May 17, 1932. P. S. WOOD ET AL 1,858,797

MANUAL HYDRAULIC HOIST

Filed Nov. 25, 1929 4 Sheets-Sheet 1

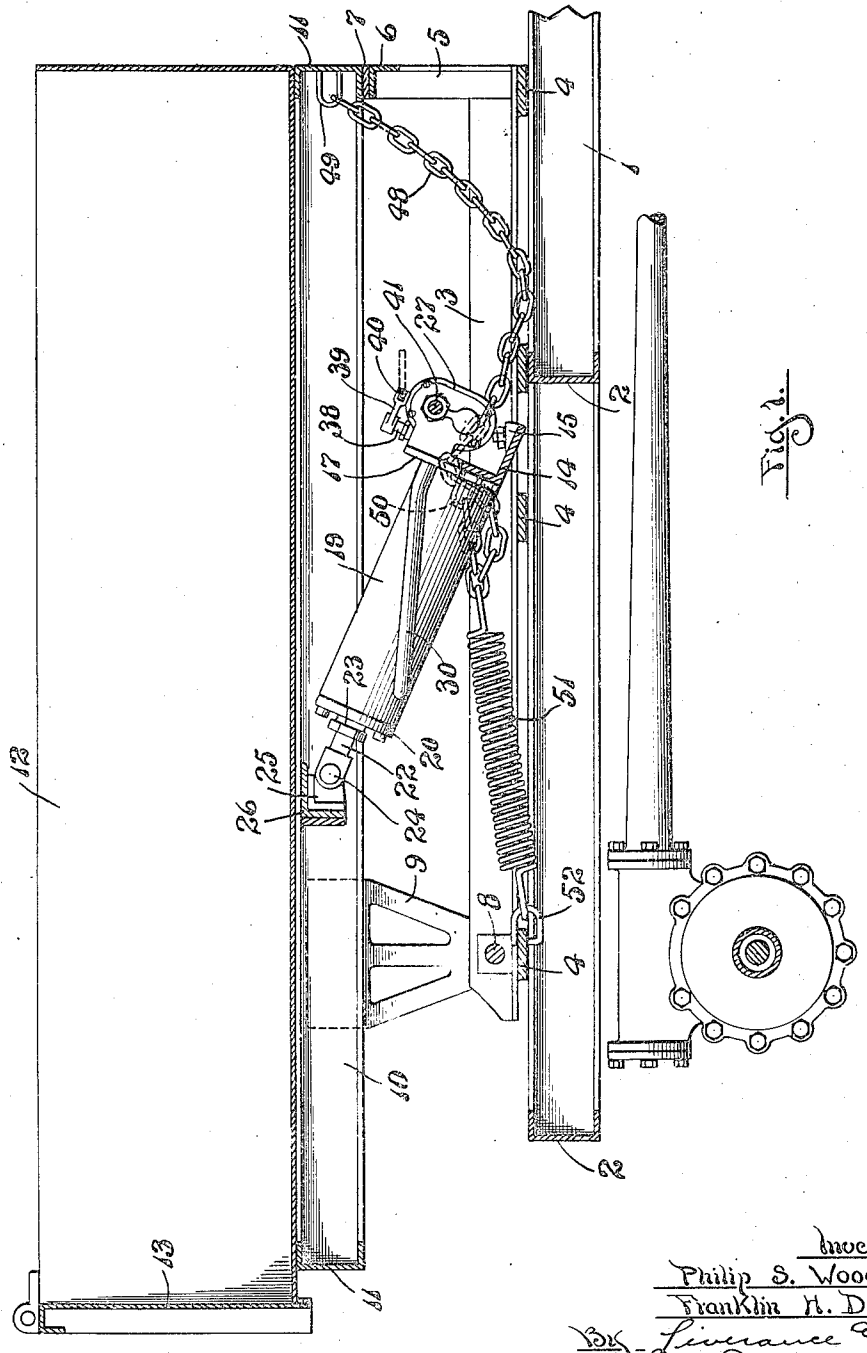

Fig. 1.

