 72, all of which are similar to the corresponding elements of the first modification. The frame is made from steel fabrications welded together and comprises a longitudinal drawbar tubular member 73 in the form of a cylindrical tube which is welded to a transverse tubular member 74 constituting a T-shaped formation. The tubular member 73 serves as the sole forward extending tongue and drawbar member for the scraper unit. Suitable gusset plates and brace members 75 are welded between the tubular member 73 and the transverse tubular member 74 for the purpose of making the construction more rigid. The frame 70 includes longitudinally extending box members 76 welded to the transverse tubular member 74. These box members 76 are very similar to the side plate members 16 defined in connection with Figures 1 to 4, inclusive, except that the box members 76 have upstanding projections 76a to which hydraulic cylinders 62 and 63 are respectively pivoted. Also, the adjustable wheel carriage in this second modification is similar to the one previously described, the only difference being that in this modification each one of the arms 81 and 82 which carry the stub shafts on which the ground engaging wheels 30 are journaled, constitute one arm of bell cranks, both of which are welded to the transverse tubular axle (not shown) which is journaled inside of the transverse tubular member 74 in a manner similar to the arrangement previously described. In order to reduce the torsional stress in the central part of the tubular axle, respective arms 83 and 84 of the respective bell cranks are pivotally connected to the hydraulic cylinder mechanisms 60 and 61 respectively. As will appear later, these hydraulic cylinders 60 and 61 are operated in unison from the common source of hydraulic fluid pressure for the purpose of lowering the wheels to raise the scraper, the scraper being lowered sole-

ly by gravity when the fluid pressure is released from the hydraulic cylinders 60, 61.

The forward end of the hydraulic cylinders 60 and 61 respectively, are provided with ears 60a and 61a respectively, which are pivotally connected to extensions 86 on the side plates 87 which, together with the apron construction, similar to the one of the previous modification, serves as the hopper for cooperating with the scraper bowl 71 for transporting earth material. The parallel links 88 and 89 serve to pivotally connect the piston rods 60b and 61b, respectively, to the arms 83 and 84, respectively. Suitable fenders 91 and 92 are suitably secured to the inner one of the respective parallel links for the purpose of keeping dust and dirt material from falling on the lubricated piston rods 60b and 61b respectively.

In general, the hopper for cooperating with the scraper bowl for receiving and transporting earth material is very similar to the one previously described. An upstanding shield or apron construction 99 is welded to the transverse member 74 and to the box members 76. A depending skirt construction 100 comprises a transverse plate welded to the underside of the transverse member 74 and suitable side plates welded to the box members 76 to constitute an enclosure which cooperates with the lower forward part of the bowl to receive earth material. It will be readily apparent that the apron and skirt construction cooperates with the other members of the frame to provide a rigid construction. As shown in Figure 6, when the scraper bowl 71 is in the closed position the scraper blade 75 will be adjacent the lower edge of the depending skirt.

As shown and described in connection with the previous modification, the scraper bowl 71 is pivotally mounted on the box-like members 76 on an axis substantially on a level with the axis of the longitudinal drawbar tongue member 73 so that the pull from the tractor is direct and there will be a minimum of torsional or bending stress applied to the drawbar tongue member 73 during the digging and loading operation of the scraper. The construction and arrangement of the hopper and the bowl is such that when the scraper bowl is closed to carry a load of earth or dirt material, the load will be substantially balanced with respect to the axis of the ground engaging wheels 30.

The scraper bowl 71 is of substantially conventional construction similar to that previously described and is provided with suitable trunnions 103, which are fixed to the respective side plates thereof, forming the pivotal support for the bowl. The details of this pivotal connection are similar to those previously described and it is believed that repetition of detailed description is unnecessary. As in the modification previously described, the centers of the trunnions are so positioned on the sides of the bowl that when the bowl is in the closed position the center of gravity of the latter will be forward of the center of the trunnions. The center of gravity of the bowl and the apron construction which constitute the dirt-carrying hopper will be substantially over the axis of the wheels. When the force is applied by the hydraulic mechanisms 61 and 62 to raise and lower the wheels 30, there will be substantially no shift in the position of the center of gravity with respect to the axis of the wheels. As in the previous modification, because of this construction there will be a minimum of stress applied to the longitudinal tongue member 73. It

will also be noted that by reason of the pivotal mounting of the bowl 71 substantially on the axis of the tubular tongue member 73, there will be a minimum of stress applied to this member as a result of turning movements acting on the scraper bowl during the digging and loading operations.

