Dec. 28, 1937. C. LE BLEU 2,103,588

SCRAPER

Filed May 15, 1936 2 Sheets-Sheet 1

FIG. 1

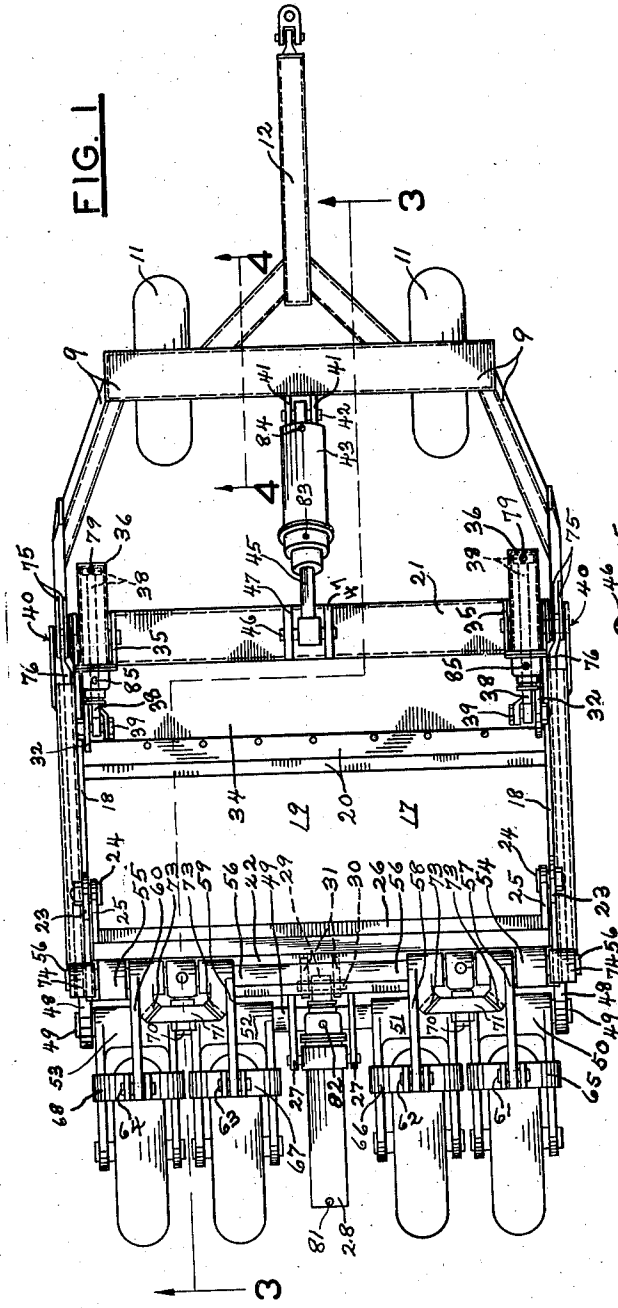
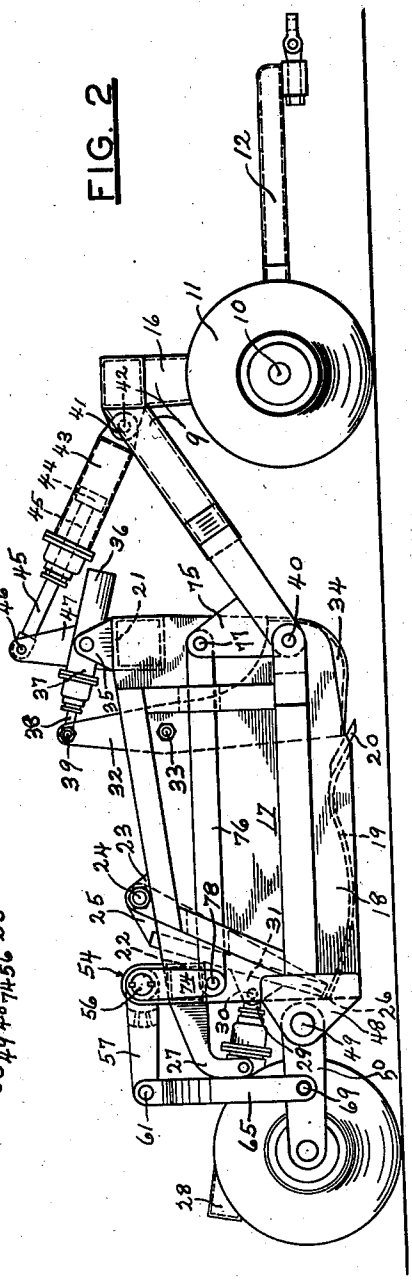


