

Feb. 27, 1951

E. M. WAGSTAFF
DUMPING BODY HOIST

2,543,210

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3 Sheets-Sheet 1

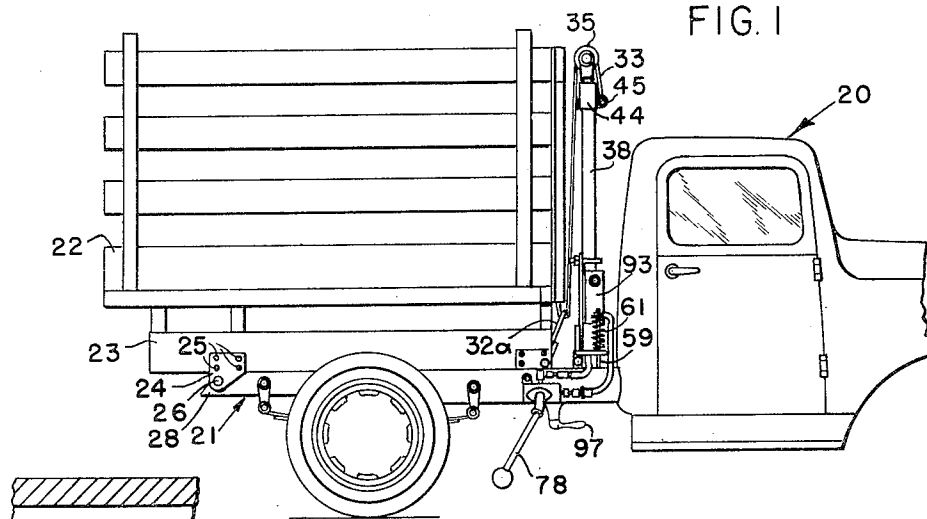
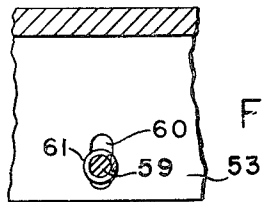


FIG. II

FIG. 2

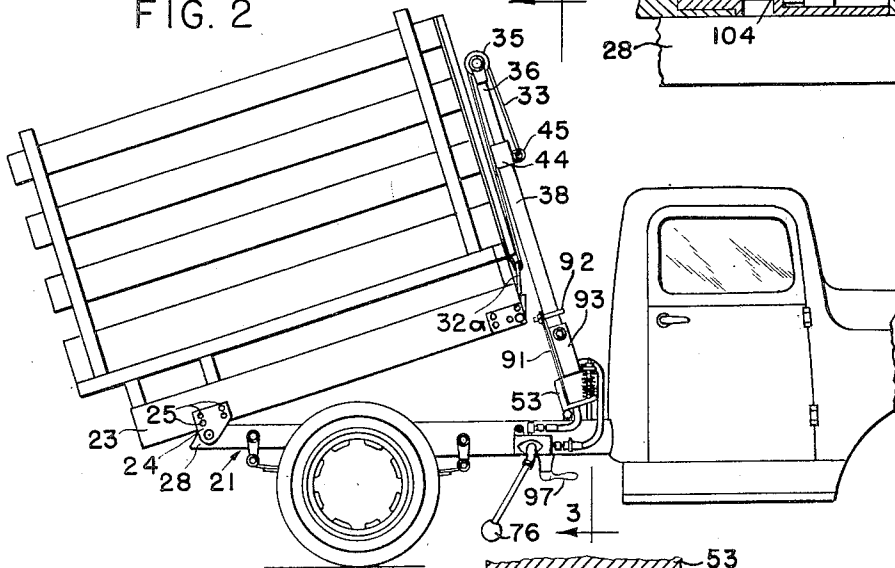


FIG. 8

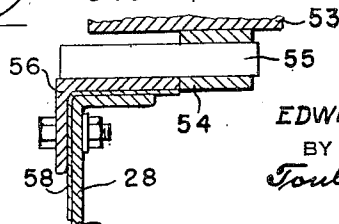
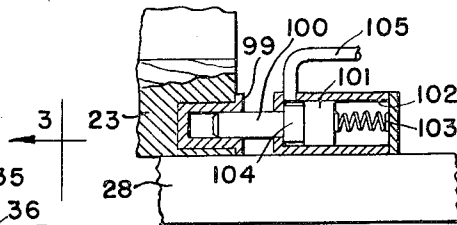


