Dec. 7, 1926. 1,610,066

J. M. MEYERS

TRUCK HOIST MECHANISM

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Fig. 3

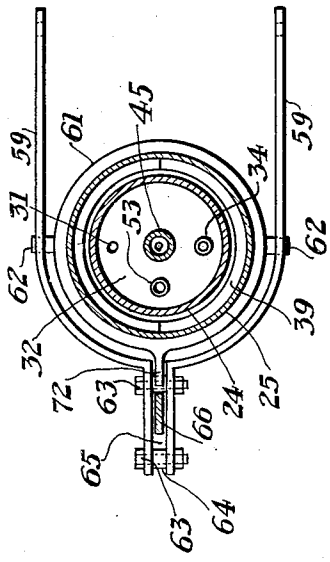


Fig. 1

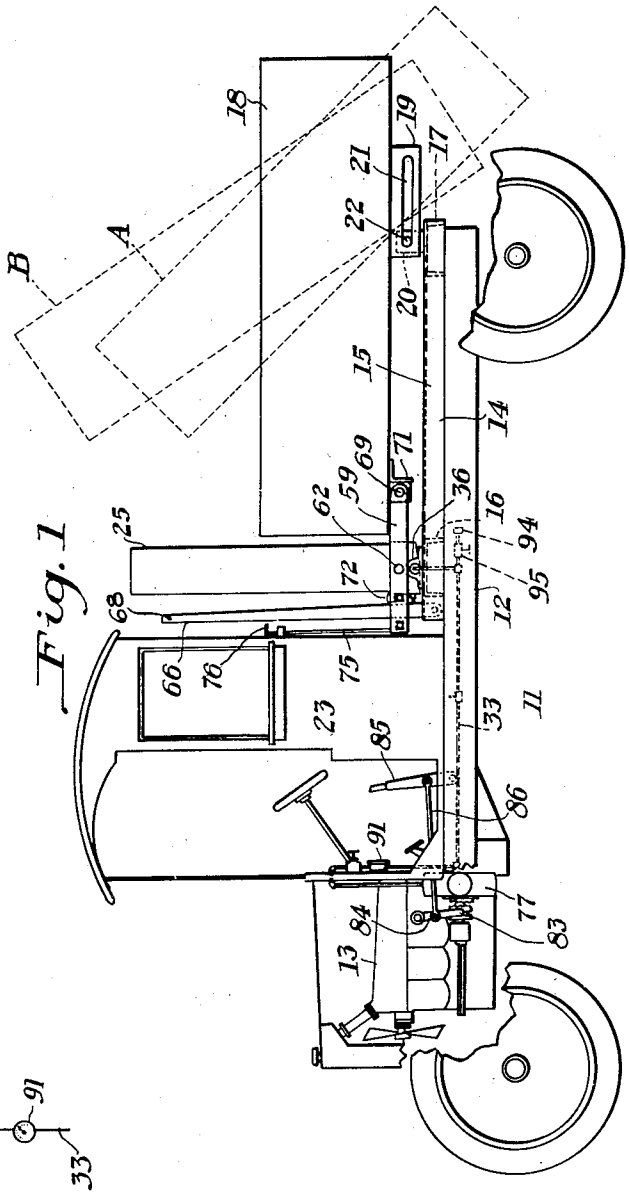
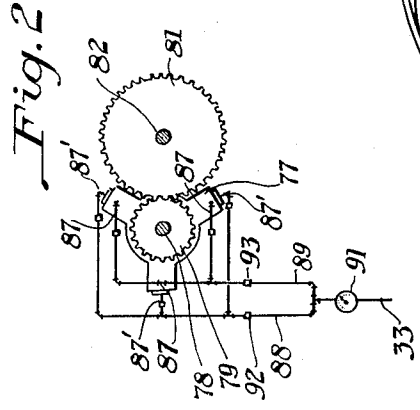


