Nov. 15, 1932. J. P. HEIL ET AL 1,887,508

TELESCOPIC HOIST

Filed Nov. 29, 1929 4 Sheets-Sheet 1

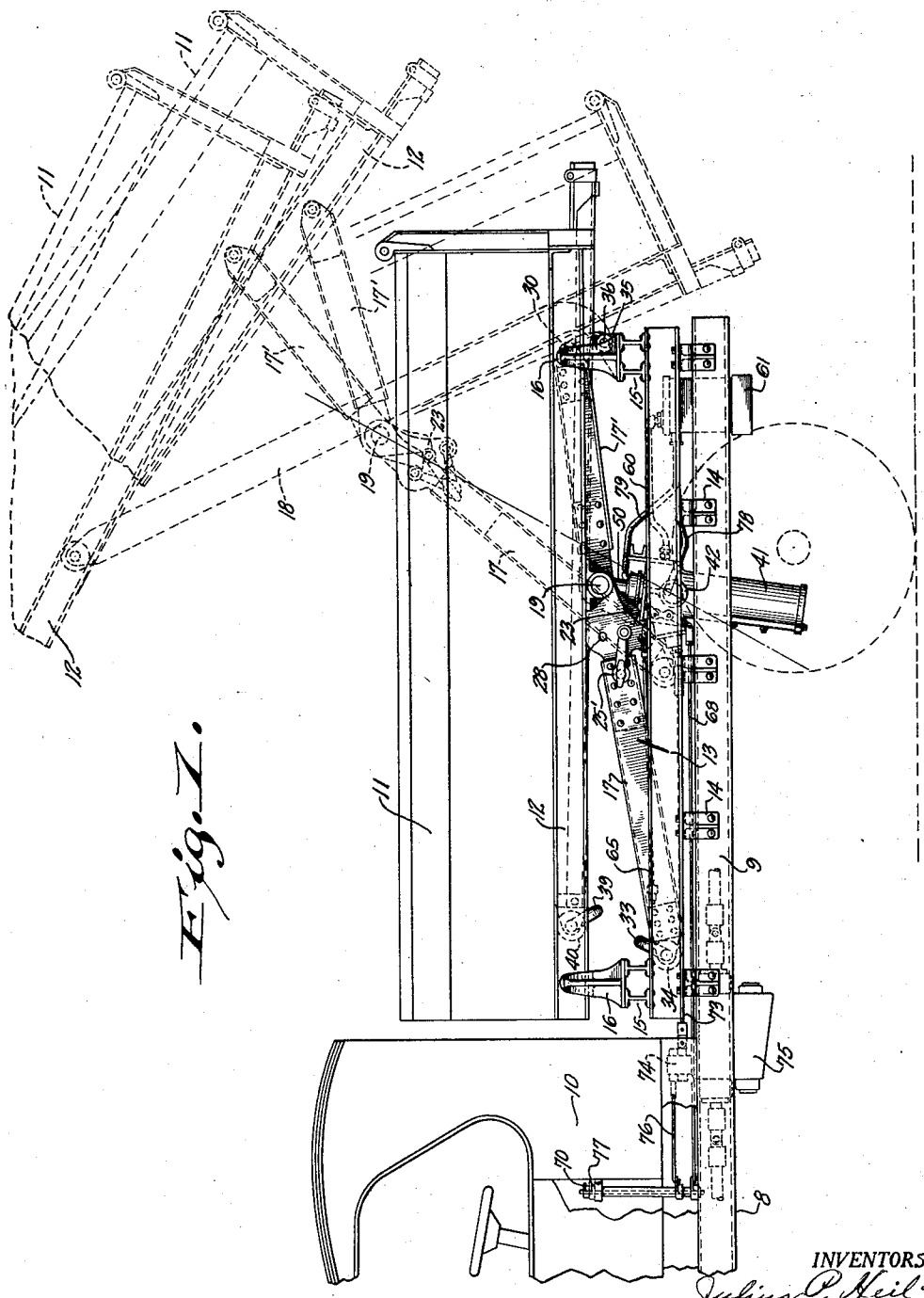


Fig. 1.