FIG. 10



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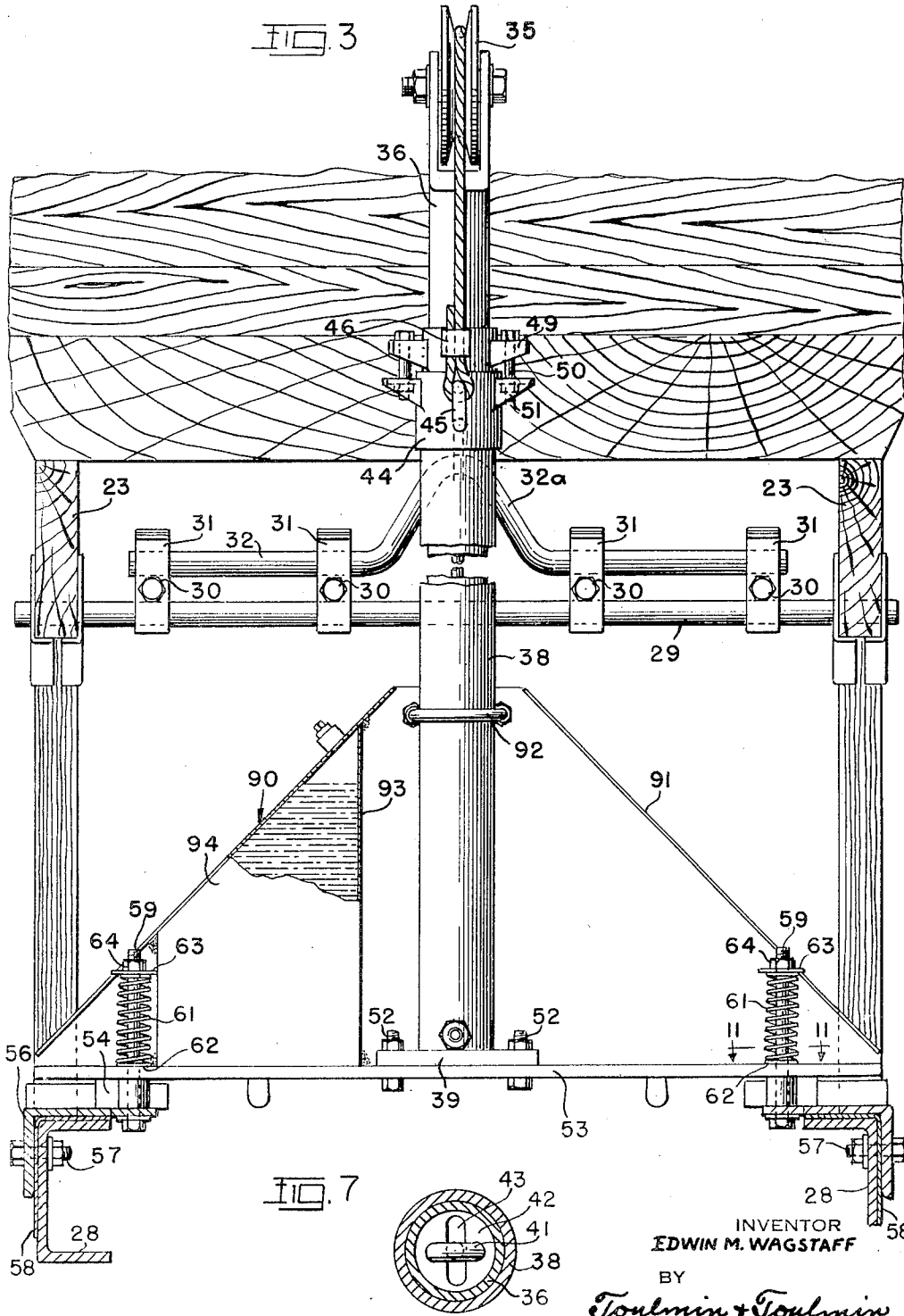
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3 Sheets-Sheet 2