Fig. 2



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Fig. 4

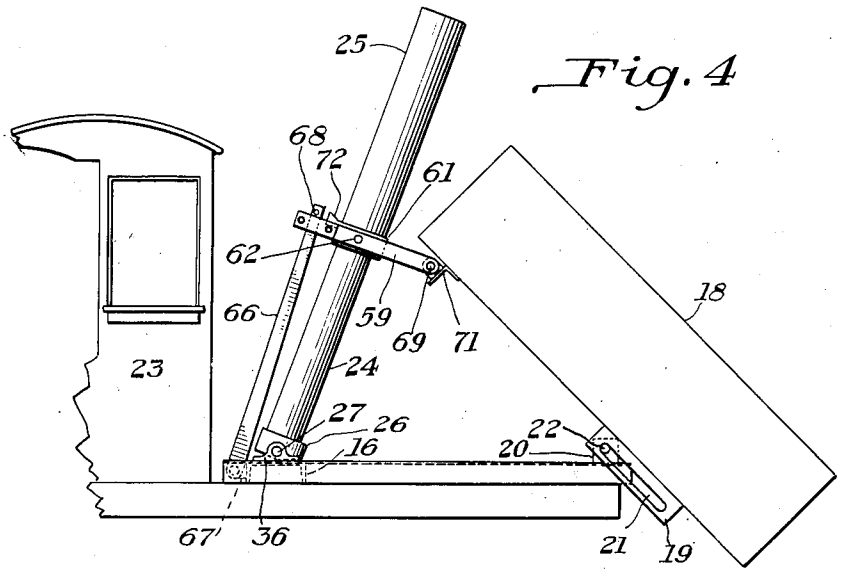
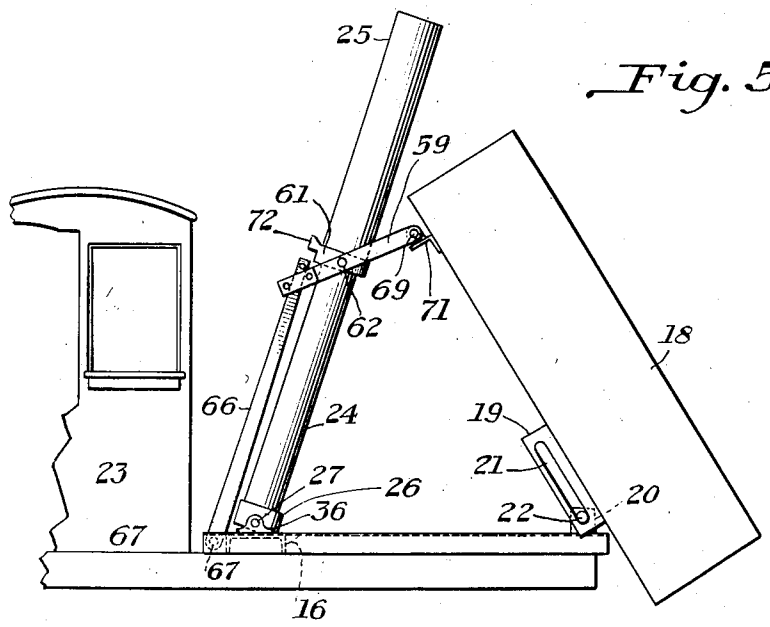