FIG. 2



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FIG. 3

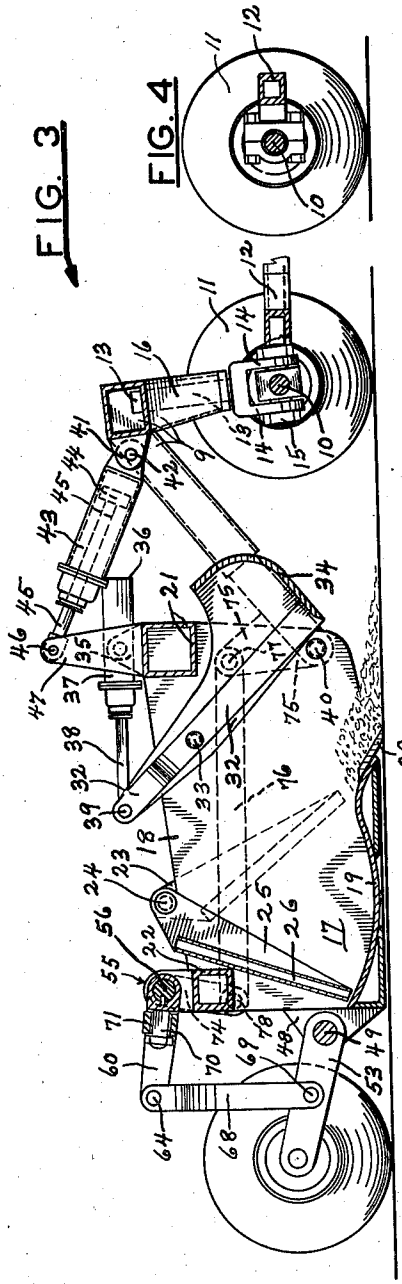


FIG. 4

FIG. 8



FIG. 7

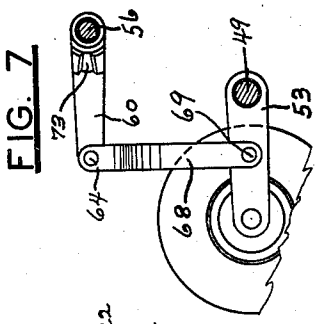


FIG. 6

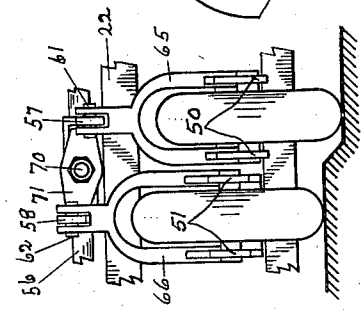
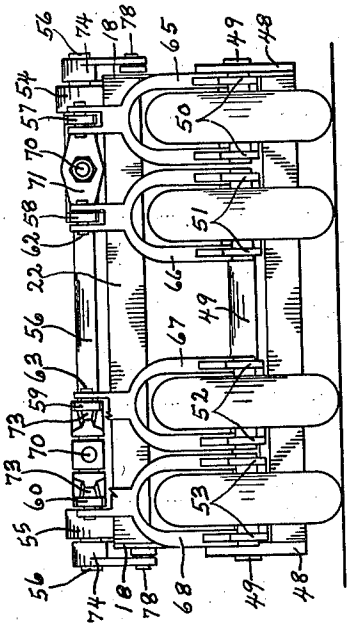


FIG. 5



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UNITED STATES PATENT OFFICE

2,103,588

SCRAPER

Charles Le Bleu, Los Angeles, Calif.

Application May 15, 1936, Serial No. 79,909

20 Claims. (Cl. 37—124)

This invention relates to a scraper having a bucket which may be raised and lowered.

An object of the present invention is the provision in a scraper of means for raising and lowering the bucket vertically.

Still another object of the invention is the provision in a machine of the character described, of an articulately assembled frame and bucket structure and means for articulating said structure for raising and lowering the bucket vertically without tilting it.