One of the important features of the present invention is the arrangement of the hydraulic means for raising and lowering the wheels and for rotating the scraper bowl substantially in the vertical plane passing through the box-like side members 76 of the frame. To this end, as previously described, the forward end of the hydraulic cylinders 62 and 63, respectively, are pivotally connected at 101 and 102 to the projections 76a of the box-like side frame members 76 and the hydraulic cylinders 60, 61 are pivotally connected to extensions 86 on the side plates 87. The piston rod of cylinder 62 is pivotally connected to the scraper bowl 71 by means of a suitable trunnion 106. Likewise, the piston rod of the hydraulic cylinder 63 is connected to the opposite side of the scraper bowl by means of a trunnion 107. As has been previously set forth in the present type of implement under consideration, it is particularly advantageous to be able to operate the scraper bowl in both directions with sufficient speed so that the implement can be in substantially constant operation between the loading and unloading operations. Accordingly, it is necessary to provide force applying means such as the hydraulic mechanism which can move the bowl to the loading position and hold it in this position during the loading operation and then can move it to the dumping position in the quickest possible time considering the other practical aspects of the limitations of the power available to operate the scraper. It will be readily understood that it is necessary to provide means which can exert a greater force in one direction or resist movement in the opposite direction during the loading operation than for the dumping operation because during the loading it is necessary to hold the scraper blade in the proper position to cut into the earth. During this operation it is necessary to apply force which is substantially equivalent to the drawbar force applied by the tractor to the drawbar of the scraper. Since the capacity of the fluid pressure pump and system for operating the hydraulic devices is limited, it is highly desirable that mechanism be provided for moving the bowl to the load position and holding it therein during the loading operation and to thereafter move it to the dumping position not only with a minimum of time, but at the same time holding to a minimum the amount of hydraulic fluid necessary to accomplish these operations. In devices prior to this invention, it is common to use force-applying means such as the hydraulic mechanism which has substantially the same capacity for operation in both directions. This necessitates moving through the pump as much fluid for moving the scraper bowl to the dumping position as is required to move to the loading position. In these prior devices, it is common to use a mechanical linkage or other mechanism such as pulleys and cables to obtain the necessary force for operating the scraper. It is well understood that the greater the mechanical advantage obtained, the greater will be the necessary length of travel of the hydraulic means. This is a definite disadvantage in this type of implement.

As is shown in Figures 6 and 7, the hydraulic cylinders 60, 61, 62 and 63 are supplied from a

common source of hydraulic fluid through a central dual control valve 108 through hydraulic fluid conduits 109, 111 and 112. Conduit 109 has two branches, 109a and 109b which supply hydraulic fluid to cylinders 60 and 61 respectively. Likewise, conduit 111 has two branches, 111a and 111b through which hydraulic fluid to cylinders 62 and 63, respectively, is supplied. It is to be noted that hydraulic cylinder 63 is double-acting, conduit 111b being connected to the front end of this cylinder while a conduit 112 connects the rear end of the cylinder 63 to the dual control valve 108. From the above it will be seen that by supplying hydraulic fluid to the front ends of cylinders 60, 61, the arms 83 and 84 will be operated through the respective links 88 and 89 to lower the wheels 30 and thereby raise the whole scraper. By operating the valve 108 the fluid can be bled from the cylinders 60, 61 so that the scraper will be lowered by gravity.

At another position of the valve 108 fluid may be supplied to the front ends of cylinders 62 and 63 which will rock the bowl 71 in a clockwise direction as viewed in Figure 6, to the closed position. It will also be apparent that the resistance or force of both cylinders may be utilized to resist turning movement of the bowl 71 during loading operations of the scraper.