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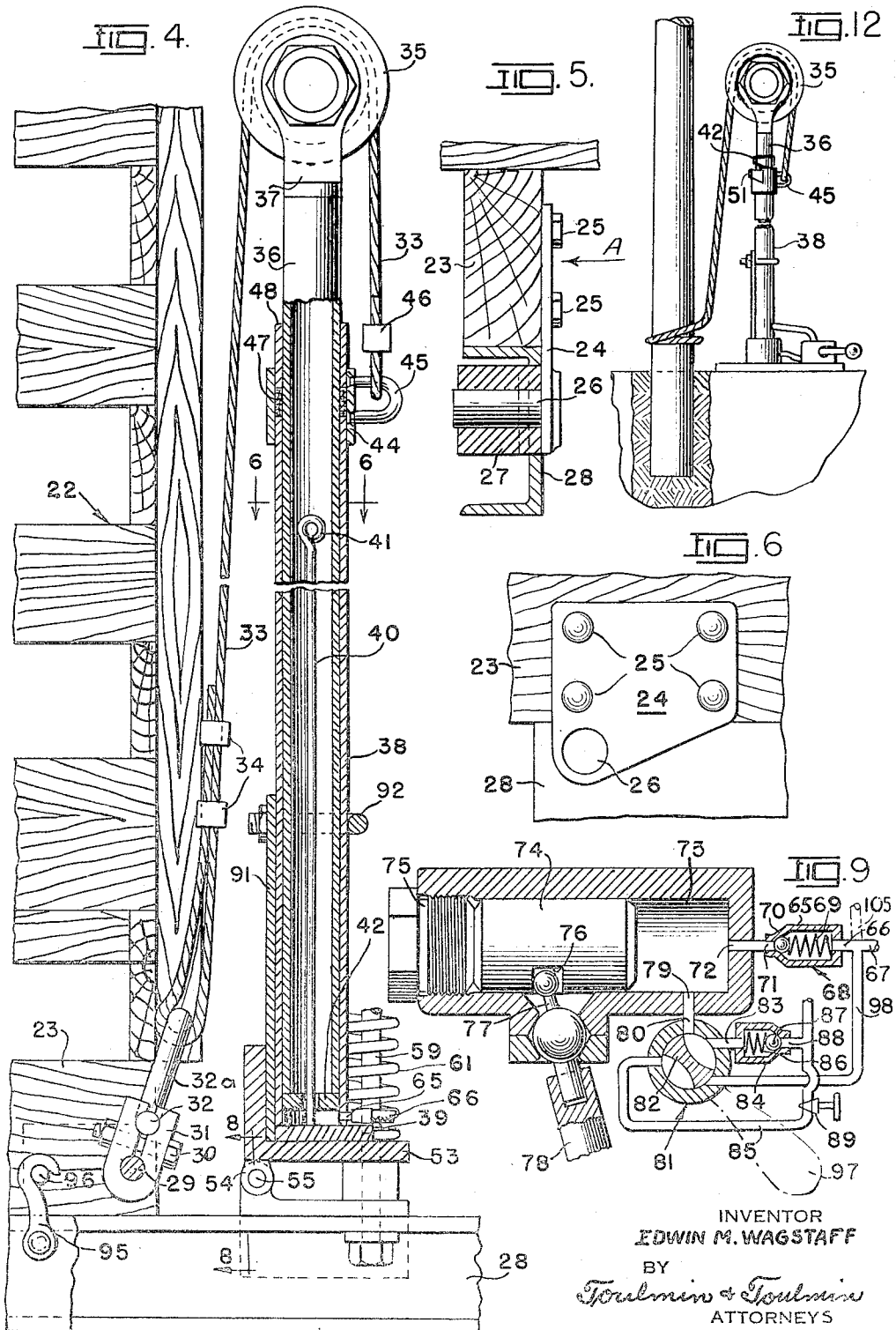
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UNITED STATES PATENT OFFICE

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DUMPING BODY HOIST

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2 Claims. (Cl. 298—22)

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The present invention relates to lifting devices and, more particularly, to hoists, especially for use in connection with vehicles.

It is an object of the invention to provide a hoist which is of a sturdy construction, simple in design, easy to handle and adapted to be used for various purposes.

It is another object of this invention to provide a hoist which can easily be connected with vehicles to facilitate the unloading thereof.

It is also an object of the invention to provide a hoist which can easily be hooked up with trailers or trucks in such a manner as to transform the same into dump trucks.

A still further object of the invention consists in the provision of a hoist as set forth above, which employs a hydraulic medium and can be worked by hand.

These and other objects and advantages of the invention will appear more clearly from the following description in connection with the accompanying drawings, in which:

Figure 1 illustrates a hoist according to the invention as applied to a truck.

Figure 2 shows the arrangement of Figure 1 in operation.