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MANUAL HYDRAULIC HOIST

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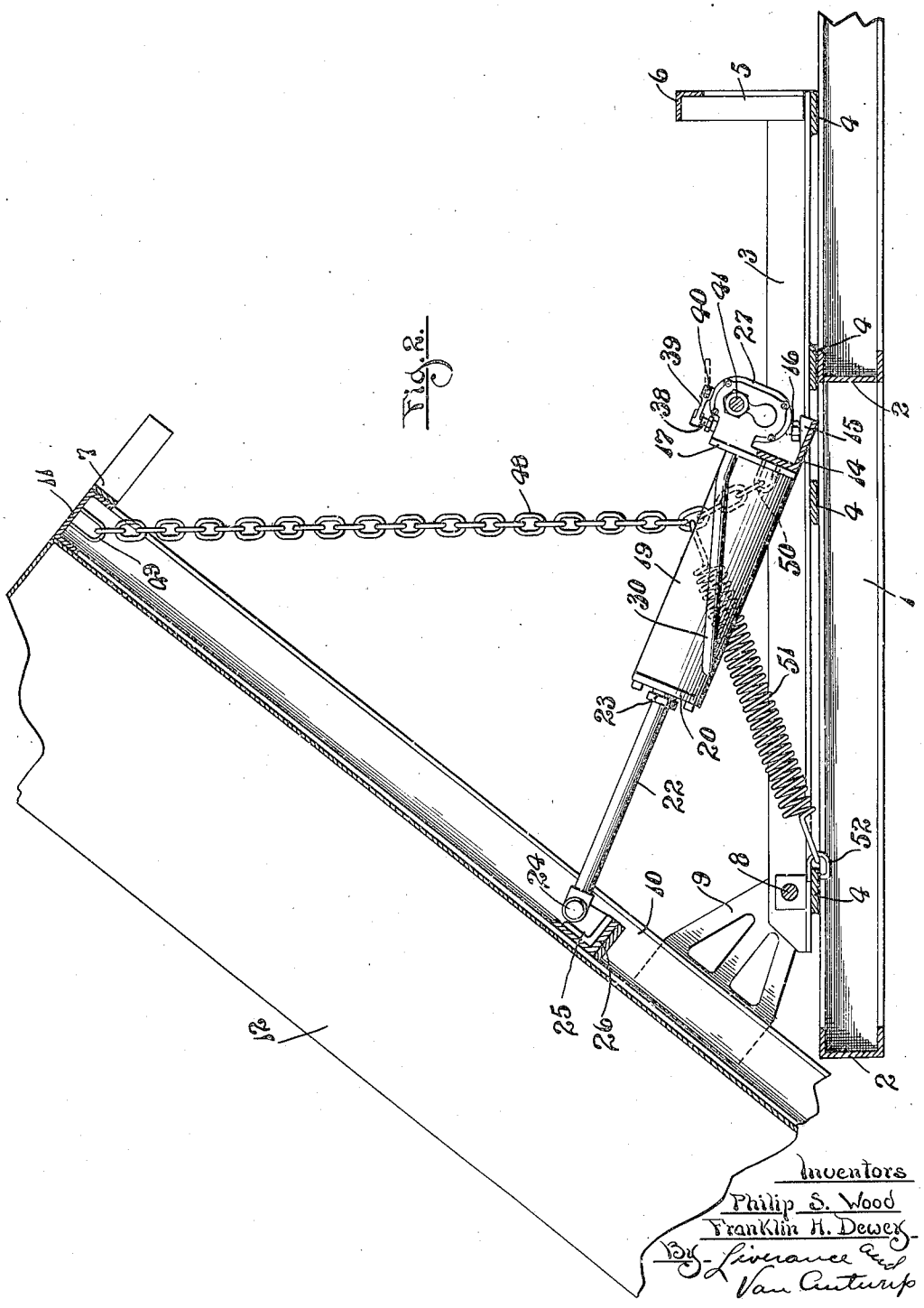
Fig. 2.



