July 22, 1952 J. R. KENNEDY 2,603,894

EXCAVATOR AND LOADER

Filed April 17, 1947 3 Sheets-Sheet 1

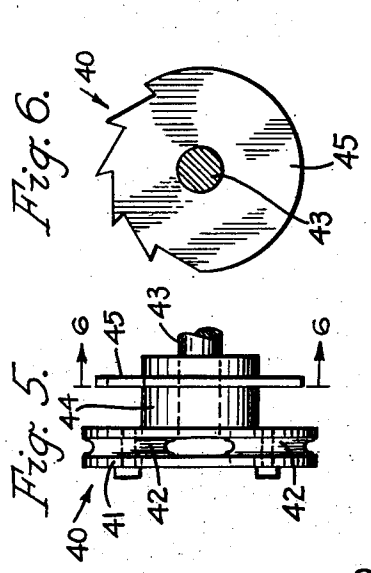


Fig. 6.

Fig. 5.

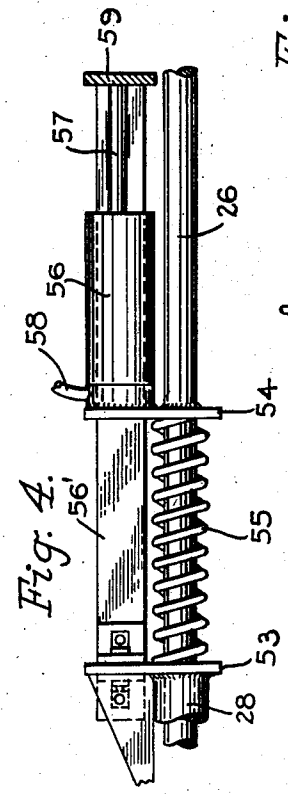


Fig. 4.

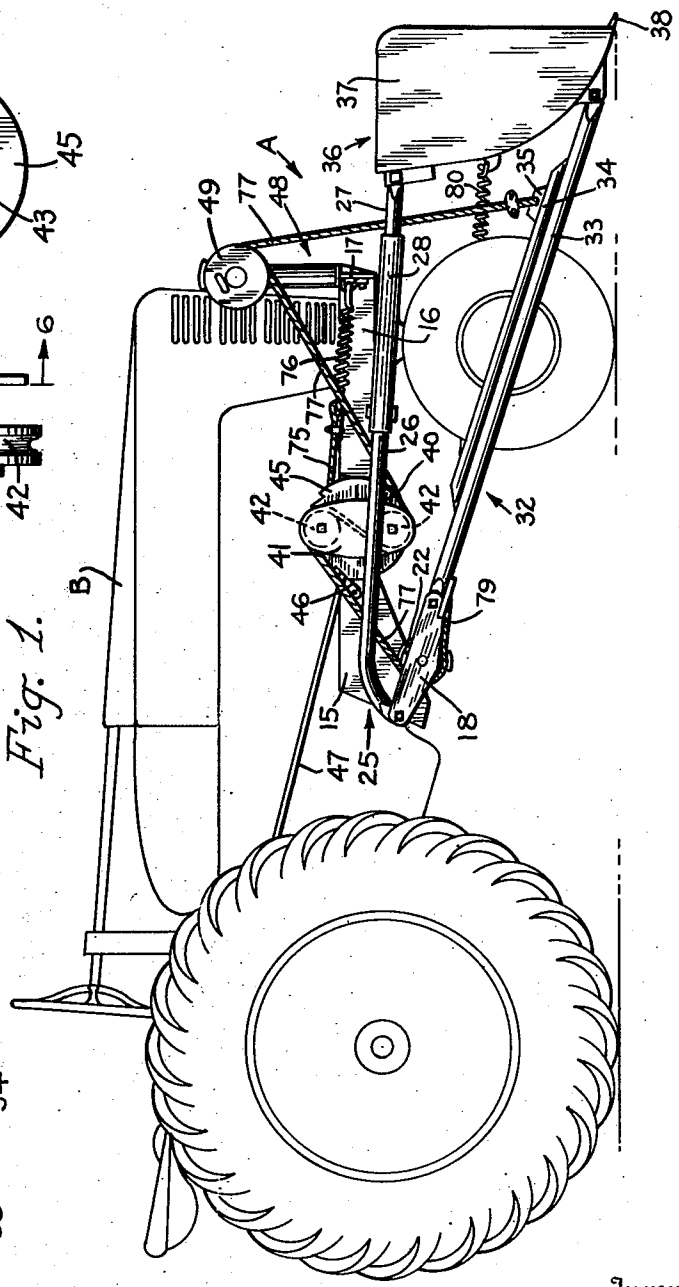


Fig. 1.