Figure 3 is a view and partially a section along the line 3—3 of Figure 2.

Figure 4 is a partial section through the hoist according to the invention.

Figure 5 illustrates a possible connection between the vehicle body and the chassis of the vehicle when the hoist is applied to the body of the vehicle.

Figure 6 shows the detail of Figure 5 seen in the direction of the arrow A.

Figure 7 is a section along the line 6—6 of Figure 4.

Figure 8 is a section along the line 8—8 of Figure 4 and illustrates a possible pivotal connection of the hoist with the chassis.

Figure 9 is a section through a pump arranged for use in connection with a hoist according to the invention.

Figure 10 represents an automatic locking and unlocking device for use in connection with Figure 1 for automatically locking the vehicle to and unlocking it from the chassis.

Figure 11 is a section along the line 11—11 of Figure 3.

Figure 12 illustrates a hoist according to the invention being used for pulling poles out of the ground.

General outline

In general, the hoist, according to the invention, consists of a fluid operable cylinder piston assembly, one stationary element of which has connected thereto one end of a cable, which passes over a pulley carried by a movable element of said cylinder piston assembly, while the other

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end of the cable is connected to the object to be lifted. A tank containing fluid as, for instance, oil, is preferably arranged in the immediate vicinity of the cylinder piston assembly, while a manually operable pump and valve are provided for supplying fluid from the tank into the cylinder piston assembly and allowing the fluid to empty from the fluid piston assembly into the tank.

The arrangement can easily be mounted on a vehicle such as a truck for converting the latter into a dump truck. To this end, one end of the vehicle body, preferably the rear end, is pivotally connected to the chassis of the vehicle, while the other end of the vehicle body, preferably the front end, is connected to one end of the cable pertaining to the hoist. The hoist itself is mounted on the chassis. Operation of the hoist will then lift the adjacent end of the truck body. When the truck body, after the dumping operation is completed, is returned to its normal position, a locking device preferably locks the truck body to the chassis so that the truck body cannot swing up and down when the truck is moving empty over bumpy roads.

Structural arrangement

Referring now to the drawings and Figures 1 and 2 thereof in particular, these figures illustrate a truck, generally designated 20, comprising a chassis 21 and a truck body 22. The truck body 22 has the rear end of its sills 23 connected to a plate 24, for instance, by means of screws 25. This plate is provided with a pivot or stud 26 pivotally mounted in a bearing 27 supported by and connected to the adjacent channel 28 of the chassis. In this way the rear end of the truck body is pivotally connected to the chassis 21. The front end of the sills 23 is provided with a rod 29 having clamped thereto, by means of screws 30, a plurality of clamping elements 31. Pivotally supported by the clamping elements 31 is a yoke or rod 32 with a cranked portion 32a around which one end of a cable or rope 33 is passed. Clamping elements 34 hold the free end of the cable clamped so as to prevent its slipping away from the yoke 32.

The cable 33 is passed over a pulley 35 which is rotatably supported by a tubular or hollow cylindrical element. The tubular member 36 is closed adjacent its upper end by a disc 37 preferably welded to the tubular member 36 and constituting the effective piston area for the tubular member 36. The tubular member 36 is slidably mounted in a tube or hollow cylinder 38 which is rigidly mounted on and preferably welded to a ground plate 39. The ground plate 39 has rigidly connected thereto, in any convenient manner, a rod 40 with a bent portion or eyelet 41 at the upper end thereof. The bent portion 41 constitutes an abutment for engag-

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ing a slotted plate 42 connected to the bottom of the cylindrical member 36 to limit the maximum upward movement of the cylindrical member 36. As will be seen from Figure 7, the plate 42 is provided with a slot 43 adapted to allow passage of the bent portion 41 therethrough to allow the assembly of the hoist. Once the cylindrical member 36 has been passed over the rod 40, it is rotated by 90° so that it will be in the position indicated in Figure 7. The cylindrical member 36 has connected thereto, in any convenient manner, for instance, by welding, a sleeve 44 which carries rigidly connected thereto a loop or eyelet forming member 45 through which the other end of the cable 33 is passed. This end is prevented, by clamping member 46, from slipping away from the eyelet 45. Interposed between the tubular member 36 and the sleeve 44 is sealing material 47 compressed by a gland 48. The gland 48 is provided with bosses 49 through which screws 50 pass, which engage similar bosses 51 on the sleeve 44. The sealing material 47 prevents any leakage of fluid between the tubular member 36 and the hollow cylinder 38. It will be clear that, once the tubular member 36 is assembled in the hollow cylinder 38 in proper position in regard to the latter, and, once the cable 33 has its ends connected to the eyelet 45 and the yoke 32, the tubular member 36 cannot turn relative to the hollow cylinder 38 so that the bent portion 41 cannot pass through the longitudinal slot 43.