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MANUAL HYDRAULIC HOIST

Filed Nov. 25, 1929 4 Sheets-Sheet 3

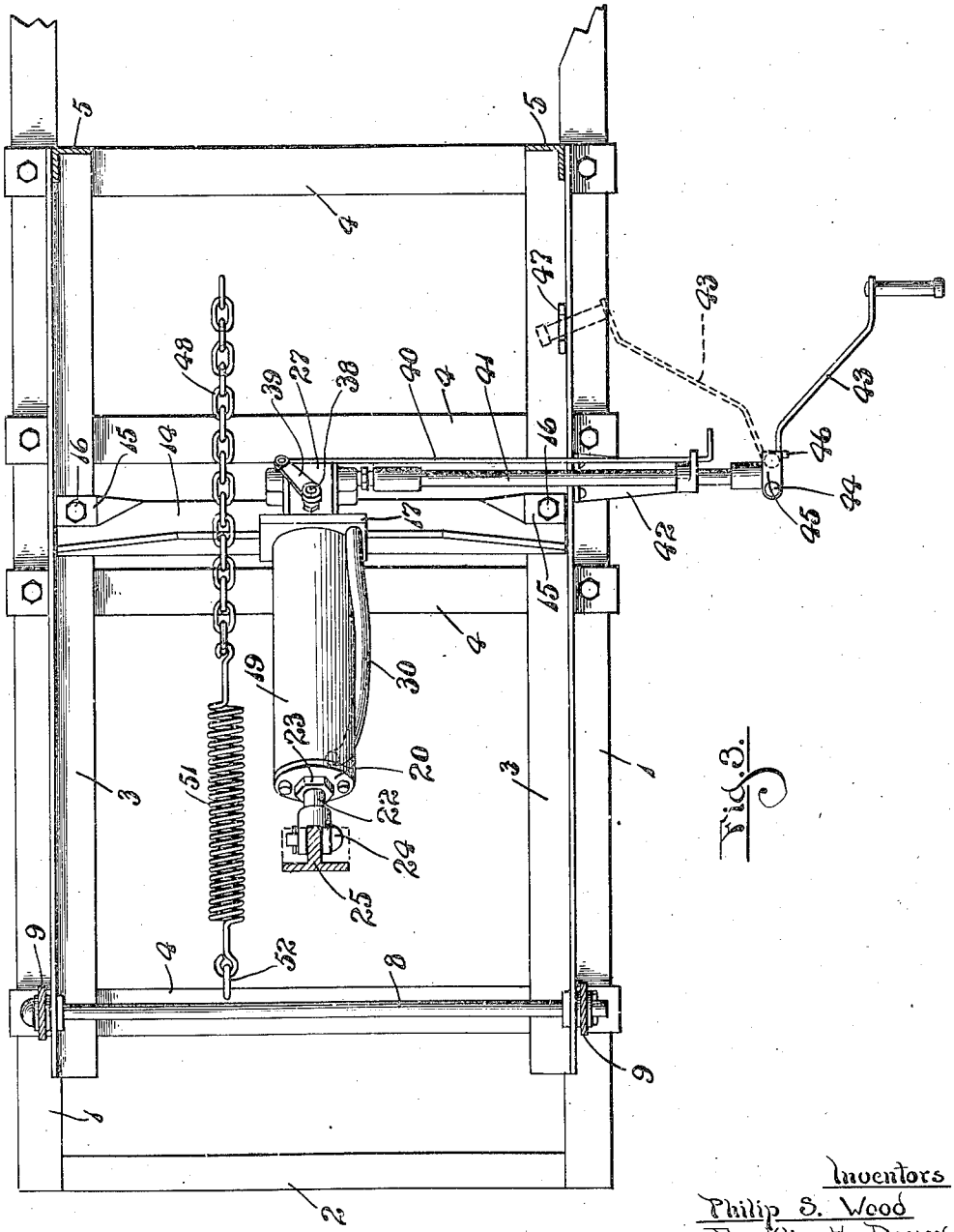

Fig. 3.