Fig. 5



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Fig. 8

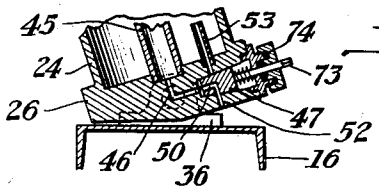


Fig. 6

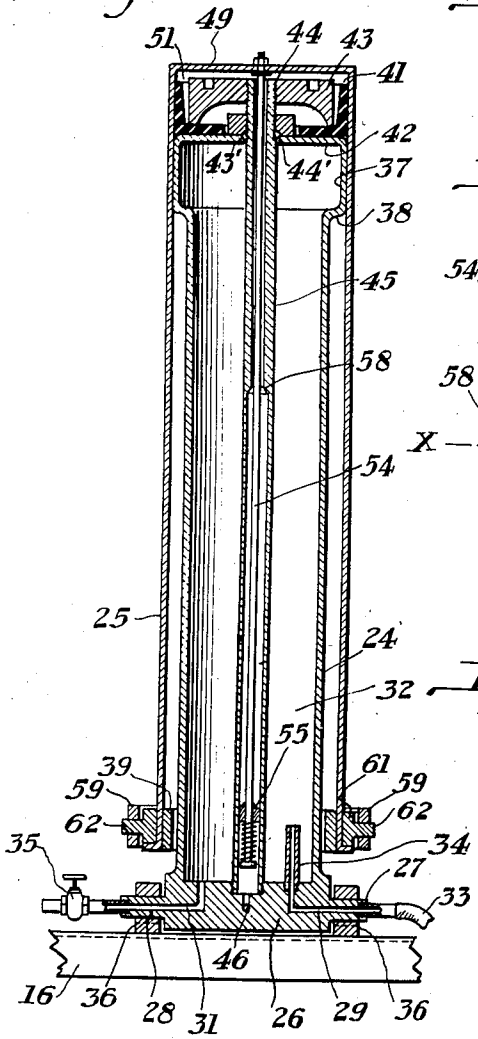


Fig. 7

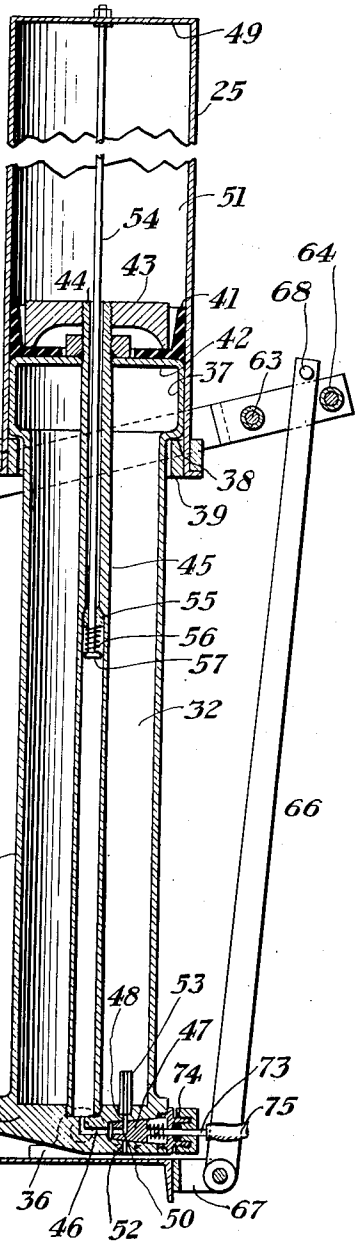


Fig. 9

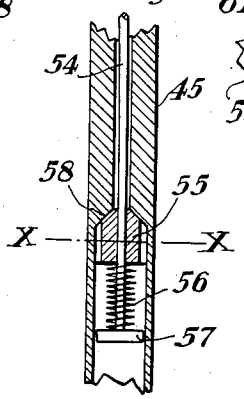
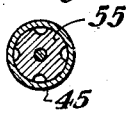


Fig. 10



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UNITED STATES PATENT OFFICE.

JOHN M. MEYERS, OF PITTSBURGH, PENNSYLVANIA.

TRUCK HOIST MECHANISM.

Application filed November 25, 1922. Serial No. 603,240.

My invention relates to truck hoist mechanism and particularly to mechanism for raising the bed or body of the truck to dumping position.

One object of my invention is to provide a dumping hoist for trucks that is actuated by compressed air or gases.

Another object of my invention is to provide a dumping hoist device for trucks that tilts the bed of the truck for the purpose of dumping the contents thereof out of the rear end of the bed and which raises the bed bodily clear of the discharged material, thereby obviating the usual necessity of moving the truck and bed free of the discharged material in order to permit all material to fall from the bed.

Another object of my invention is to provide a hoist mechanism, having the above characteristics, wherein the storage tank for the compressed air or gases serves as a piston for the hoist and wherein a movable cylinder cooperates with the piston for moving the bed of the truck.

Another object of my invention is to provide a compressed air or gas hoist mechanism for trucks that is controlled by simple valve mechanism and which is comprised of a minimum number of inexpensive parts that may be readily assembled or disassembled for the purpose of inspection and repair.

Another object of my invention is to provide a dumping hoist that includes in the hoist mechanism a storage tank for air or gases that may be charged from a rotary pump driven from the truck engine, and which may supply compressed air to the pump for starting the engine or to branch tubes for the purpose of inflating tires of the truck.