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TELESCOPIC HOIST

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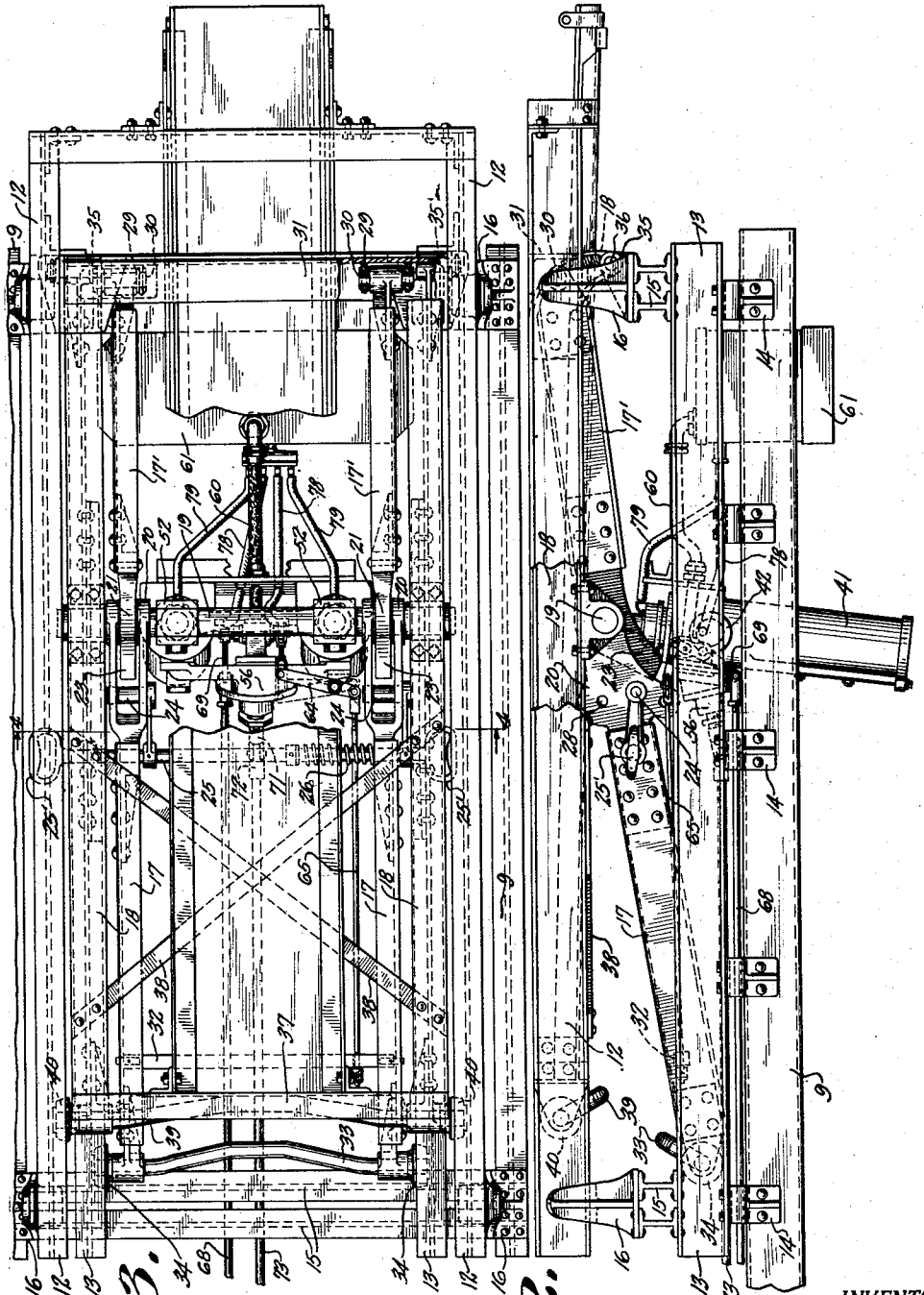


Fig. 3.

Fig. 2.

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TELESCOPIC HOIST

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Fig. 4.