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MANUAL HYDRAULIC HOIST

Filed Nov. 25, 1929 4 Sheets-Sheet 4

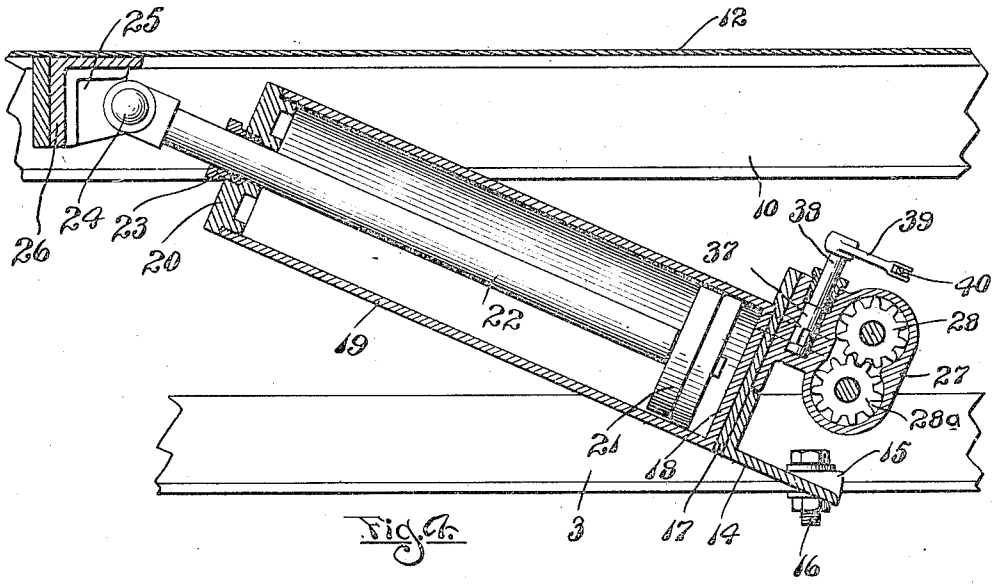

Fig. 4.

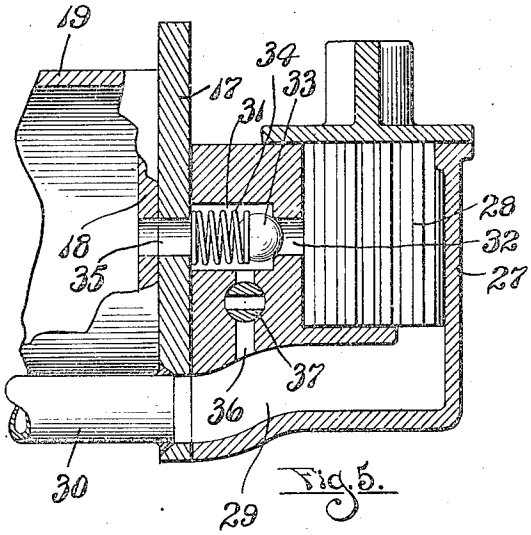

Fig. 5.

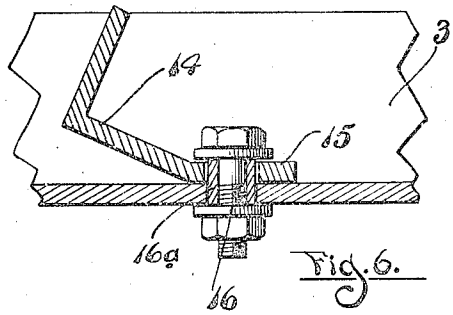

Fig. 6.

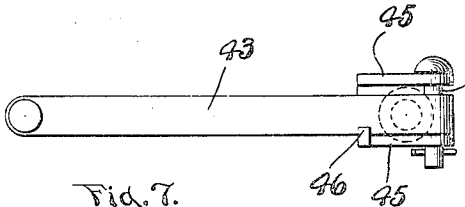

Fig. 7.