Another object of my invention is to provide a compressed air or gas actuated dumping hoist for trucks with a rotary pump that is so connected to the truck engine and the storage tank of the hoist that the pump may serve as a charging compressor for the air or gas or as a starting motor actuated by air or gas from the storage tank.

A further object of my invention is to provide apparatus having the above characteristics that is simple, durable, effective and inexpensive to manufacture.

These and other objects, that will be made apparent throughout the further description of my invention, are attained by means of the apparatus herein described, and illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevational view of a dump truck having hoist and gas compressor mechanism thereon embodying features of my invention;

Fig. 2 is a diagrammatic illustration of the pump mechanism shown in Fig. 1;

Fig. 3 is a transverse sectional view of the hoist mechanism;

Figs. 4 and 5 are side elevational views of a fragment of the truck showing, respectively, the tilted and completely elevated positions of the truck bed;

Fig. 6 is a vertical section through the hoist cylinders, taken on a line normal to the longitudinal axis of the truck;

Fig. 7 is a vertical section through the hoist cylinders, taken on a plane normal to the plane of the section shown in Fig. 6;

Fig. 8 is a fragmental vertical section similar to that of Fig. 7, showing the plug valve in air-exhausting position;

Fig. 9 is a fragmental vertical section of valve mechanism shown in Figs. 6 and 7, and

Fig. 10 is a transverse section of the valve mechanism, taken on the line X—X of Fig. 9.

Referring to the drawings, and particularly to Fig. 1, the apparatus includes an automobile truck 11 having the usual frame 12 and internal combustion engine 13 carried thereon. An auxiliary frame 14 is mounted on the frame 12 that is fabricated of longitudinal angle bars 15 and transverse channel bars 16 and 17. Brackets 20 are mounted upon the bar 17 and the truck bed or box 18 is pivotally attached thereto by means of a pair of brackets 19 having slots 21 therein and a pivot bar 22 that extends across the bed from one bracket to the other. By reason of the pivoted and lost-motion connection of the truck bed to the frame, the bed may be tilted to the position A, indicated in dotted lines in Fig. 1, for dumping the contents of the bed out of the rear open end thereof and may subsequently be elevated bodily to the position B, indicated in dotted lines in Fig. 1, wherein the bed is raised clear of the pile of discharged material, thus obviating the necessity of moving the truck to clear the bed of the pile of material in order to permit the discharge of all of the contents of the bed.

The hoist mechanism for tilting and ele-

vating the truck is disposed between the driver's seat or cab 23 and the front end of the truck bed or box 18. The hoist mechanism herein illustrated is similar in certain characteristics to hoist devices fully illustrated and described in my Letters Patents of the United States No. 1,223,712, issued April 24, 1917, No. 1,286,051, issued November 26, 1918, and No. 1,324,842, issued December 16, 1919. Referring particularly to Figs. 1, 4, 5, 6 and 7, the hoist apparatus includes a drawn metal cylindrical reservoir 24 which serves the dual purpose of a storage reservoir for compressed air or gases and of a piston for the metal hoist cylinder 25 that telescopes over the reservoir piston 24 in the manner indicated in Figs. 6 and 7.

The lower head 26 of the reservoir 24 is provided with oppositely disposed tubular projections 27 and 28 having passages 29 and 31, respectively, (see Fig. 6) which communicate with the chamber 32 of the reservoir 24. The passage 29 communicates with a conduit 33 that is connected to the compressor pump to be hereinafter described. A tube 34, which is a continuation of the passage 29, extends upwardly into the reservoir 24 above the head 26 and serves to prevent the discharge of oil and other foreign substances through the passage 29 when air or gas is discharged from the reservoir for actuating the air compressor pump when the latter is used as a starter for the engine in a manner to be hereinafter described. The passage 31 is closed by a manually-operable valve 35 and is provided for the purpose of discharging to the atmosphere any accumulated deposits of oil or foreign substances within the reservoir.

The projections 27 and 28 are trunnioned within bearing blocks 36 that are secured to the channel bar 16 and permit of rotary movement of the reservoir 24. The upper end of the reservoir is provided with an enlarged portion 37 which provides a stop shoulder 38 which is engaged by a stop ring 39 on the interior of the lifting cylinder 25 for limiting upward movement of the cylinder.