It will be understood that less force will be required to move the bowl 71 in a counter-clockwise direction (as viewed in Figure 6) during the dumping operations of the scraper. For this reason the present invention utilizes the rear end of cylinder 63 to move the bowl to this position. This may be accomplished by moving the valve 108 to such a position as to bleed the fluid from the front ends of cylinders 62 and 63 and to supply fluid pressure through the conduit 112 to the rear end of the cylinder 63. The advantages of this construction have been set forth above and no elaboration thereon at this point is believed necessary. No means are shown for supporting the dual-control valve 108 but it will be understood that this control valve will normally be carried by the tractor pulling the scraper in such a position that it can be conveniently operated by the operator of the tractor.

During the operation of the scraper implement, the position of the wheels 30 and the position of the scraper blade 75 and the bowl 71 will be properly coordinated by the operator by the proper manipulation of the dual-control valve 108 so that the scraper blade will be presented at the proper angle to the ground in order to obtain the proper digging and loading action. During the loading operation the operator will so manipulate the dual-control valve 108 so that fluid pressure will be supplied through conduit 112 to the rear end of the hydraulic cylinder 63. The rear end of the cylinder 63 is the only hydraulic means utilized for rotating the bowl to the loading position. As soon as the bowl is moved to the loading position and the wheels are properly lowered so that the scraper blade 75 may penetrate the earth, it will take a much greater force to hold the bowl in the digging and loading position. The force required to hold the bowl in this position will be supplied by controlling the valve 108 so that the hydraulic fluid is supplied to the forward ends of both of the hydraulic cylinders 62 and 63. The forward ends of both of the cylinders 62 and 63 operate in unison to resist any movement of the bowl toward the dumping position due to the scooping action of the scraper blade. Also, the cylinder 62

and 63 operate in unison to move the bowl to the closed position after the scraper bowl and hopper have been filled. In this position the scraper is adapted to transport the load to the point at which the material is to be dumped. The bowl is moved to the dumping position by again operating the valve 108 to such a position as to supply hydraulic fluid through conduit 112 to the rear end of the hydraulic cylinder 63. It will be understood that at the same time the rear end of the hydraulic cylinder 63 moves the bowl to the dumping position, the pistons of the hydraulic cylinders 62 and 63 will force the hydraulic fluid out of the front ends through conduit 111a, 111b and 111 back to the reservoir (not shown) for the hydraulic fluid system. It will be readily apparent from the above description that the hydraulic cylinders are so arranged that their force is applied directly to the elements to be operated and also that the full capacity of one end of each of the hydraulic cylinders 62 and 63 requiring a maximum of hydraulic fluid, is utilized at the same time only during operations which require a maximum force and that the other end of one hydraulic cylinder 63 of smaller capacity is utilized only when it is desired to move the bowl to the dumping position which requires a lesser force. The over-all result of this new construction and arrangement is that the bowl can be moved to the different positions by the movement of a minimum amount of hydraulic fluid thereby retaining at all times in reserve sufficient capacity for effecting the raising and lowering of the wheels, all of which contributes to the speed of the over-all operations of the device.

We claim:

1. In an earth handling implement, a frame, a scraper bowl pivoted on an axis transverse to said frame, hydraulic means for effecting rotational movement of said scraper bowl to the loading position and for holding it in the latter position and additional hydraulic means of lesser capacity for rotating said scraper bowl to the dumping position, an axle intercoupled with and extending transversely of said frame and having bell cranks fixed thereto at the respective opposite ends thereof, one arm of said bell cranks extending longitudinally of said implement and having wheels mounted on the ends thereof and the other arm of said bell crank extending generally vertically of said implement, and hydraulic cylinders intercoupled between the vertical arms of said bell cranks and said frame for rotating said axle for raising and lowering said scraper bowl.

2. In an earth handling implement, a frame, a scraper bowl pivoted on an axis extending transversely of said frame, a double-acting hydraulic cylinder directly connected to one side of said scraper bowl, a single-acting hydraulic cylinder connected to the other side of said scraper bowl, one end of said double acting cylinder adapted to cooperate with said single acting hydraulic cylinder to rotate said scraper bowl to the loading position and to hold it in this position, the other end of said hydraulic cylinder being adapted to move said scraper bowl to the dumping position, an axle intercoupled with and extending transversely of said frame and having bell cranks fixed thereto at the respective opposite ends thereof, one arm of said bell cranks extending longitudinally of said implement and having wheels mounted on the ends thereof and the other arm of said bell crank extending gen-

erally vertically of said implement, and hydraulic cylinders intercoupled between the vertical arms of said bell cranks and said frame for rotating said axle for raising and lowering said scraper bowl.