The ground plate 39 of the cylinder piston assembly 36, 38 is connected, in any convenient manner, for instance, by screws 52, to a supporting plate 53. This plate 53 is provided with eyes 54 through which pivots 55 pass which are connected preferably by welding to angles 56. The angles 53 are connected to the channels 28 by means of bolts 57; preferably shims 58 are interposed between the angles 56 and the channels 28. Each of the angles 56 has rigidly connected thereto a bolt 59 which passes through a slot 60 (see Figure 11) and is surrounded by a spring 61. The lower end of the spring 61 engages a washer 62 supported by the plate 53, whereas the upper end of the spring 61 engages a washer 63 held in its respective position by a nut 64. It will be clear that the slots 60 allow tilting of the cylinder piston assembly 36, 38 about the pivots 55 without affecting the action of the springs 61 which continuously tend to hold the cylinder piston assembly 36, 38 in upright position.

The lower end of the hollow cylinder 38 is provided with a port 65 which communicates through a conduit 66 with a conduit 67 (see Figure 9). The conduit 67 leads to a check valve, generally designated 68, comprising a spring 69 which continuously urges a ball 70 to close the port 71. The port 71 communicates through a conduit 72 with a cylinder bore 73 having reciprocally mounted therein a plunger 74. The leftward movement of the plunger 74, as viewed in Figure 9, is limited by an adjustable nut 75. The plunger 74 has a recess 76 engaged by a ball-shaped portion of a lever 77 which lever is provided with a handle 78 to allow manual operation of the plunger 74. The cylinder bore 73 with the plunger 74 constitutes a pump. The cylinder bore 73 is provided with a port 79 which communicates through a conduit 80 with a valve generally designated 81. The valve 81 is provided with a manually operable valve member 82 adapted selectively to effect communication be-

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tween the conduit 80 and a conduit 83, leading to a check valve 84, or between the conduit 80 and the conduit 85. The check valve 84 comprises a spring 86 continuously urging a ball 87 into position for closing the valve port 88. The valve port 88 communicates with the conduit 85 which contains an adjustable choke 89. The conduit 85 leads to a tank generally designated 90. This tank or fluid reservoir contains the actuating fluid, such as oil, for operation of the cylinder piston assembly 36, 38. The tank 90 is formed by a portion of the brace 91, connected to the cylinder 38 by means of a clamping ring 92, and is also formed by plates 93 and 94.

According to the arrangement shown in Figure 4, the channels 28 have connected thereto hooks 95 (one only being shown), each of which is adapted to engage a stud 96 at the adjacent end of the sills 23. In this way, the hooks 95 will hold the truck body properly clamped or locked to the chassis when the hoist is not operated for lifting or tilting the truck body.

Operation.

It may now be assumed that the truck body occupies the position shown in Figure 1 and that it is desired to tilt the truck body in order to unload the truck. To this end, the operator detaches the hooks 95 from the studs 96 and then by operation of the handle 97 moves the valve member 82 into the position shown in Figure 9. Thereupon, the operator moves the handle 78 back and forth, thereby reciprocating the plunger 74. By movement of the plunger 74 toward the left, as viewed in Figure 9, a suction is created in the cylinder bore 73 so that fluid from the tank or reservoir 90 will pass through conduit 85, check valve 84, conduit 83 and conduit 80 into the cylinder bore 73. When the plunger 74 now moves toward the right with regard to the showing in Figure 9, the fluid in the cylinder bore 73 is put under pressure, thereby causing the bore 86 to close its port 88 while the bore 70 opens against the thrust of the spring 69 and allows the fluid to escape from the cylinder bore 73 through conduit 67 and conduit 66 into the cylinder 38. From the cylinders 38 the fluid passes through the slot 60 into the tubular member 36 and acts upon the disc 37 and thus begins to lift the tubular member 36 together with the pulley 35. This, in turn, causes lifting of the yoke 32 and thereby also causes the adjacent end of the truck body to tilt about the pivots 26. Continuing the reciprocation of the plunger 74 will cause the cylindrical member 36 to rise to a pre-determined maximum height determined by the abutment of the bent portion 41 of the rod 40 against the plate 42, thereby tilting the truck body and unloading the same. While the cylindrical member 36 is being lifted, the cylinder 36 tilts about the pivots 55 as illustrated in Figure 2.