A packing washer or cup 41, made of leather or other packing material, is secured to the upper head 42 of the reservoir 24 by a block 43 that is threaded upon the projecting end 44 of the central air tube 45 that is threaded into the lower head 26 and closes the upper head 42 by engagement of a tapered shoulder 43' with a tapered opening 44' in the head 42. The tube 45 communicates with an air or gas supply passage 46 in the head 26 that is controlled by a plug valve 47 (Fig. 7) that serves to control the passage of air of gas from the chamber 32 of the reservoir, through a passage 48, to the tube 45 which communicates with the space between the reservoir head 42 and the head 49 of the cylinder 25. When the valve 47 is in the position indicated in Fig. 7, air or gas is discharged from the chamber 32, through the valve and passage 46, to the tube 45 and thence to the cylinder chamber 51, causing the cylinder to move upwardly.

When the valve 47 is in the reverse position indicated in Fig. 8, the air or gas within the cylinder chamber 51 is discharged to the atmosphere through the tube 45, passage 46, valve passage 50 of the plug 47 and exhaust passage 52. It will be apparent that the cylinder 25 may be stopped in any desired position when raising or lowering by simply turning the valve 47 ninety degrees from either of the positions indicated in Figs. 7 and 8 and thereby closing the passages 48 and 46. The passage 48 is provided with a tube 53 for preventing the discharge of oil and foreign substances accumulating in the chamber 32 into the cylinder chamber 51.

In order to automatically shut off the supply of air or gas to the chamber 51 before the stop ring 39 actually engages the shoulder 38 for the purpose of providing a cushioning effect and preventing undue shock, the cylinder 25 is provided with a valve stem 54 that extends into the tube 45 and which carries a valve 55 yieldingly and slidably supported upon a helical spring 56 disposed between the valve 55 and a head 57 on the stem 54. The valve 55 engages a seat 58 in the tube 45 and shuts off the supply of air to the chamber 51 before the ring 39 engages the shoulder 38. The head 57 of the stem 54 may be threaded upon the stem and may therefore be adjusted to close the air supply at any desired point, thereby making it possible to arrest upward movement of the cylinder at predetermined positions depending upon the load on the cylinder and pressure within the chamber 32. The valve 55 is shown in closed position in Fig. 9.

Referring to Figs. 3, 4 and 5, it will be seen that the lifting cylinder 25 is connected to the front end of the bed or box 18 by means of a floating lever or yoke 59 that is pivoted intermediate its ends to a ring 61 by pins 62 that may be forged integral with the ring 61. The yoke 59 comprises two flat metal bars that are clamped together by bolts 63 with spacers 64 disposed therebetween to provide a space 65 between them through which a pivoted tie rod 66 extends.

The tie rod 66 is pivotally mounted in a bracket 67 that is secured to the channel bar 16 and is provided with a stop pin 68 for limiting upward movement of the floating bar 59. The widely separated ends of the floating lever bars constituting the yoke 59 are pivoted to the front end of the truck by means of a pivot shaft 69 that is rotatably mounted in brackets 71 secured to the underside of the bed or box 18. Clockwise ro-

tation of the yoke 59 is prevented by a stop 72 on the ring 61 that engages the spacer 64 on one of the bolts 63.

When the bed is in normal position, the parts of the hoist occupy the positions indicated in Fig. 1. When the air or gas is supplied to the cylinder chamber 51 in the manner previously described, the cylinder 25 is raised carrying with it the floating lever 59 and the front end of the bed or box 18. The initial movement of the cylinder 25 tilts the truck bed to the position indicated in Fig. 4, the bed pivoting about the shaft 22. Further upward movement of the cylinder causes the link 59 to engage the pin 68 on the tie rod 66. The yoke 59 then fulcrums on the pin 68 and is rotated thereabout to the position indicated in Fig. 5, lifting the bed 18 bodily clear of the pile of material previously discharged by the initial tilting movement. The slot 21 in the bracket 19 serves as a guide for the rear end of the truck bed.

By reason of the construction wherein the bed is raised clear of the discharged material, it is unnecessary to move the truck in order to permit all of the material to be discharged. Time is therefore saved in the dumping operation, and there is no danger of the bed being damaged by material lodging beneath the bed and in the path of forward movement of the truck.