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EXCAVATOR AND LOADER

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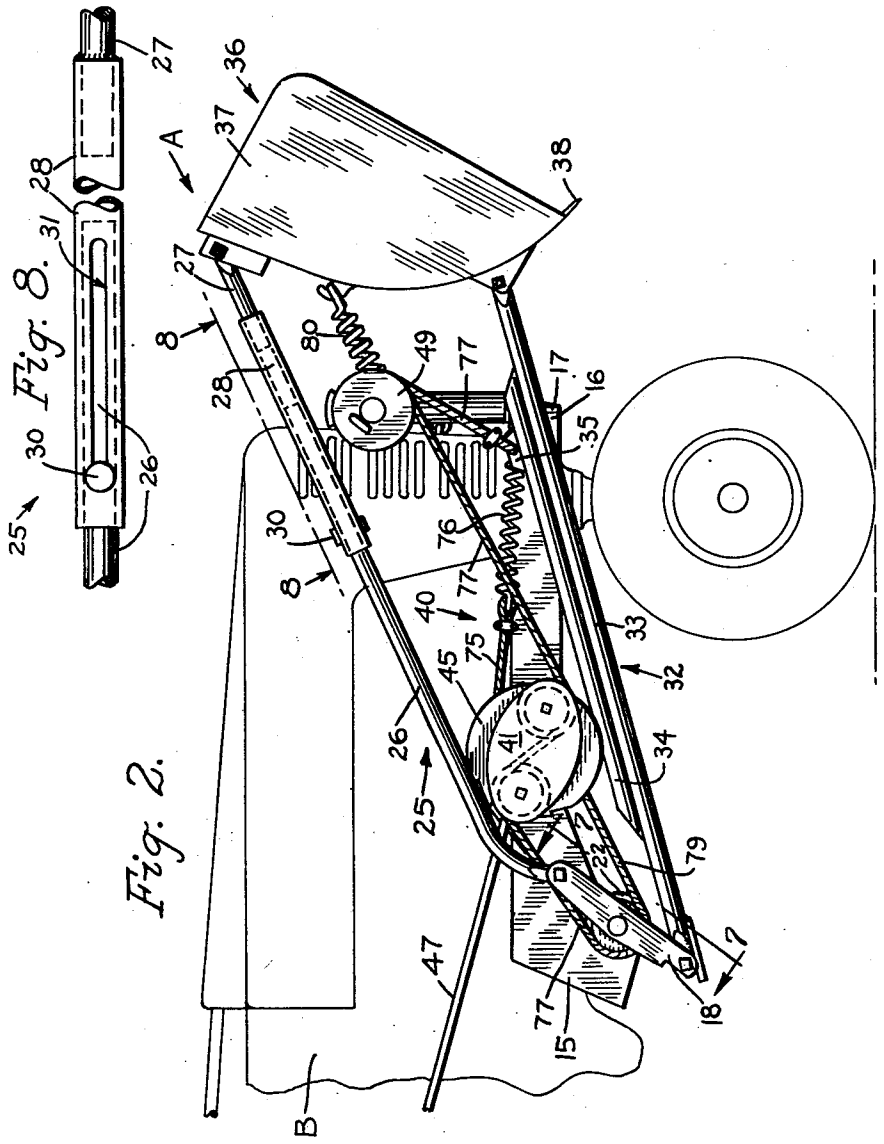


Fig. 8.

Fig. 2.

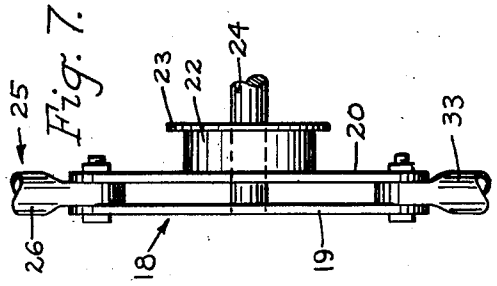


Fig. 7.

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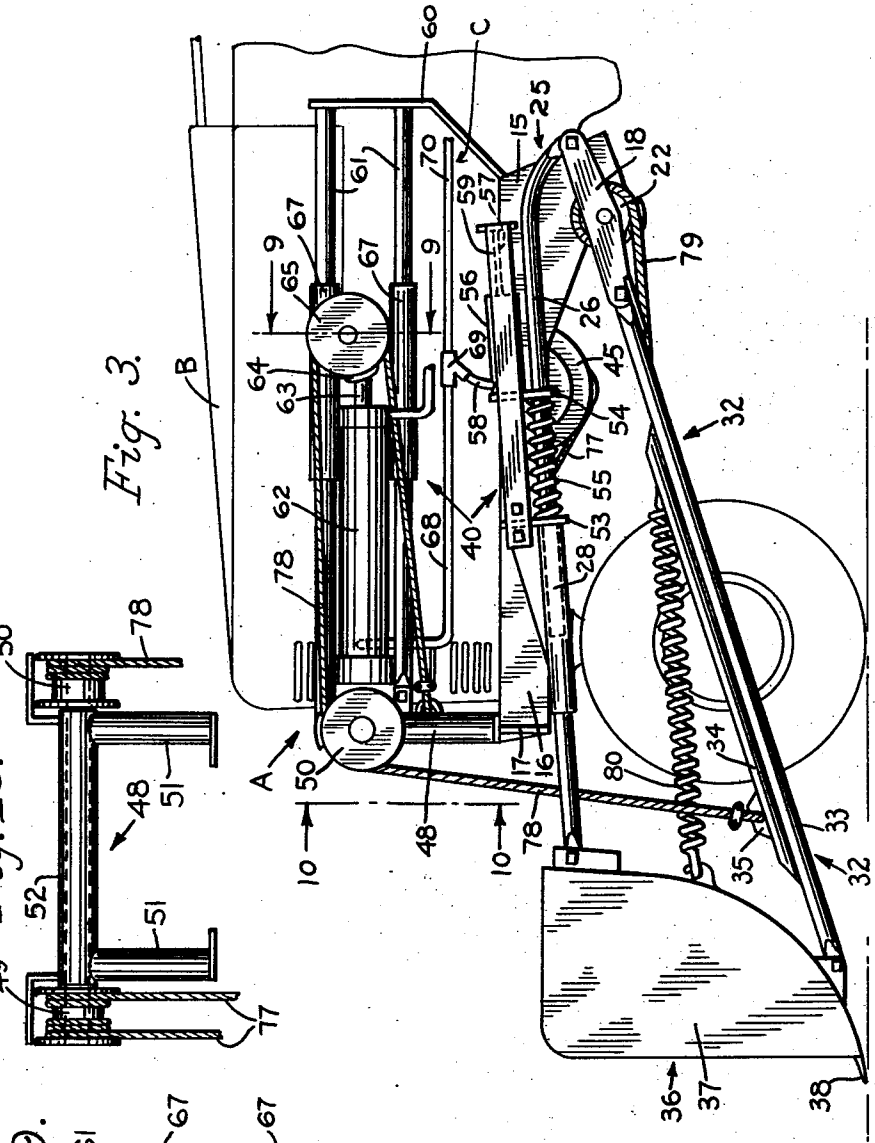
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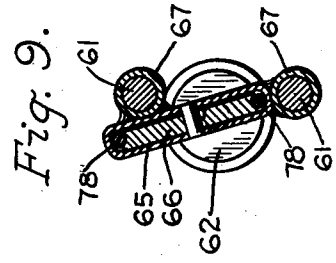
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EXCAVATOR AND LOADER