Still another object is the provision in a machine of the character described having a bucket of means whereby the bucket may be raised, lowered and material discharged therefrom without tilting it.

Still another object of this invention is the provision in a wheeled vehicle, of differential mechanism associating the wheels in pairs whereby the wheels in each pair may oscillate simultaneously in opposite directions in a vertical plane to the end that each wheel in the pair may support its portion of the weight of the vehicle applied to the pair in common when the vehicle travels over uneven surfaces.

Still other objects, features and advantages of this invention will be apparent to those skilled in the art upon detailed perusal of the attached drawings and the following specifications, wherein I describe and exemplify my invention, but it is to be understood that my invention as herein exemplified and described is susceptible to modification in the combination, correlation and construction of parts, members and features without departing from the spirit of the invention as defined in the annexed claims.

In the drawings:

Figure 1 is a plan view of my invention, the bucket being disposed in carrying position.

Figure 2 is a side elevation of Figure 1.

Figure 3 is a side elevation in section taken on a line 3—3, all parts being in loading position, the rear gate being also shown in a dotted position indicating that the gate may swing lengthwise of the bucket for discharging material therefrom without tilting it.

Figure 4 is a side elevation, in section, of the front axle taken on a line 4—4 of Figure 1.

Figure 5 is a rear elevation of the rear end of my invention, one of the rocker arms, see Figure 8, being removed to permit viewing the gear segments formed on each of the rearwardly projecting arms.

Figure 6 is a fragmentary elevation of the rear end of the invention showing a pair of wheels disposed on an uneven surface, each wheel of the pair supporting its portion of weight applied to the pair as a unit.

Figure 7 is a fragmentary view in section giving a side view of the gear segment formed on each of the rearwardly projecting arms.

Figure 8 is a rocker arm provided with a gear tooth or segment on each of its ends to mesh with gear segments carried by the rearwardly projecting arms.

Referring now more particularly to the drawings, a frame 9 is provided with a front axle 10 having wheels 11 journaled thereon forming a front truck. A draft tongue 12 is secured at its rear end to the front axle 10 and is adapted at its front end for connection to any suitable draft device for drawing the scraper along the ground, such as a tractor. The draft tongue 12 may be pivotally secured to the front axle 10 as shown in Figure 4.

The front axle 10 is provided with an opening therethrough midway between its ends. A substantially vertical shaft 13 is turnably mounted in the front end of frame 9 and is provided at its lower end with a pair of lugs 14 having openings therethrough and spaced apart to receive the front axle 10 therebetween. A large bolt 15 passes through the openings in the lugs 14 and the front axle 10, thus turnably and rockably mounting the lower end of a post 16 on the front axle 10, the post 16 being a portion of frame 9.

Reference character 17 designates generally a bucket. Bucket 17 comprises side walls 18 and a bottom 19 extending from the rear edge of the side walls to a position short of the front. The front edge of the bottom 19 is provided with a detachable scraper blade 20. The bottom 19 is arcuate in shape, the side walls 18 overhanging portions thereof. A beam 21 extends transversely of the bucket 17 forwardly of the scraper blade 20 and is rigidly secured at its opposite ends each to the overhanging portion of a side wall 18. Extending transversely of the bucket 17 at the rear end thereof is a beam 22 rigidly secured at its opposite ends each to a side wall 18.

Upstanding from side walls 18 and rigidly secured thereto are brackets 23 having journals 24. Pivotally mounted on the journals 24 are arms 25. The journals 24 and the arms 25 constitute hinges supporting a rear gate 26 extending transversely of the bucket 17, the arms 25 being secured to the gate and the hinges being concentric with the arcuate bottom 19. Brackets 27 are rigidly secured to cross beams 22 and pivotally support, in any suitable manner, a cylin-

der 28 having the usual piston, and a piston rod 29 secured thereto, the forward end of the piston rod being pivotally connected by a wrist pin 30 to brackets 31 rigidly secured to the gate 26. Thus, it is apparent that gate 26 may serve as a back wall for the bucket 17 and may be swung to sweep from one end of the bucket to the other for discharging material.