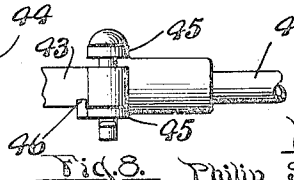

Fig. 8.

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UNITED STATES PATENT OFFICE

PHILIP S. WOOD AND FRANKLIN H. DEWEY, OF DETROIT, MICHIGAN, ASSIGNORS TO WOOD HYDRAULIC HOIST & BODY CO., OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN

MANUAL HYDRAULIC HOIST

Application filed November 25, 1929. Serial No. 409,512.

This invention relates to dumping hoists and is more particularly concerned with a manually operable hydraulic hoist for dumping bodies of relatively small capacity and in which it is not economical or necessary to supply the body with a more expensive engine operated hydraulic hoist.

The present invention is adapted for application to bodies which can carry in the neighborhood of two tons contents, though this limit of weight contents is in no sense a rigid one and the hoist is operable for heavier weights. With the present invention, however, a body carrying two tons or less in weight may be very quickly, easily, and readily dumped through manual operation of the hydraulic hoisting apparatus and without the undue expenditure of energy by the one operating the hoist.

It is a primary object and purpose of the present invention to provide a very practical, efficient and commercially proven manually operable hydraulic hoist body dumping apparatus which may be manufactured as a unit and applied by mere attachment to and above the motor vehicle chassis on which it is to be carried. A further object of the invention is to provide the construction with many novel combinations and arrangement of parts for effective attainment of the hoisting of the dumping body and for returning the body to its lower position automatically upon release of the hydraulic pressure.

Other objects and purposes than those stated will appear upon an understanding of the invention had from the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a longitudinal vertical section and side elevation showing a dumping body and the manually operable hoisting mechanism of our invention as a unit located above and attached to the chassis of a motor vehicle, the body being in horizontal position.

Fig. 2 is a similar view illustrating the body tilted to its extreme dumping position.

Fig. 3 is a plan view, partly in section, of the hoisting unit, the body being removed from such view.

Fig. 4 is a fragmentary enlarged longitudinal vertical section through the hoisting cylinder and a pump associated therewith and showing the means of mounting the cylinder on the base of the unit and connecting the piston rod to the bottom of the body.

Fig. 5 is a fragmentary horizontal section through the pump and the adjacent end of the cylinder associated therewith.

Fig. 6 is a fragmentary vertical section enlarged, showing the connection used for mounting the supporting bar for the cylinder to permit a limited tilting or angular movement of the hydraulic cylinder.

Fig. 7 is an end elevation showing the crank handle for manually operating the pump in its operative position, and

Fig. 8 is a fragmentary end elevation thereof.

Like reference characters refer to like parts in the different figures of the drawings.

The chassis frame upon which the dumping unit is to be mounted may be of any conventional construction having side chassis channel frame members 1 connected by a plurality of cross channels 2 in the usual manner. This frame requires no alteration in any respect in applying the dumping body unit of our invention thereto except a boring of the necessary holes in the flanges of the side members to bolt the unit in place.

The hydraulic dumping body unit in its construction includes a base frame comprising two parallel side bars 3 of angle form which are spaced apart from each other and are located above and near the ends of a plurality of flat bars 4 which are attached to and extend across underneath them, and it is through the end portions of the bars 4 that the bolts are passed to bolt the same to the chassis side frame members 1 in connecting the unit to the chassis frame, as fully shown in Fig. 3. At the front end of the base two vertical posts 5 are permanently secured which are connected by a horizontal cross member 6 at their upper ends, the posts 5 and the cross member 6 together being of inverted U-shape. Over this front support a U-shaped co-acting guide 7 at the bottom of and extending below the body supporting frame near its front end is adapted to engage when

the body is in or near to its lowermost position.