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UNITED STATES PATENT OFFICE

2,603,894

EXCAVATOR AND LOADER

James R. Kennedy, Purcell, Okla.

Application April 17, 1947, Serial No. 741,971

10 Claims. (Cl. 37—117.5)

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This invention relates to machines for material handling, and more particularly to a tiltable scoop excavator and loader. The machine may be employed, for example, associated with a tractor, as a combination excavator and loader for earth working.

An important object of the invention is to provide a machine of this kind including means for automatically setting the scoop in the proper position at all times during operation so as to utilize to the full the pressure fluid power employed, which power may be derived from that contained in the tractor, for example, upon which the machine is mounted.

Another important object is to simplify the construction of a tiltable scoop excavator and loader, associated with a suitable vehicle, employing but one control lever, for controlling the fluid pressure to two hydraulic cylinders, forming portions of the tilting means.

Still another important object is to provide a novel means for initially tilting a loaded scoop or shovel, raising the same to a selected height, holding it at this height until the vehicle to which the scoop is operatively connected is moved, the scoop then elevated to a higher position or lowered to a lower position, or permitted to remain in its initially raised position, then tilted into a dumping position and, when the vehicle is again in position for loading of the scoop, the latter may be lowered to its loading position.

Yet another object is to provide a novel means for manipulation of a tiltable scoop, whereby the latter may be oscillated in order to penetrate and break up hard surfaces and sub-surface material in which it may work.

Other objects and advantages of the invention will be apparent during the course of the following detailed description of the invention, taken in connection with the accompanying drawings, forming a part of this specification, and in which drawings:

Figure 1 is a side elevation of a vehicle upon which the novel machine is mounted, with the scoop or shovel thereof in a lowered position.

Figure 2 is a side elevation of the forward portion of the vehicle, with the scoop or shovel of the new machine in a raised position.

Figure 3 is a side view of the forward portion of the vehicle, showing the side of the new machine opposite the side shown in Figures 1 and 2 and the scoop or shovel lowered.

Figure 4 is a fragmentary side view of a cylinder and piston and associated parts forming a portion of a means to effect operation of the scoop or shovel.

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Figure 5 is an end elevation of pulleys and a drum, with a ratchet wheel forming a part of the means to effect operation of the scoop or shovel.

Figure 6 is a sectional view of a ratchet wheel forming part of the assembly of Figure 5 and taken on the line 5—5 of Fig. 6.

Figure 7 is an end elevation of a rocker arm associated with a movable support for the scoop or shovel.

Figure 8 is a fragmentary plan view of the movable support for the scoop or shovel substantially on the line 8—8 of Figure 2.

Figure 9 is a vertical section of a slidable and rotatable assembly forming part of the means to effect operation of the scoop or shovel, substantially on the line 9—9 of Figure 3.

Figure 10 is an elevation of a pulley support bracket forming a part of the means to effect operation of the scoop or shovel.

In the drawings wherein for the purpose of illustration is shown a preferred embodiment of the invention and wherein similar reference characters designate corresponding parts throughout the several views, the letter A designates the novel tiltable-scoop excavator and loader and the letter B a vehicle upon which it is mounted and which carries a power take-off C.

The novel tiltable-scoop excavator and loader A includes a pair of side frame members 15, suitably spaced apart in substantial parallelism, each having a front end 16 which carries a pulley support bracket 17 having a horizontal support face.

Referring to Figures 1 and 2, which show one side frame member 15, and Figure 3 which illustrates the other member 15, each member 15 rockably supports a rocker arm 18, best shown in Figure 7, which preferably consists of two parallel spaced-apart arm portions, one being an outer portion 19 and the other an inner portion 20. To one of these portions (20, in the example shown) is fixedly secured a drum or pulley 22, having one flange 23 but the adjoining arm portion 20 functions as the second flange. The two rocker arms 18 with their associated drums 22 are fixedly connected by a shaft 24 journaled in the two side members 15.

The upper end of each rocker arm 18 is pivotally connected with the rear of an upper scoop-control arm assembly 25 which comprises a rear control arm portion 26 (to the J-shaped rear end of which the upper end of the rocker arm 18 is pivotally connected), a front control arm portion 27 and an intermediate portion 28 which is preferably a tube with the front end section of the rear control arm portion slidable therein and the rear end section of the front

control arm portion extending into the front end of the intermediate portion 28 and fixedly secured thereto, as by welding.

Means is provided, as shown in Figure 8, to prevent the front end section of the rear control arm portion 26 of the arm assembly 25, shown in Figs. 1 and 2, from sliding wholly from the tubular intermediate portion 28 and may comprise a suitable headed stud or projection 30, with the body of the stud or projection extending through a longitudinally-extending slot 31 in the rear section of the intermediate portion 28.