Arms 32 are pivotally secured between their ends each to a side wall 18 at 33, and are rigidly secured at their lower ends to a transversely extending auxiliary bucket 34. Thus is provided an auxiliary bucket swingingly mounted between the overhanging portions of side walls 18 and relative to the scraper blade 20. Rigidly mounted on cross beam 21 are two pairs of brackets 35. Brackets 35 serve as bearing for pivotally supporting a pair of hydraulic jacks 36 disposed one relative to each of the arms 32. Hydraulic jacks 36 comprise in each, a cylinder 37 having slidably mounted therein the usual piston and piston rod 38, the outer ends of the piston rods being pivotally connected each to the upper end of an arm 32 at 39, the cylinder of each of the jacks 36 being pivotally mounted in brackets 35. Upon outstroke movement of piston rods 38, the auxiliary bucket 34 will be swung away from the bucket 17 to open it, and on instroke toward the bucket 17 to close it.

Frame 9 is pivotally connected at its rear end to the lower front end of side walls 18 at 40.

A pair of lugs 41 is rigidly secured to frame 9 and carries a pin 42 pivotally supporting one end of a hydraulic cylinder 43, said cylinder having a piston 44 slidably disposed therein and secured to a piston rod 45, the outer end of piston rod 45 being pivotally connected at 46 to the upper end of arms 47 rigidly secured at their lower ends to beam 21. Upon instroke movement of piston rod 45 the scraper blade 20 will be lowered and upon outstroke movement of piston 45 the scraper blade 20 will be raised.

Secured to the rear end of bowl 17 are bearings 48 having mounted therein a shaft 49. Journaled on shaft 49 are wheeled brackets 50, 51, 52 and 53 each provided at its rear end with a rolling support.

Mounted on beam 22 are bearings 54 and 55 having journaled therein a shaft 56. Journaled on shaft 56 are rearwardly projecting arms 57, 58, 59 and 60 associated in pairs by a differential mechanism which will be described presently. Pivotally mounted on the rear ends of arms 57, 58, 59 and 60 by pins 61, 62, 63 and 64 respectively are downwardly extending links 65, 66, 67 and 68 pivotally secured at their lower ends, as shown in Figures 2, 3 and 7, each to a wheeled bracket as at 69.

Wheeled brackets 50, 51, 52 and 53 are disposed in pairs together with related structure comprising links 65, 66, 67 and 68, and rearwardly projecting arms 57, 58, 59 and 60. Wheeled brackets 50 and 51 together with links 65 and 66 and rearwardly projecting arms 57 and 58 comprise one pair and wheeled brackets 52 and 53 together with links 67 and 68 and rearwardly projecting arms 59 and 60 comprising the other pair. The pairs are identical and, therefore, only one pair will be described. Wheeled brackets 50 and 51 are associated as a pair by differential mechanism disposed between the confronting faces of rearwardly projecting arms 57 and 58 journaled on shaft 56. The differential mechanism includes a rearwardly projecting trunnion 70 rigid with shaft 56 midway between rearwardly projecting arms 57 and 58. Rockably mounted on trunnion 70 is a rocker arm 71 having formed on each of its opposite ends a gear tooth 72 adapted to mesh with a gear segment 73 formed on the confronting faces of rearwardly projecting arms 57 and 58. Thus, shaft 56 being fixed in a given position, wheeled brackets 50 and 51 may swing simultaneously in opposite directions but may not swing simultaneously in the same direction. The object of this arrangement is exemplified in Figure 6, wherein the wheels are shown as resting on an uneven surface and yet each wheel may support a portion of a load applied to the pair as a unit because the load is applied to the wheels through a differential mechanism. Applicant is aware that the differential mechanism is subject to many modifications and the structure shown and described is presented to exemplify this broad feature of my invention and not by way of limitation.

Rigid with each end of shaft 56 is a downwardly extending crank arm 74. Rigid with frame 9 at each side thereof is an arm 75. A tension member 76 is disposed one at each of the opposite sides of bucket 17 pivotally connected at their front ends each to an arm 75 at 77 and being pivotally connected at their rear ends each to the lower end of a crank arm 74 at 78.