3. In an earth handling implement, a frame comprising a longitudinal member constituting the drawbar tongue and the sole forward frame member, a transverse member connected to said longitudinal member, side members fixed to said transverse member and extending longitudinally of said implement, an axle having wheels mounted thereon and an offset central portion pivotally connected to said frame adjacent the forward end of said side members and means for rotating said axle about said offset portion for raising and lowering said wheels with respect to said frame, the scraper bowl pivotally connected to the rear end of said side members, a source of hydraulic fluid pressure, double acting hydraulic means operably connected between said frame and one side of said scraper bowl, a second single acting hydraulic means operably connected between said frame and the other side of said scraper bowl, hydraulic means for rotating said axle about said offset portion for raising and lowering said bowl and means for connecting said hydraulic means for operating said bowl and said hydraulic means for rotating said axle to said source of fluid pressure.

4. In an earth handling implement, a frame, an axle having wheels mounted thereon and an offset central portion pivotally connected to said frame, a scraper bowl pivotally connected to said frame on an axis parallel to the offset central portion of said axle, a source of hydraulic fluid pressure, hydraulic means for rotating said axle about said offset central portion for raising and lowering said bowl, double-acting hydraulic means operably connected between said frame and one side of said scraper bowl, a second single-acting hydraulic means operably connected between said frame and the other side of said scraper bowl, and means for intercoupling with said source of fluid pressure the hydraulic means for operating said bowl and the hydraulic means for rotating said axle.

5. In an earth handling implement, a frame, a scraper bowl pivotally connected to said frame on an axis arranged transversely thereof, hydraulic means connected between said frame and said bowl and having a greater force exerting capacity in the direction for rotating said bowl to and holding said scraper bowl in the loading position than for rotating said scraper bowl to the dumping position, an axle intercoupled with and extending transversely of said frame and having bell cranks fixed thereto at the respective opposite ends thereof, one arm of said bell cranks extending longitudinally of said implement and having wheels mounted on the ends thereof and the other arm of said bell crank extending generally vertically of said implement, and hydraulic cylinders intercoupled between the vertical arms of said bell cranks and said frame for rotating said axle for raising and lowering said scraper bowl.

6. An earth handling implement comprising a frame having longitudinally extending side members, a scraper bowl having its respective ends pivotally connected to said side members on an axis transverse thereto, hydraulic cylinder means operably connected between said side members and the respective ends of said bowl for causing pivotal movement of said bowl about its pivotal connections with said side members, said pivotal connections between said hydraulic means and said side members and the pivotal connection between said hydraulic means and the respective ends of said scraper bowl lying in the same plane with the pivotal connection between the respective ends of said scraper bowl and said side members, thereby permitting the force of said hydraulic means to be applied directly to said bowl and in the plane of the side members of said frame, an axle extending transversely between said side members and having bell crank members fixed thereto at the respective opposite ends thereof, one arm of said bell crank members extending longitudinally of said implement and having wheels mounted on the end thereof and the other arm of said bell crank member extending generally vertically of said implement, and hydraulic cylinders intercoupled between said vertically extending arm of said bell crank members and said side members for rotating said axle to raise and lower said bowl.

7. An earth handling implement, comprising a frame having a longitudinally extending tubular drawbar tongue member, a transverse tubular member fixed to said longitudinal member in a T-shaped configuration, side members fixed to said transverse member and extending longitudinally of said implement, an axle extending through said transverse member and having bell crank members fixed thereto at the respective opposite ends thereof, one arm of said bell crank members extending longitudinally of said implement and having wheels mounted on the end thereof and the other arm of said bell crank members extending generally vertical of said implement, hydraulic cylinders operably associated with said vertical arms of said bell crank members for rotating said axle, additional hydraulic cylinders pivotally connected to said side members and the respective ends of said bowl for rotating the latter about its pivotal connection with said side members, the pivotal connections between said hydraulic cylinders and their respective operating elements lying substantially in the vertical plane of said side members.

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