The lower end of each rocker arm 18 is pivotally connected with the rear end of a lower control arm assembly 32, each assembly preferably comprising a single substantially straight arm portion 33 provided with an upstanding, longitudinally-extending flange portion 34, mounting an eyed member 35 for attachment of a flexible member to be described.

A suitable scoop or shovel 36 is supported wholly by the two control arm assemblies 25 and 32, with the upper rear portion of the scoop or shovel 36 pivotally connected with the two upper control arm assemblies and the lower rear portion of the same pivotally connected with the two lower control arm assemblies 32. This scoop or shovel may include side wall portions 37 supporting a combined arcuate rear and bottom wall portion terminating at its forward end in a somewhat sharp edge 38 extending forwardly of the vertical planes of the front edges of the side wall portions 37.

Means 40 to effect operative movements of the scoop or shovel 36 includes structures shown in Figures 1 and 2 and detailed in Figures 5 and 6, as follows: In Figure 5 there is detailed a block 41 carrying two idler pulleys 42 with the block 41 mounted upon a shaft 43 and connected, as by the cylindrical member or drum 44 with a ratchet wheel 45 fixed to the drum 44. Since the drum 44 supports a flexible connection to be described, one outer face of the block 41 and one face of the ratchet wheel 45 provides flanges for this drum 44. Associated with the ratchet wheel 45 is a pawl 46, movable by operation of a control rod 47 with the free end of the latter within reach of an occupant of the vehicle B. When the scoop or shovel 36 is raised, as in Figure 2, the pawl 46 engages a tooth near the right-hand end of the row of teeth of the ratchet wheel 45 but when the scoop or shovel 36 is lowered, as in Figure 1, the pawl engages a tooth adjacent the left hand end of the row of teeth. The shaft 43 is journaled in one of the side frame members 15.

Additional portions of means 40 includes the pulley support bracket 48, shown more specifically in Figure 10, and a pair of pulleys 49 and 50 mounted on the bracket 48. The bracket 48 may comprise two uprights 51, mounted upon the brackets 17 of the front ends 16 of the side frame members 15, and a horizontal tubular portion 52 bridging the uprights 51 and secured thereto. Extending through the tubular portion 51 is a shaft upon the ends of which are secured the pulleys 49 and 50. The pulley 49 also functions as a drum as will be subsequently explained.

Before describing the several flexible connections included in the means 40, just described, those portions of the structure of the means 40, shown particularly in Figures 3, 4 and 9 will be explained.

Mounted upon one of the upper scoop-control

arm assemblies 25 (in the example shown, the assembly 25 of Figure 3) is the structure shown in detail in Figure 4. This structure includes a pair of upwardly extending bracket and spring abutments 53 and 54. The abutment 53 is fixedly secured, as by welding, to the rear end of the intermediate portion 28 and the abutment 54 is fixedly secured to the intermediate section of the rear control arm portion 26, as by welding, so that the two abutments are spaced apart and an expansion coil spring 55 bears against the abutments and encircles that part of the rear control arm portion 26 between the abutment 53 and abutment 54.

Supported by the abutment 54 is a cylinder 56 from the rear end of which slidably extends a piston rod 57 carrying a suitable piston head within the cylinder 56. A tube 58 for pressure fluid opens into the cylinder's chamber adjacent the end (head end) opposite that from which the piston extends. The rear end of the piston rod 57 is fixed to the bight 59 of a substantially U-shaped yoke 56' with the arms thereof secured to the abutment 53. One of the functions of the spring 55 is to tend to force the piston head toward the head end of the cylinder 56, but this has another function as will be detailed later.

Referring now to the structure in Figure 3 above that just described, a bracket 60 extends upwardly from, preferably, the rear end of the side frame member 15 which supports the abutments 53 and 54. The bracket 60 supports the rear ends of two horizontally disposed, substantially parallel guide rods 61 whose front ends are secured to the pulley support bracket 48. Carried by the guide rods 61 is a fixed structure comprising a major cylinder 62 disposed adjacent the front end portions of the guide rods 61, and a sliding or reciprocating structure comprising a piston rod 63 for the cylinder 62 extending outwardly of the rear end thereof, having an arcuately-faced shoe 64 at its outer end bearing against the peripheral portion of a sheave housing 65. As shown in Figure 9, this housing 65 is disposed about a sheave 66 and pivotally supports the latter. The housing 65 is, in turn, fixedly supported by two sleeves 67 which extend about portions of the guide rods 61, and are adapted to slide back and forth along these rods. The housing 65 is disposed, inclined from the vertical, as in Figure 9 and may be welded to the sleeves 67. A tube 68 for pressure fluid opens into the head end of the cylinder 62 and extends to a coupling 69 for it, the tube 58 and a main conduit 70 for pressure fluid extending to any suitable source (not shown) of such fluid.

The flexible connections forming parts of the means 40 are as follows: Referring first to Figures 1 and 2, there is a flexible connection 75 such as wire cable, secured at one end to the drum 44 of Figure 5, to wind thereabout and, from this drum, the connection 75 extends forwardly to and is secured to one end of a retraction spring 76, the other end of which spring is secured to one of the brackets 17 of the adjacent side frame member 15. A flexible connection 77 extends, from one eyed member 35 of the lower scoop-control arm assembly 32, shown in Figures 1 and 2, upwardly to the pulley 49, extends fully around it and is attached thereto, its direction of travel reversed, and it then extends rearwardly to and under and partly around the lowermost idler pulley 42, then diagonally upwardly to the upper idler pulley 42, over and partly around which it

travels, thence downwardly and rearwardly to the adjacent drum 22 to which it is secured. Referring to the flexible connections shown more particularly in Figure 3, there is a flexible connection 78, as wire cable, secured to the other eyed member 35 and extends upwardly to and around the pulley 50, thence extends rearwardly to and partly around the sheave 66 and then extends forwardly to the support bracket 48 to which it is secured. A fourth flexible connection 79, as wire cable, extends from the rear end of a contraction coil spring 80, which latter is secured at its other end to the scoop or shovel 36 at preferably the rear portion thereof intermediate the upper and lower ends of the scoop or shovel. This flexible connection 79 extends from the spring 80, rearwardly to the adjacent pulley 22 to which it is secured.