In Figure 2 the various parts are shown in the load carrying position. Material in bucket 17 is retained therein by the auxiliary bucket 34, the auxiliary bucket being normally filled with material also. When it is desired to discharge the materials, hydraulic pressure is introduced simultaneously into the front ends of hydraulic cylinders 36 at 79, see Figure 1, openings 80 being connected to discharge, whereupon piston and piston rods 38 will move rearwardly causing the auxiliary bucket 34 to be swung to open position, see Figure 3, in which position the materials in bucket 34 may spill outwardly therefrom onto the ground. Fluid may then be held static in the front ends of cylinders 36 to maintain the auxiliary bucket 34 in open position. Hydraulic pressure is then introduced into the rear end of cylinder 28 at 81, the opening 82 being connected to discharge, whereupon rear gate 26 will be swung forwardly to sweep the materials forwardly out of bucket 17. Hydraulic pressure is then introduced into the front end of cylinder 28 at 82, the opening 81 being connected to discharge, whereupon rear gate 26 will be swung rearwardly to its normal position at the rear of bucket 17, as shown in Figure 2. Fluid may then be held static in the front end of cylinder 28 to retain rear gate 26 in its normal position at the rear of bucket 17. Auxiliary bucket 34 being in open position, to load bucket 17, hydraulic pressure is introduced into the upper end of cylinder 43 at 83, opening 84 being connected to discharge, whereupon the bucket 17 will be lowered into scraping contact with the ground and by forward movement of the scraper over the ground dirt will be scraped up and loaded into bucket 17. After bucket 17 has been loaded hydraulic pressure is introduced into the rear ends of cylinders 36 at 85, opening 79 being connected to discharge, whereupon the auxiliary bucket will be closed. Hydraulic pressure may then be introduced into the front end of cylinder 43 at 84, opening 83 being connected to discharge, to raise the bucket to carrying position. Fluid may then be held static in the lower end of cylinder 43 to retain the bucket 17 in carrying position.

It will be noted that because of the arrangement of the various parts, members and features of my invention, bucket 17 may be disposed in loading, carrying and discharging positions without applying tilting movement thereto. In other words, the bucket 17 of my invention may be raised and lowered without tilting it as is usually done. This feature of my invention is advantageous because when bucket 17 is in loading position the rear end of the bucket is disposed in close proximity to the ground and therefore the dirt need not be forced upwardly as high as would be the case if the bucket 17 were only tilted downwardly at its front end to load. Still another advantage resides in the fact that greater clearance may be obtained between the underside of the bucket at its rear end and the ground thereunder.

It will be readily understood that while I have shown a front axle 10 and rolling supports 11, still the front end of frame 9 may be attached directly to the draft device, the latter constituting, in effect, a truck.

I claim:—

1. A machine of the character described comprising a bucket, wheels mounted on the rear end of the bucket for swinging movement in a vertical plane, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and swingably mounted at its rear end on the bucket, connecting means operably associating the frame and the swingably mounted wheels at the rear end of the bucket, and means for swinging the frame to move the bucket vertically without tilting it.

2. A machine of the character described comprising a bucket, wheels mounted on the rear end of the bucket for swinging movement in a vertical plane, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, an arm mounted on and upstanding from the pony truck, rearwardly extending arms rigid with the upstanding arm and pivoted at their rear ends on the bucket at its front end, connecting means operably associating the rearwardly extending arms and the swingably mounted wheels at the rear end of the bucket and means for swinging the rearwardly extending arms to move the bucket vertically without tilting it.

3. A machine of the character described comprising a bucket, ground wheels mounted on the rear end of the bucket for swinging movement in a vertical plane, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, an arm mounted on and upstanding from the pony truck, rearwardly extending arms rigid with the upstanding arm and pivoted at their rear ends on the bucket at its front end, connecting means operably associating the rearwardly extending arms and the swingably mounted ground wheels at the rear end of the bucket and a power thrust device disposed with the upstanding arm and the bucket and operable to swing the rearwardly extending arms and move the bucket vertically without tilting it.

4. A machine of the character described comprising a bucket, ground wheels mounted on the rear end of the bucket for swinging movement in a vertical plane, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and pivotally mounted at its rear end on the bucket at its lower front end, connecting means operably associating the frame and the swingably mounted ground wheels at the rear end of the bucket, and a hydraulically expansible strut mechanism mounted on the frame and connected to the bucket at a point spaced upwardly from the pivotal connection of the frame with the lower front end of the bucket and operable to swing the frame and move the bucket vertically without tilting it.