If it is now desired to return the truck body into its Figure 1 position, it is merely necessary to actuate the valve handle 97 so as to shift the valve member 82 by 90° in one or the other direction with regard to Figure 9. When the valve member 82 has thus been adjusted, communication between the conduits 80 and 83 is interrupted, while communication is effected between the conduit 85 and the conduit leading from the valve 81 to the conduit 67. Consequently, the fluid in the cylinder piston assembly 36, 38 can now escape through conduits 66, 67, 93 and 85 into the tank 90, and is caused to do so by the weight of the cylindrical member 36 and the

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weight of the truck body. The rate at which the cylindrical member 36 and, therefore, also the truck body, are turned to their Figure 1 position, is controlled by the adjustable choke 89. When the truck body has completely returned to its Figure 1 position, the hooks 95 may again be actuated for engaging the studs 96.

If desired, the hooks 95 and studs 96 may be replaced by a construction shown in Figure 10. According to this construction, the sills 23 are provided with a socket 99 adapted to be engaged by a bolt 100 when the truck body is in its Figure 1 position. The bolt 100 has connected thereto a piston 101 reciprocally mounted in a cylinder bore 102. The cylinder bore 102 houses a spring 103 which continuously urges the piston 101 leftwardly as viewed in Figure 10 to thereby cause the bolt 100 to engage the socket 99. The piston 101 is provided with an abutment portion 104 limiting the leftward movement of the piston 101. The cylinder bore 102 is provided with a conduit 105 leading to the conduit 67 (see Figure 9). Therefore, as soon as the plunger 74 is actuated for pumping fluid into the cylinder piston assembly 36, 38, fluid from the conduit 67 will also enter the cylinder bore 102, thus causing the plunger 101 to move toward the right with regard to Figure 10, thereby automatically causing the locking bolt to withdraw from the socket 99. The truck body is then free to tilt about the pivots 26 as described above.

While the invention has been described for use in connection with vehicles to convert normal vehicles, such as trucks into dump trucks, it is of course understood that the invention is by no means limited to this particular field. For instance, if desired, the hoist, according to the invention, may be mounted on an independent unit and can be used for pulling posts out of the ground as shown in Figure 12.

It is also understood that the present invention is by no means limited to the particular construction shown in the drawings but also embraces any modifications within the scope of the appended claims.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A hoist comprising in combination, a vehicle including a chassis, cylinder means pivotally connected to said chassis to allow tilting movement of said cylinder means relative to said chassis, a vehicle body, hinge means hinging one end of said vehicle body to said chassis for allowing tilting of said vehicle body relative to said chassis, a yoke tiltably connected to the other end of said vehicle

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body, plunger means reciprocally mounted in said cylinder means, roller means rotatably supported by said plunger means, cable or rope means passing over said roller means and having one end connected to said cylinder means while the other end of said cable or rope means is connected to said yoke, coil spring means associated with said cylinder means and arranged on one side only of a longitudinal plane of symmetry passing through said cylinder means for continuously urging said cylinder means into its upright position, means associated with said coil spring means for limiting the deflection of said coil spring means, and means for selectively supplying actuating fluid to and exhausting actuating fluid from said cylinder means.

2. In combination, a vehicle including a chassis and a vehicle body, means tiltably connecting one end of said vehicle body with said chassis, yoke means tiltably connected to the other end of said vehicle body, a cylinder hinged to said chassis adjacent said other end of said vehicle body to allow tilting movement of said cylinder relative to said chassis, a plunger reciprocable in said cylinder and being formed of a tubular member open at its bottom and closed at its top, a pulley rotatably mounted on top of said plunger, cable or rope means passing over said pulley and having one end thereof connected to said cylinder while the other end of said cable or rope means is connected to said yoke means, means for selectively supplying actuating fluid to an exhausting actuating fluid from said cylinder, and locking means adapted automatically to lock the vehicle body to the chassis when the vehicle body is in its normal or non-tilted position, said locking means having associated therewith fluid operable means hydraulically connected with said cylinder for hydraulically unlocking said vehicle body from said chassis in response to the admission of actuating fluid to said cylinder.

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