The vehicle B is illustrated as a conventional tractor upon which the novel machine A is mounted in any approved way, preferably adjacent the forward end thereof with the side frame member 15 secured to the tractor chassis so that the shaft 24 connecting the drums 22 and rocker arms 18 may pass transversely under the tractor B and the horizontal tubular portion 52 of the pulley support bracket 48 extend transversely across the front end of the vehicle.

In operation, the vehicle B is, of course, moved forwardly, with the scoop or shovel 36 in the positions shown in Figures 1 and 3 so that the latter will contact the material being worked upon and cause it to move into the scoop or shovel 36. Upon operation of the conventional valve control lever (not shown) of the pressure fluid system, pressure fluid will be permitted to flow along conduit 70, coupling 69 and tubes 58 and 68. Since there is obviously less load on that portion of the pressure system represented by the cylinder 56 and associated structure than on that portion represented by the cylinder 62 and its associated structure, that portion including the cylinder 56 operates first so that piston rod 57 is forced outwardly to its limit of movement, whereupon the pressure forces piston rod 63 outwardly and the rear control arm portion 26 rearwardly, which causes rocking in one direction of the rocker arm 18 and forward movement of the lower control arm assembly 32. The movement of piston rod 57 compresses spring 55 and the movements of the arm portion 26 and arm assembly 32 draw the upper end portion of the scoop 36 backwardly, thus tilting the latter and causing it to cut into the material at an angle from the horizontal and eases the load on the vehicle B. This tilting is such that the load carried by the scoop will not be lost. When sufficiently tilted the scoop is pressure-held in its tilted position. Obviously, alternately opening and closing the pressure valve will cause rocking movements of the partly loaded scoop and thus aid it in working into difficult material.

The subsequent movement of the piston rod 63 causes the shoe 64 to force the sheave housing 65 toward the rear end consequent drawing up of the flexible connection 78 attached to the eyed portion 35 in Figure 3 whereby the scoop is caused to rise. After the consequent slack has been taken out of the flexible connection 77 (limited by the tilting of the block 41) the pulleys 22 come into operation, rotating in one direction and causing the consequent rocking of the rocker arms 18 into the positions, as shown by one of them in Figure 2. This throws the upper scoop-control arm assembly 25 forwardly and the lower scoop-control arm assembly 32 rearwardly, thus tilting the scoop 36 as in Figure 2 and dumping the load. At this time the spring 80 has expanded but when the fluid pressure is released, this spring may contract and its contraction permits, because of the connection therewith of the flexible connection 79, the pulleys 22 to rotate in a direction opposite to the direction heretofore described and, since the fluid pressure is now released, the flexible connections 77 and 78 will slacken. The consequent rotation of the pulleys 22 causes rocking of the rocker arms out of the positions, as shown by one in Figure 2, so that the scoop is rightened. Release of the fluid pressure permits the scoop to lower by reason of its weight and the scoop is now in position to perform another loading or moving operation.

The height to which the scoop may rise is controlled by means of the control rod 47, pawl 46 operated thereby, ratchet wheel 45 associated with the pawl, and the operative connection of the ratchet wheel with the rest of the assembly, particularly the block 41 and its idler pulleys 42. When elevated to a desired position (not necessarily its highest position), the vehicle B may be moved to a position where the scoop load may be discharged. Manipulation of the conventional pressure fluid valve lever permits, as is now obvious, further raising of the scoop to its maximum highest position before dumping, or lowering it below its carrying position, for dumping.

When the fluid pressure in the cylinder 56 is released through the tube 58, the spring 55, working against the abutment 53, which is fixedly secured, as by welding, to the rear end of the intermediate portion 28, forces the shovel 36 into the normal or loading position shown in Figure 3.

Various changes may be made to the form of the invention herein shown and described without departing from the spirit of the invention or scope of the claims.

What is claimed is:

1. In a material handler, a scoop; means for selectively maintaining the scoop in a scooping position, in a rearwardly-tilted position and in a forwardly-tilted position, including an upper scoop-control arm assembly, including a rear control arm portion, a front control arm portion and an intermediate tubular portion, with the front end section of said rear control arm portion slidably retained in said intermediate tubular portion and said front control arm portion fixedly secured to said intermediate tubular portion, an expansion coil spring about an intermediate section of said rear control arm portion rearwardly of said front end section thereof, an abutment carried by said rear control arm portion rearwardly of said intermediate section, an abutment carried by the rear end of said intermediate tubular portion, with said coil spring bearing against said abutments, a lower scoop-control arm assembly, both assemblies pivotally connected with said scoop, a rocker arm, and means pivotally connecting the assemblies with said rocker arm for reciprocation in opposite directions upon oscillation of said rocker arm; means operatively connected with said rocker arm for rocking said rocker arm in one direction, including a pressure fluid cylinder and a piston rod therefor, with said cylinder supported by one of said abutments and the piston rod operatively connected with the other abutment; and means to rock said rocker arm in the opposite direction.