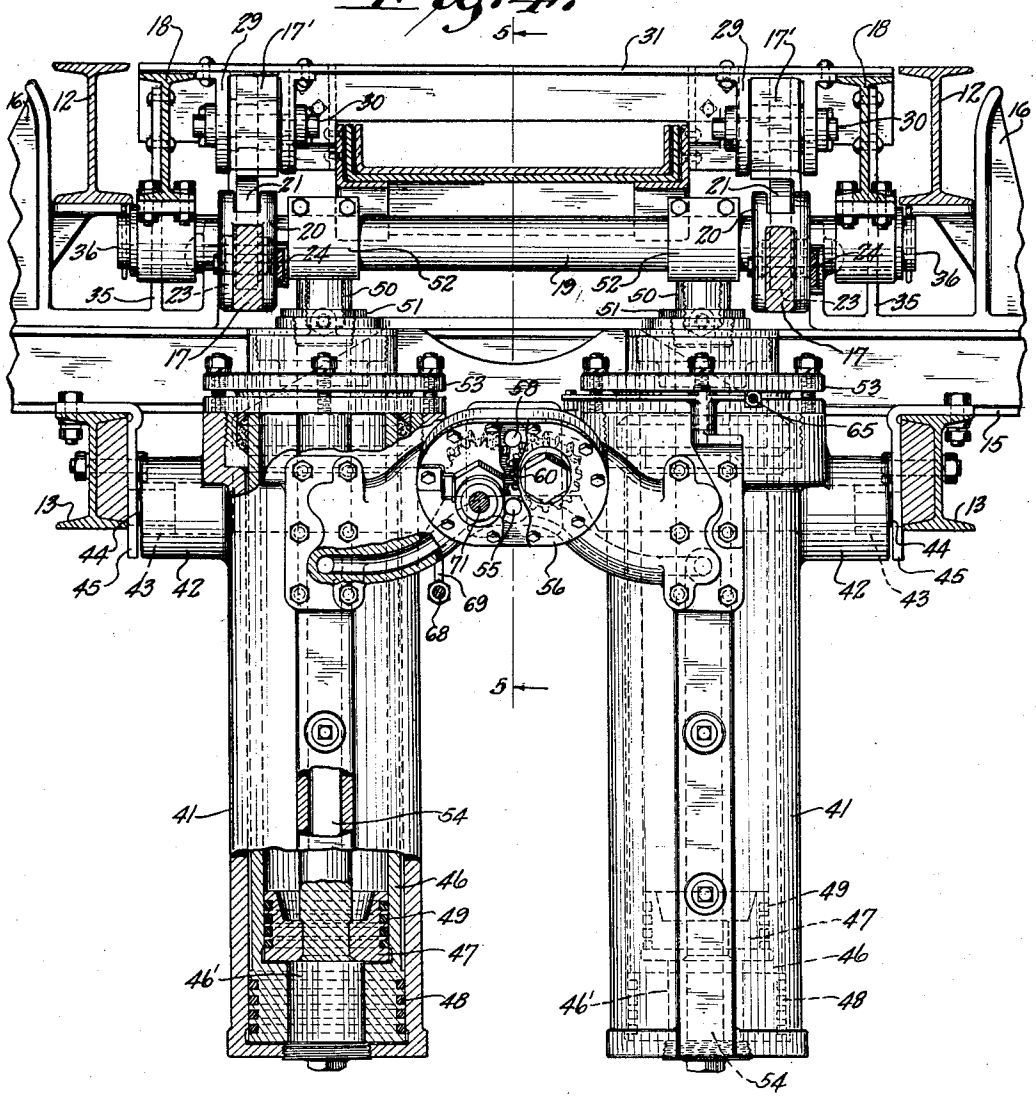
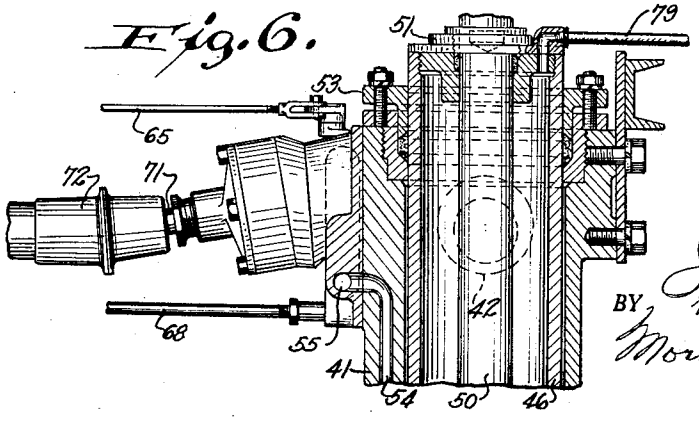


Fig. 6.



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Fig. 5.