A rod 8 passes through the vertical flanges of the angle bars 3 near their rear ends, on which two supporting brackets 9 are pivotally mounted one near each end of the rod. The brackets 9 in turn are permanently secured at their upper ends to horizontal longitudinal sills 10 which, with cross members 11, as shown, form a supporting frame for the body 12 located thereabove. The body 12 is of any conventional form, preferably of sheet metal having a bottom, sides and front end and a rear tail gate 13 pivotally suspended from its upper edge so as to open outwardly at its lower portion when the body is tilted upwardly about the axis of the rod 8.

A cross supporting bar 14 of angle form extends between the side members 3 of the base. This bar 14 is of angle form in cross section having a downwardly and forwardly extending lower leg and an upwardly and forwardly extending upper leg and the ends of the lower leg are pressed to provide horizontal portions 15 which extend over the horizontal flanges of the side bars 3. Bolts 16 pass through said horizontal portions and flanges first going through collars 16*a* (see Fig. 6) which are longer than the combined thickness of the leg 14 and the horizontal flange of the side member 3, while the opening through the part 15 of member 14 is of greater diameter than the exterior diameter of the collar. This permits a certain leeway of the movement of the cross angle bar 14 so that it may tilt up or down a limited distance.

A plate 17 is permanently secured to the upwardly and forwardly extending ledge of the supporting angle bar 14 to which the lower end 18 of a hydraulic cylinder 19 is permanently connected. This cylinder extends to the rear and upwardly from the plate 17 with its axis at right angles to the plane of the plate and its rear end is closed by a suitable head 20. A piston 21 having opposed cup leathers thereon is located in the cylinder and is secured to a piston rod 22 which passes to the rear and upwardly through a suitable opening in the head 20 and there is the usual and conventional packing at 23 to prevent escape of oil used in the cylinder around the piston rod.

The piston rod 22 at its rear end carries a forked member which is pivotally connected at 24 to a bracket 25 in turn permanently secured to an angle cross bar 26 located at the underside of the body between the longitudinal sills 10 of the body supporting frame.

A pump casing or housing 27 is attached to the plate 17 noted, above the supporting cross bar 14 and has a pumping mechanism therein including two spur gears 28 and 28*a* in mesh, the chamber in which they are located joining with a passage 29 in the pump casing (see Fig. 5) with which a pipe 30 is joined at one end. The other end of the pipe leads to the rear and upwardly and connects with the cylinder 19 so as to make a passage between that part of the cylinder above the piston 21 with the gear chamber.

A valve chamber 31 made in the pump casing between the gear chamber and the lower end of the cylinder is connected with the gear chamber by a smaller passage 32 which is normally closed by a ball valve 33 held in place by the spring 34 shown in Fig. 5; and a like passage 35 leads from the opposite end of the valve chamber 31 through the plate 17 and the bottom 18 of the cylinder as shown. A by-pass passage 36 connects the valve chamber 31 and the passage 29 previously described in which a cylindrical valve 37 is mounted for rotation about its longitudinal axis. The valve 37 has a passage diametrically therethrough which when turned to one position joins with the by-pass 36 but when turned at right angles, as shown in Fig. 5, closes the by-pass, as is evident. From the cylindrical valve 37 a stem 38 extends upwardly above the pump casing to the upper end of which an arm 39 is attached, it having a rod 40 secured thereto at its free end. The rod 40 extends horizontally outward to a side of the unit and is turned at right angles whereby it may be readily engaged by the hand to turn the valve 37 to its operative or inoperative position.

A horizontal shaft 41 is connected with the gear 28 and extends outwardly in parallelism with the rod 40 being supported, together with said rod 40, at its outer end portion, by a bracket 42 fixed to the adjacent side member 3 of the base frame of the unit construction. A crank 43 is mounted at the outer end of the rod 41 on a vertical pin 44 which extends between upper and lower flanges 45 on a fixture attached to the outer end of the shaft 41 the distance between said flanges being greater than the width of the crank 43. The lower flange 45 has an upturned lip 46 to engage with the crank 43 when it is in position as shown in Fig. 7 so that the shaft may be readily turned, or the crank may be turned inwardly to the dotted line position shown in Fig. 3 so that the handle at the outer end of the crank may be engaged with a catch 47 to hold it when it is not being used.