2. In a material handler, a scoop; means for

selectively maintaining the scoop in a scooping position, in a rearwardly-tilted position and in a forwardly-tilted position, including an upper scoop-control arm assembly, including a rear control arm portion, a front control arm portion and an intermediate tubular portion, with the front end section of said rear control arm portion slidably retained in said intermediate tubular portion and said front control arm portion fixedly secured to said intermediate tubular portion, an expansion coil spring about an intermediate section of said rear control arm portion rearwardly of said front end section thereof, an abutment carried by said rear control arm portion rearwardly of said intermediate section, an abutment carried by the rear end of said intermediate tubular portion, with said coil spring bearing against said abutments, a lower scoop-control arm assembly, both assemblies pivotally connected with said scoop, a rocker arm, and means pivotally connecting the assemblies with said rocker arm for reciprocation in opposite directions upon oscillation of said rocker arm; means for rocking said rocker arm in one direction, including a pressure fluid cylinder and a piston rod therefor, with said cylinder supported by one of said abutments and the piston rod operatively connected with the other abutment; means to rock said rocker arm in the opposite direction; a drum operatively secured to said rocker arm for rotation upon oscillation of said rocker arm and a flexible connection mounted upon said drum and operatively connected to said scoop; and means operatively connected with said assemblies to raise and lower said scoop.

3. In a material handler, a scoop; means for selectively maintaining the scoop in a scooping position, in a rearwardly-tilted position and in a forwardly-tilted position, including an upper scoop-control arm assembly, including a rear control arm portion, a front control arm portion and an intermediate tubular portion, with the front end section of said rear control arm portion slidably retained in said intermediate tubular portion and said front control arm portion fixedly secured to said intermediate tubular portion, an expansion coil spring about an intermediate section of said rear control arm portion rearwardly of said front end section thereof, an abutment carried by said rear control arm portion rearwardly of said intermediate section, an abutment carried by the rear end of said intermediate tubular portion, with said coil spring bearing against said abutments, a lower scoop-control arm assembly, both assemblies pivotally connected with said scoop, a rocker arm, and means pivotally connecting the assemblies with said rocker arm for reciprocation in opposite directions upon oscillation of said rocker arm; means for rocking said rocker arm in one direction, including a pressure fluid cylinder and a piston rod therefor, with said cylinder supported by one of said abutments and the piston rod operatively connected with the other abutment; means to rock said rocker arm in the opposite direction; a drum operatively secured to said rocker arm for rotation upon oscillation of said rocker arm, a flexible connection mounted upon said drum and a retraction coil spring secured at one end to said scoop and secured at its other end to said flexible connection; and means operatively connected with both of said assemblies to raise and lower said scoop.

4. In a material handler, a scoop; means for selectively maintaining the scoop in a scooping position, in a rearwardly-tilted position and in a forwardly-tilted position, including an upper scoop-control arm assembly, including a rear control arm portion, a front control arm portion and an intermediate tubular portion, with the front end section of said rear control arm portion slidably retained in said intermediate tubular portion and said front control arm portion fixedly secured to said intermediate tubular portion, an expansion coil spring about an intermediate section of said rear control arm portion rearwardly of said front end section thereof, an abutment carried by said rear control arm portion rearwardly of said intermediate section, an abutment carried by the rear end of said intermediate tubular portion, with said coil spring bearing against said abutments, a lower scoop-control arm assembly, both assemblies pivotally connected with said scoop, a rocker arm, and means pivotally connecting the assemblies with said rocker arm for reciprocation in opposite directions upon oscillation of said rocker arms; means for rocking said rocker arm in one direction, including a pressure fluid cylinder and a piston rod therefor with said cylinder supported by one of said abutments and the piston rod operatively connected with the other abutments; means to rock said rocker arm in the opposite direction; a drum operatively secured to said rocker arm for rotation upon oscillation of said rocker arm, a flexible connection mounted upon said drum and a retraction coil spring secured at one end to said scoop and secured at its other end to said flexible connection; means operatively connected with both of said assemblies to raise and lower said scoop, including a shaft, with said drum fixedly mounted thereon, a second drum fixedly mounted on said shaft, and a second flexible connection with one end portion thereof wound upon and secured to said second drum and secured, at its other end, to said lower scoop-control arm assembly; and means to alternately take in and pay out the intermediate portion of said second flexible connection.

5. In a material handler, a scoop, a support, means for selectively maintaining the scoop in a scooping position, in a rearwardly-tilted position and in a forwardly-tilted position, including an upper scoop-control arm assembly, including a rear control arm portion, a front control arm portion and an intermediate tubular portion, with the front section of said rear control arm portion slidably retained in said intermediate tubular portion and said front control arm portion fixedly secured to said intermediate tubular portion, an expansion coil spring about an intermediate section of said rear control arm portion rearwardly of said front end section thereof, an abutment carried by said rear control arm portion rearwardly of said intermediate section, an abutment carried by the rear end of said intermediate tubular portion, with said coil spring bearing against said abutments, a lower scoop-control arm assembly, both assemblies pivotally connected with said scoop, a rocker arm, and means pivotally connecting the assemblies with said rocker arm for reciprocation in opposite directions upon oscillation of said rocker arm; means for rocking said rocker arm in one direction, including a pressure fluid cylinder and a piston rod therefor, with said cylinder supported by one of said abutments and the piston rod operatively connected with the other abutment, a drum operatively secured to said rocker arm for rotation upon oscillation of said rocker arm, a flexible

connection mounted upon said drum and a retraction coil spring secured at one end to said scoop and secured at its other end to said flexible connection, means operatively connected with both of said assemblies to raise and lower said scoop, including a shaft, with said drum fixedly mounted thereon, a second drum fixedly mounted on said shaft, a block, a pair of idler pulleys rotatably mounted thereon, a second shaft with said block mounted upon said second shaft for oscillation, a third drum mounted upon said second shaft, a second flexible connection with one end portion thereof wound upon and secured to said second drum and its other end secured to said lower scoop-control arm assembly, said second flexible connection extending over and between said idler pulleys, and a third flexible connection with one end wound upon said third drum and secured thereto and its other end operatively connected with said support; and means to alternately take in and pay out the intermediate portion of said second flexible connection.