After the load has been dumped, the bed is returned to its normal position by turning the valve plug 47 to the position indicated in Fig. 8, wherein the escape of air or gas from the chamber 51 is permitted through the passage tube 45 and passage 52 to the atmosphere. The valve plug 47 is provided with a stem 73 that extends through a packing gland 74 and which is connected to a flexible shaft 75 that leads to a convenient point near the driver's seat and terminates in a handle 76.

It is old in the art to connect an air compressor to an internal combustion engine for the purpose of storing compressed air in a reservoir, the air being subsequently returned to the compressor in such manner as to convert the latter into a compressed air motor for starting the engine. It is a purpose of my invention, however, to provide a storage tank for the compressed air or gases that serves as a piston for a cylindrical hoist and from which compressed air may be supplied for the purpose of either operating the lifting cylinder or for operating the compressor as an engine-starting motor and suitable valves are supplied within easy reach of the operator for controlling the charging and discharging of the hoist reservoir to obtain desired operations.

Referring to Figs. 1 and 2, it will be seen that a triple cylinder, combined air compressor and motor 77 is mounted adjacent the engine 13 and the compressor shaft 78 is provided with a gear 79 that meshes with a toothed flywheel gear 81 mounted upon the engine shaft 82. The gear 79 is adapted to be connected to, or disconnected from, the compressor shaft 78 by means of a clutch 83 that is actuated by a lever 84 pivoted to the truck frame and which is moved by a pivoted operating lever 85 that is connected thereto by a link 86. The compressor 77 may therefore be connected to, or disconnected from, the motor by moving the operating lever 85.

The tube 33, which communicates with the reservoir chamber 32 is connected to two sets of ports 87′ and 87 of the compressor cylinders by tubes 88 and 89, respectively, (see Fig. 2) and a pressure gauge 91 is placed in the tube 33. The tubes 88 and 89 are controlled by valves 92 and 93, respectively, for controlling the passage of fluid to and from the compressor 77 or reservoir chamber 32. When the valve 92 is open and valve 93 closed, compressed air is discharged from the ports 87′ to the reservoir 32 and, when the valve 93 is open and the valve 92 closed, air is discharged from the chamber 32 to ports 87, causing the compressor to be actuated thereby as an engine starting motor. When the engine has been started, the valve 93 is closed by the operator and the clutch 83 actuated to disconnect the compressor until such time as it becomes necessary to recharge the reservoir. To charge the reservoir 32, the clutch 83 is actuated to connect the compressor to the motor and the valve 92 is opened. When the gauge 91 indicates that the desired pressure has been obtained within the chamber 32, the clutch is released and the valve 92 closed. In place of valves 92 and 93, a single three-way plug valve may be connected to the tubes 33, 88 and 89. I make no claim to the type of compressor or its manner of connection to the combustion engine and, therefore, make no attempt to describe in detail such parts as are well known in the art.

Compressed air may be supplied from the reservoir chamber 32 for inflating the truck tires and, for this purpose, an extension 94 of the tube 33 is provided for attaching a flexible hose, not shown. A valve 95 controls the delivery of air to the tires.

While I have shown a combined storage reservoir and hoist adapted to be operated by compressed air supplied by a combined motor and compressor, it is obvious that the hoist may be actuated by compressed gases supplied directly from the engine cylinders or from other sources.

While I have described and illustrated but one embodiment of my invention, it will be apparent to those skilled in the art that various changes, modifications, substitutions, additions and omissions may be made there-

in without departing from the spirit and scope of my invention, as set forth in the appended claims.

I claim as my invention:

1. A dump truck comprising a truck frame member, a bed member, a bracket secured to one member having an elongated slot therein and a pivot member cooperating with the slot in the bracket for securing the members together and for permitting limited relative movement of said members, and a hoist for causing a predetermined tilting of the bed by raising the forward end of the bed member and for subsequently lifting the bed bodily by a forward longitudinal movement thereof.

2. Dump truck mechanism comprising a truck frame, a bed pivoted to the frame for rotary and longitudinal movement of the bed with respect to the frame, a hoist, a lever pivoted to the hoist and to the bed for moving the bed longitudinally forward after the hoist has moved a predetermined distance to bring the bed into a tilted position for dumping.