5. A machine of the character described comprising a bucket open at both ends, ground wheels mounted on the rear end of the bucket for swinging movement in a vertical plane, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and swingably mounted at its rear end on the bucket at its lower front end, connecting means operably associating the frame and the swingably mounted ground wheels at the rear end of the bucket and means for swinging the frame to move the bucket vertically without tilting it.

6. A machine of the character described comprising a bucket open at both ends, ground wheels mounted on the rear end of the bucket for vertical swinging movement, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and pivotally mounted at its rear end on the bucket at its lower front end, connecting means operably associating the frame and the swingably mounted ground wheels at the rear end of the bucket and power operated means disposed with the frame and the bucket for swinging the frame to selectively raise and lower the bucket without tilting it.

7. A machine of the character described comprising a bucket open at both ends, ground wheels mounted on the rear end of the bucket for vertical swinging movement, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and swingably mounted at its rear end on the bucket at its front end, connecting means articulately associating the frame and the swingably mounted ground wheels at the rear end of the bucket, means for swinging the frame to selectively raise and lower the bucket without tilting it, a gate adapted to be moved lengthwise of the bucket from end to end and means for so moving the gate.

8. A machine of the character described comprising a bucket open at both ends, ground wheels mounted on the rear end of the bucket for vertical swinging movement, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and swingably mounted at its rear end on the bucket at its front end, connecting means articulately associating the frame and the swingably mounted ground wheels at the rear end of the bucket, means for swinging the frame to move the bucket vertically without tilting it, a gate adapted to be moved lengthwise of the bucket from end to end and power operated means disposed rearwardly of the bucket to move the gate.

9. A machine of the character described comprising a bucket open at both ends, ground wheels mounted on the rear end of the bucket for vertical swinging movement, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and pivotally mounted at its rear end on the bucket at its front end, con-

necting means articulately associating the frame and the swingably mounted ground wheels at the rear end of the bucket, power operated means for swinging the frame to move the bucket vertically without tilting it, a gate adapted to be moved lengthwise of the bucket from end to end and power operated means mounted on the bucket to move the gate.

10. A machine of the character described comprising a bucket open at both ends, ground wheels mounted on the rear end of the bucket for vertical swinging movement, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and pivotally mounted at its rear end on the bucket at its front end, connecting means articulately associating the frame and the swingably mounted ground wheels at the rear end of the bucket, hydraulically operated means for swinging the frame to move the bucket vertically without tilting it, a gate adapted to be moved lengthwise of the bucket from end to end and hydraulically operated means to move the gate.

11. A machine of the character described comprising a bucket open at both ends, ground wheels mounted on the rear end of the bucket for vertical swinging movement, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and pivotally mounted at its rear end on the bucket at its front end, connecting means articulately associating the frame and the swingably mounted ground wheels at the rear end of the bucket, means for swinging the frame to move the bucket vertically without tilting it, a gate pivotally supported on the bucket and adapted to be swung lengthwise of the bucket from end to end and means to swing the gate.

12. A machine of the character described comprising a bucket open at both ends, ground wheels mounted on the rear end of the bucket for vertical swinging movement, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and pivotally mounted at its rear end on the bucket at its front end, connecting means articulately associating the frame and the swingably mounted ground wheels at the rear end of the bucket, power operated means for swinging the frame to move the bucket vertically without tilting it, a gate pivotally supported on the bucket and adapted to be swung lengthwise of the bucket from end to end and power operated means to swing the gate.

13. A machine of the character described comprising a bucket open at both ends, ground wheels mounted on the rear end of the bucket for vertical swinging movement, a pony truck disposed forwardly of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and pivotally mounted at its rear end on the bucket at its front end, connecting means articulately associating the frame and the swingably mounted ground wheels at the rear end of the bucket, hydraulically operated means for swinging the frame to move the bucket vertically without tilting it, a gate pivotally supported on the bucket and adapted to be swung lengthwise of the bucket from end to end and hydraulically operated means to swing the gate.