6. In a material handler, a scoop, a support, means for selectively maintaining the scoop in a scooping position, in a rearwardly-tilted position and in a forwardly-tilted position including an upper scoop-control arm assembly, including a rear control arm portion, a front control arm portion and an intermediate tubular portion, with the front end section of said rear control arm portion slidably retained in said intermediate tubular portion and said front control arm portion fixedly secured to said intermediate tubular portion, an expansion coil spring about an intermediate section of said rear control arm portion rearwardly of said front end section thereof, an abutment carried by said rear control arm portion rearwardly of said intermediate section, an abutment carried by the rear end of said intermediate tubular portion, with said coil spring bearing against said abutments, a lower scoop-control arm assembly, both assemblies pivotally connected with said scoop, a rocker arm, and means pivotally connecting the assemblies with said rocker arm for reciprocation in opposite directions upon oscillation of said rocker arm; means for rocking said rocker arm in one direction, including a pressure fluid cylinder and a piston rod thereof, with said cylinder supported by one of said abutments and the piston rod operatively connected with the other abutment, a drum operatively secured to said rocker arm for rotation upon oscillation of said rocker arm, a flexible connection mounted upon said drum and a retraction coil spring secured at one end to said scoop and secured at its other end to said flexible connection; means operatively connected with both of said assemblies to raise and lower said scoop, including a shaft, with said drum fixedly mounted thereon, a second drum fixedly mounted on said shaft, a block, a pair of idler pulleys rotatably mounted thereon, a second shaft with said block mounted upon said second shaft for oscillation, a third drum mounted upon said second shaft, a second flexible connection with one end portion thereof wound upon and secured to said second drum and its other end secured to said lower scoop-control arm assembly, said second flexible connection extending over and between said idler pulleys, a second contraction coil spring with one end thereof secured to said support forwardly of said block, and a third flexible connection with one end thereof wound about said third drum and secured thereto and its other end secured to the other end of said second contraction coil spring; and means to alternately take in and pay out the intermediate portion of said second flexible connection.

7. In a material handler, a scoop, a support, means for selectively maintaining the scoop in a scooping position, in a rearwardly-tilted position and in a forwardly-tilted position including an upper scoop-control arm assembly, including a rear control arm portion, a front control arm portion and an intermediate tubular portion, with the front end section of said rear control arm portion slidably retained in said intermediate tubular portion and said front control arm portion fixedly secured to said intermediate tubular portion, an expansion coil spring about an intermediate section of said rear control arm portion rearwardly of said front end section thereof, an abutment carried by said rear control arm portion rearwardly of said intermediate section, an abutment carried by the rear end of said intermediate tubular portion, with said coil spring bearing against said abutments, a lower scoop-control arm assembly, both assemblies pivotally connected with said scoop, a rocker arm, and means pivotally connecting the assemblies with said rocker arm for reciprocation in opposite directions upon oscillation of said rocker arm; means for rocking said rocker arm in one direction, including a pressure fluid cylinder and a piston rod therefor, with said cylinder supported by one of said abutments and the piston rod operatively connected with the other abutment, a drum operatively secured to said rocker arm for rotation upon oscillation of said rocker arm, a flexible connection mounted upon said drum and a retraction coil spring secured at one end to said scoop and secured at its other end to said flexible connection; means operatively connected with both of said assemblies to raise and lower said scoop, including a shaft, a second drum with said second drum fixedly mounted thereon, a pulley fixedly mounted on said shaft, a block, a pair of idler pulleys rotatably mounted thereon, a second shaft with said block mounted upon said second shaft for oscillation, a third drum mounted upon said second shaft, a second flexible connection with one end portion thereof wound upon and secured to said second drum, intermediate the length of said second flexible connection, and its other end secured to said lower scoop-control arm assembly, said second flexible connection having its direction of travel reversed at said second drum and extending therefrom over and between said idler pulleys, a fourth drum mounted upon said support, with an intermediatie portion of said second flexible connection wound thereupon, and a third flexible connection with one end wound upon said third drum and secured thereto and its other end operatively connected with said support.

8. In a material handler, a scoop, a support, means for selectively maintaining the scoop in a scooping position, in a rearwardly-tilted position and in a forwardly-tilted position including an upper scoop-control arm assembly, including a rear control arm portion, a front control arm portion and an intermediate tubular portion, with the front end section of said rear control arm portion slidably retained in said intermediate tubular portion and said front control arm portion fixedly secured to said intermediate tubular portion, an expansion coil spring about an intermediate section of said rear control arm portion