3. Dump truck mechanism comprising a truck frame, a bed pivoted to the frame for rotary and longitudinal movement of the bed with respect to the frame, a hoist and a floating lever pivotally connected to the frame, hoist and bed for moving the bed.

4. Dump truck mechanism comprising a truck frame, a bed pivoted to the frame for rotary and longitudinal movement with respect to the frame, a hoist, a floating lever connected to the hoist and the bed and a stop member for limiting movement of the floating lever.

5. Hoist mechanism for a dump truck having a movable bed and comprising a hollow plunger member constituting a fluid pressure reservoir connected to the truck, a shell member telescoping over the plunger member and connected to the movable bed, means supplying fluid to the reservoir, means for controlling the discharge thereof to the shell member, including a tube communicating with the reservoir and opening into the shell member, a valve seat in the tube and a valve carried by the shell member for engaging the seat and shutting off the supply of fluid to the shell when the shell and plunger member have moved relatively a predetermined distance.

6. Hoist mechanism for a dump truck comprising a reservoir member constituting a piston and a cylinder member telescoping over the reservoir, means for supplying compressed fluid to the reservoir, a tube communicating with the interior of the reservoir and opening into the cylinder, a passage for establishing communication between the said tube and the atmosphere, and a valve for establishing communication between the tube and the said passage or the said reservoir.

7. Hoist mechanism for a dump truck having a movable bed and comprising a reservoir member constituting a piston and a cylinder member telescoping over the reservoir, the said reservoir having an enlarged piston portion providing a stop shoulder, means on the open end of the cylinder for engaging the said shoulder and limiting separating movement of the members, means for supplying fluid pressure to the reservoir, means for controlling its delivery to the cylinder and means for connecting one of the said members to the movable bed.

8. In a dump truck, the combination with a truck having a movable bed, an engine, and a combined starting motor and compressor actuated by the engine for compressing fluid and for starting the engine with motive fluid compressed by the compressor, of a storage tank for fluid from the compressor constituting a piston and a hoist cylinder connected to the movable bed and telescoping over the storage tank and receiving fluid therefrom for actuating the bed, and means for controlling the delivery of fluid from the compressor to the tank, from the tank to the compressor and from the tank to the cylinder.

9. In a dump truck, the combination with a truck having a frame and a movable bed, an engine, a combined starting motor and compressor actuated by the engine for compressing fluid and for starting the engine with motive fluid compressed by the combined starting motor and compressor and a clutch for detachably connecting the combined compressor and starting motor to the engine, of a reservoir member for fluid from the compressor constituting a piston and a cylinder member telescoping over the piston and receiving fluid therefrom, and means for connecting one of the members to the movable bed and the other to the truck frame whereby the bed is moved relatively to the frame when fluid is supplied to the cylinder.

10. In a dump truck, the combination with a truck having a frame and a movable bed, an engine, a combined starting motor and compressor actuated by the engine for compressing fluid and for starting the engine with motive fluid compressed by the combined starting motor and compressor and a clutch for detachably connecting the combined compressor and starting motor to the engine, of a reservoir member for fluid from the compressor constituting a piston and a cylinder member telescoping over the piston and receiving fluid therefrom, means for connecting one of the members to the movable bed and the other to the truck frame whereby the bed is moved relatively to the frame when fluid is supplied to the cylinder, and means for controlling the delivery of

fluid from the combined starting motor and compressor to the reservoir, from the reservoir to the combined starting motor and compressor and from the reservoir to the said cylinder.

11. Dump truck mechanism comprising a truck frame, a bed pivoted to the frame for rotary and longitudinal movement with respect to the frame, a hoist and a floating lever connected to the hoist and the bed and having a lost-motion connection with the frame whereby the lever is caused to bodily raise the bed when the hoist has moved a predetermined distance.

12. In a dump truck the combination with a truck having a movable bed, an engine, and a combined starting motor and compressor actuated by the engine for compressing fluid and for starting the engine with motive fluid compressed by the compressor, of a storage reservoir for fluid from the compressor, a hoist cylinder receiving compressed fluid therefrom for actuating the bed, and means for controlling the delivery of fluid from the compressor to the reservoir, from the reservoir to the compressor and from the reservoir to the cylinder.

In testimony whereof, I have hereunto subscribed my name this 20th day of November, 1922.

JOHN M. MEYERS.