A chain 48 is secured at one end to a staple 49 which in turn is permanently attached to the front cross member 11 of the body carrying frame. At its other end the chain is connected by a like staple 50 on the bar 14. A heavy coil spring 51 at one end is connected by a suitable link 52 with the rear cross bar of the base frame of the unit, while the other end of the spring is connected with a link of the chain 48 a short distance from the staple 50, as best shown in Fig. 2.

In the horizontal position of the body, as shown in Fig. 1, the U-shaped engaging mem-

ber 7 sets over the inverted U-shaped support made of the posts 5 and the upper cross bar 6. The handle 43 is turned inward to the dotted line position shown in Fig. 3. The body may be loaded and then carried by the truck to the place where it is to be dumped. The dumping is accomplished by merely moving the handle 43 outward to its operative position as shown in full lines in Fig. 3 and turning the valve 37 across the by-pass 36 as shown in Fig. 5 if it is not already in such position, and then operating the crank 43. Oil with which the cylinder, the pipe 30 and the passages and chambers in the pump casing is filled is forced by the gear pump past the valve 33 into the lower end of the cylinder against the piston while the oil above the piston is carried through the pipe 30 to the gear chamber and in this manner the piston 21 and the piston rod 22 are moved upward with a consequent upward tilting of the body about the rod 8. The tilting movement is continued as long as the shaft 41 is turned by the crank. In the later stages of tilting movement of the body the chain 48 has all its slack taken up and as it is drawn toward a straight position the spring 51 is stretched.

To return the body to lower position it is necessary to pull upon the rod 40 to turn the valve from the position shown in Fig. 5 through 90° to bring its passage in alignment with the by-pass 36, whereupon spring 51 aided by gravity causes the oil below the piston 21 to pass through the passage 35, chamber 31 and by-pass 36 and thence through the pipe 30 to the cylinder above the piston. The force of the spring 51 at the beginning of the movement is largest and at that time serves to start the body on its return movement which otherwise might not occur if gravity alone was relied upon.

The construction described is in commercial use and has proved particularly satisfactory for trucks carrying relatively light loads although a load equal to two tons or over can be very readily and easily handled and dumped with this apparatus by reason of the hydraulic hoisting unit used. The body may be mounted together with a hydraulic cylinder piston structure upon the frame of the unit and the entire unit manufactured and assembled at the factory and when sold may be sent complete to the destination for attachment to the chassis truck frame, this being very quickly and easily accomplished. The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

We claim:

1. A dumping body comprising a frame, a body pivoted thereto, a cross bar extending between and connected to opposed sides of the frame and mounted thereon for free limited tilting movement, a hydraulic cylinder connected to and extending upwardly and to the rear from the cross bar, a piston within the cylinder, a piston rod extending from the piston beyond the rear end of the cylinder, means pivotally connecting the rear end of the piston rod to the underside of the body, a pump at the front end of said cylinder for pumping oil into said end, means for taking oil from the upper end portion of the cylinder during the pumping operation, and a horizontal shaft extending from said pump adapted to be manually turned to operate the pump, said shaft extending at right angles from the cylinder to a side of the unit for access for manual operation.

2. In a hydraulic dumping body apparatus the combination of a tiltably mounted body, a frame supporting the body, a cross bar rockably mounted on said frame, a hydraulic cylinder mounted on said cross bar and connected with the body by means of a piston rod attached to a piston within said cylinder, a pump for pumping oil into the lower end of the cylinder and taking it from the upper end thereof, means for mounting said pump on the said cross bar, manually operable means for operating said pump at a side of the body, a by-pass and valve for releasing the liquid pumped into the lower end of the cylinder, and manually operable means for turning said valve operable at one side of the body.

In testimony whereof we affix our signatures.

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FRANKLIN H. DEWEY.