14. A machine of the character described comprising a main bucket open at both ends, ground wheels mounted on the rear end of the main bucket for vertical swinging movement, a pony truck disposed forwardly of the main bucket adapted for connection to a draft device, a frame mounted at its end on the pony truck and pivotally mounted at its rear end on the main bucket at its front end, connecting means articulately associating the frame and the swingably mounted ground wheels at the rear end of the main bucket, means for swinging the frame to move the main bucket vertically without tilting it, a gate adapted to be moved lengthwise of the main bucket from end to end, means to move the gate, an auxiliary bucket adapted to be moved to open and close the front end of the main bucket and means to move the auxiliary bucket.

15. A machine of the character described comprising a main bucket open at both ends, ground wheels mounted on the rear end of the main bucket for vertical swinging movement, a pony truck disposed forwardly of the main bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and pivotally mounted at its rear end on the main bucket at its front end, connecting means articulately associating the frame and the swingably mounted ground wheels at the rear end of the main bucket, power operated means for swinging the frame to move the main bucket vertically without tilting it, a gate adapted to be moved lengthwise of the main bucket from end to end, power operated means to move the gate, an auxiliary bucket adapted to be moved to open and close the front end of the main bucket and power operated means to move the auxiliary bucket.

16. A machine of the character described comprising a main bucket open at both ends, ground wheels mounted on the rear end of the main bucket for vertical swinging movement, a pony truck disposed forwardly of the main bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and pivotally mounted at its rear end on the main bucket at its front end, connecting means articulately associating the frame structure and the swingably mounted ground wheels at the rear end of the main bucket, hydraulically operated means for swinging the frame to move the main bucket vertically without tilting it, a gate adapted to be moved lengthwise of the main bucket from end to end, hydraulically operated means to move the gate, an auxiliary bucket adapted to be moved to open and close the front end of the main bucket and hydraulically operated means to move the auxiliary bucket.

17. A machine of the character described comprising a bucket, a plurality of wheeled brackets mounted on the rear end of the bucket for vertical swinging movement, a crank shaft journaled on the rear end of the bucket above the wheeled brackets, rearwardly projecting arms carried by the crank shaft, links pivotally connected at their upper ends to the rear ends of the rearwardly projecting arms and at their lower ends to the wheeled brackets, a downwardly extending crank arm rigid with each of the opposite ends of the crank shaft, a pony truck disposed in front of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and swingably mounted at its rear end on the front end of the bucket, frame extensions rigid with and upstanding from the frame, tension members pivotally connected at their front ends to the upper ends of the frame extensions and at their rear ends to the lower ends of the crank arms and means for swing-

ing the frame to move the bucket vertically without tilting it.

18. A machine of the character described comprising a bucket, a plurality of wheeled brackets mounted on the rear end of the bucket for vertical swinging movement, a crank shaft journaled on the rear end of the bucket above the wheeled brackets, rearwardly projecting arms swingably mounted on the crank shaft, differential mechanism disposed with the rearwardly projecting arms and associating the same in pairs, said differential mechanism serving to prevent swinging movement of the arms in each pair in the same direction and permitting swinging movement in opposite directions, links pivotally connected at their upper ends to the rear ends of the rearwardly projecting arms and at their lower ends to the wheeled brackets, a downwardly extending crank arm rigid with each of the opposite ends of the crank shaft, a pony truck disposed in front of the bucket adapted for connection to a draft device, a frame mounted at its front end on the pony truck and swingably mounted at its rear end on the bucket at its front end, frame extensions rigid with and upstanding for the frame at its rear end, tension members pivotally connected at their front ends to the upper ends of the frame extensions and at their rear ends to the lower ends of the crank arms and means for swinging the frame to move the bucket vertically without tilting it.

19. A machine of the character described comprising a bucket, wheels mounted on the rear end of the bucket for swinging movement in a vertical plane, a frame disposed forwardly of the bucket and adapted for connection to a draft device, a frame mounted at its front end on the first mentioned frame and swingably mounted at its rear end on the bucket, connecting means operably associating the frame and the swingably mounted wheels at the rear end of the bucket and means for swinging the frame to move the bucket vertically.

20. A machine of the character described comprising a bucket, wheels mounted on the rear end of the bucket for swinging movement in a vertical plane, a pony truck disposed forwardly of the bucket and adapted for connection to a draft device, a frame mounted at its front end on the pony truck and swingably mounted at its rear end on the bucket, connecting means operably associating the frame and the swingably mounted wheels at the rear end of the bucket and means for swinging the frame to move the bucket vertically.

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