rearwardly of said front end section thereof, an abutment carried by said rear control arm portion rearwardly of said intermediate section, an abutment carried by the rear end of said intermediate tubular portion, with said coil spring bearing against said abutments, a lower scoop-control arm assembly, both assemblies pivotally connected with said scoop, a rocker arm, and means pivotally connecting the assemblies with said rocker arm for reciprocation in opposite directions upon oscillation of said rocker arm; means for rocking said rocker arm in one direction, including a pressure fluid cylinder and a piston rod therefor, with said cylinder supported by one of said abutments and the piston rod operatively connected wtih the other abutment, a drum operatively secured to said rocker arm for rotation upon oscillation of said rocker arm, a flexible connection mounted upon said drum and a retraction coil spring secured at one end to said scoop and secured at its other end to said flexible connection; means operatively connected with both of said assemblies to raise and lower said scoop, including a shaft, with said drum fixedly mounted thereon, a second drum fixedly mounted on said shaft, a block, a pair of idler pulleys rotatably mounted thereon, a shaft with said block mounted upon said second named shaft for oscillation, a third drum mounted upon said second-named shaft, a second flexible connection with one end portion thereof wound upon and secured to said second drum, intermediate the length of said second flexible connection, and its other end secured to said lower scoop-control arm assembly, said second flexible connection having its direction of travel reversed at said second drum and extending therefrom over and between said idler pulleys, a fourth drum mounted upon said support, with an intermediate portion of said second flexible connection wound thereupon, a second contraction coil spring with one end thereof secured to said support forwardly of said block, and a third flexible connection with one end thereof wound about said third drum and secured thereto and its other end secured to the other end of said second contraction coil spring.

9. In a material handler, a scoop, a support, means for selectively maintaining the scoop in a scooping position, in a rearwardly-tilted position and in a forwardly-tilted position including an upper scoop-control arm assembly, including a rear control arm portion, a front control arm portion and an intermediate tubular portion, with the front end section of said rear control arm portion slidably retained in said intermediate tubular portion and said front control arm portion fixedly secured to said intermediate tubular portion, an expansion coil spring about an intermediate section of said rear control arm portion rearwardly of said front end section thereof, an abutment carried by said rear control arm portion rearwardly of said intermediate section, an abutment carried by the rear end of said intermediate tubular portion, with said coil spring bearing against said abutments, a lower scoop-control arm assembly, both assemblies pivotally connected with said scoop, a rocker arm, and means pivotally connecting the assemblies with said rocker arm for reciprocation in opposite directions upon oscillation of said rocker arm; means for rocking said rocker arm in one direction, including a pressure fluid cylinder and a piston rod therefor, with said cylinder supported by one of said abutments and the piston rod operatively connected with the other abutment, a drum operatively secured to said rocker arm for rotation upon oscillation of said rocker arm, a flexible connection mounted upon said drum and a retraction coil spring secured at one end to said scoop and secured at its other end to said flexible connection; means operatively connected with both of said assemblies to raise and lower said scoop, including a shaft, with said drum fixedly mounted thereon, a second drum fixedly mounted on said shaft, a block, a pair of idler pulleys rotatably mounted thereon, a shaft with said block mounted upon said second named shaft for oscillation, a third drum mounted upon said second-named shaft, a second flexible connection with one end portion thereof wound upon and secured to said second drum, intermediate the length of said second flexible connection, and its other end secured to said lower scoop-control arm assembly, said second flexible connection having its direction of travel reversed at said second drum and extending therefrom over and between said idler pulleys, a fourth drum mounted upon said support, with an intermediate portion of said second flexible connection wound thereupon, said block and third drum being disposed intermediate said second and fourth drums, a second contraction coil spring with one end thereof secured to said support forwardly of said block, and a third flexible connection with one end thereof wound about said third drum and secured thereto and its other end secured to the other end of said second contraction coil spring.

10. In a material handler, a scoop, a support, means for selectively maintaining the scoop in a scooping position, in a rearwardly-tilted position and in a forwardly-tilted position including an upper scoop-control arm assembly, including a rear control arm portion, a front control arm portion and an intermediate tubular portion, with the front end section of said rear control arm portion slidably retained in said intermediate tubular portion and said front control arm portion fixedly secured to said intermediate tubular portion, an expansion coil spring about an intermediate section of said rear control arm portion rearwardly of said front end section thereof, an abutment carried by said rear control arm portion rearwardly of said intermediate section, an abutment carried by the rear end of said intermediate tubular portion, with said coil spring bearing against said abutments, a lower scoop-control arm assembly, both assemblies pivotally connected with said scoop, a rocker arm, and means pivotally connecting the assemblies with said rocker arm for reciprocation in opposite directions upon oscillation of said rocker arm; means for rocking said rocker arm in one direction, including a pressure fluid cylinder and a piston rod therefor, with said cylinder supported by one of said abutments and the piston rod operatively connected with the other abutment, a drum operatively secured to said rocker arm for rotation upon oscillation of said rocker arm, a flexible connection mounted upon said drum and a retraction coil spring secured at one end to said scoop and secured at its other end to said flexible connection; means operatively connected with both of said assemblies to raise and lower said scoop, including a shaft, with said drum fixedly mounted thereon, a second drum fixedly mounted on said shaft, a block, a pair of idler pulleys rotatably mounted thereon, a shaft with said block mounted upon said second named shaft

for oscillation, a third drum mounted upon said second-named shaft, a second flexible connection with one end portion thereof wound upon and secured to said second drum, intermediate the length of said second flexible connection, and its other end secured to said lower scoop-control arm assembly, said second flexible connection having its direction of travel reversed at said second drum and extending therefrom over and between said idler pulleys, a fourth drum mounted upon said support, with an intermediate portion of said second flexible connection wound thereupon, said block and third drum being disposed intermediate said second and fourth drums, and said second flexible connection being secured to said fourth drum, whereby, as said fourth drum rotates in one direction, additional turns of said second flexible connection will form thereupon and as said fourth drum rotates in the other direction, turns of said second flexible connection will unwind from said fourth drum, a second contraction coil spring with one end thereof secured to said support forwardly of said block, and a third flexible connection with one end thereof wound about said third drum and secured thereto and its other end secured to the other end of said second contraction coil spring.

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The following references are of record in the file of this patent:

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