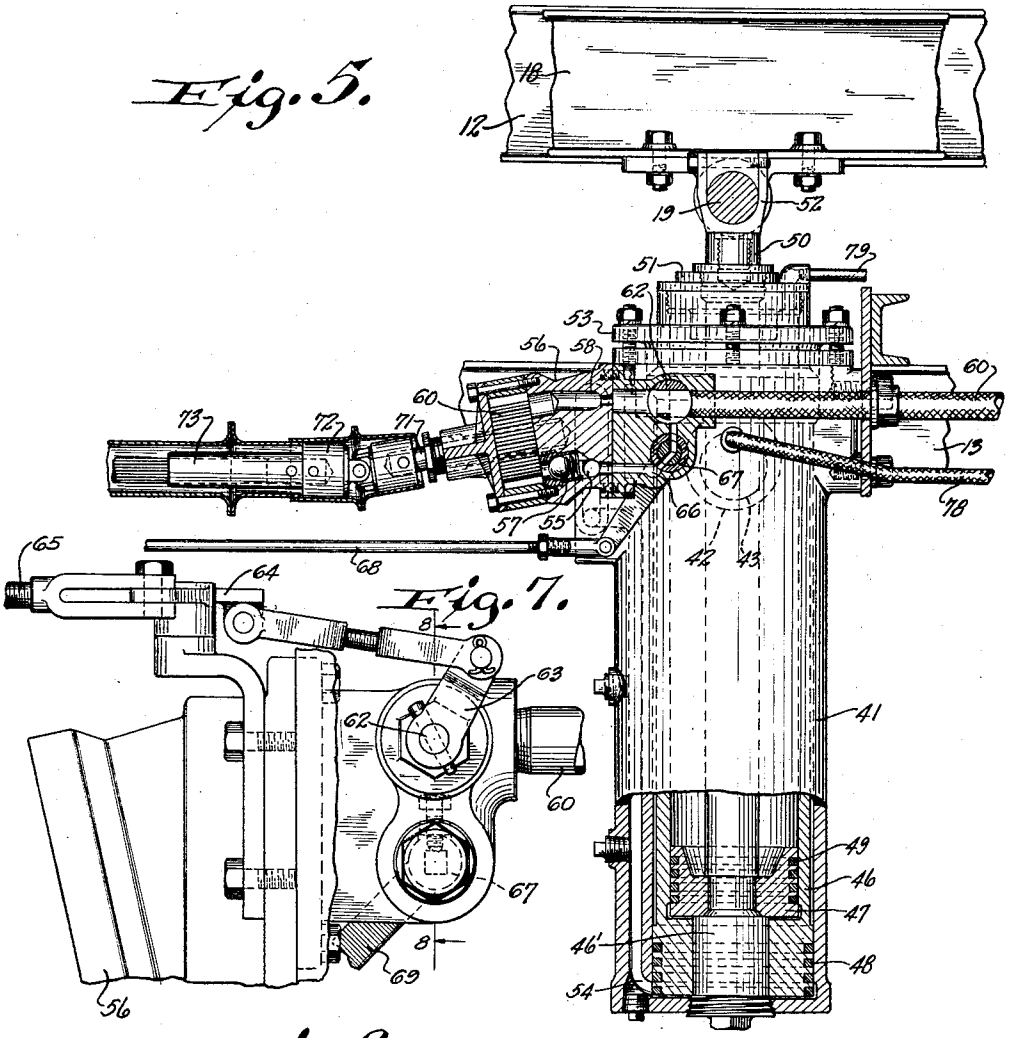
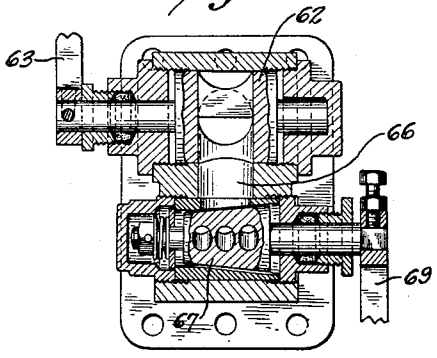


Fig. 7.

Fig. 8.



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Patented Nov. 15, 1932 1,887,508

UNITED STATES PATENT OFFICE

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TELESCOPIC HOIST

Application filed November 29, 1929. Serial No. 410,456.

This invention relates to improvements in telescopic hoists for trucks having dumping bodies.

It is one of the objects of the present invention to provide a telescopic hoist of the high lift type for unusual delivery conditions to permit raising the truck body to a considerable height before discharging its contents.

A further object of the invention is to provide a telescopic hoist of the hydraulic type which is operated from the power means of the truck and is controlled from the cab of the truck.

A further object of the invention is to provide a telescopic hoist in which the truck body may be moved to various elevated positions and dumping inclinations.

A further object of the invention is to provide a telescopic hoist having levers of the lazy tong type for elevating the truck body and also having an adjustable portion permitting a plurality of dumping positions at various extension heights.

A further object of the invention is to provide a telescopic hoist in which the body and hoist may be used as an ordinary dump truck.

A further object of the invention is to provide a telescopic hoist in which the truck body may be elevated with the body in a horizontal position.

A further object of the invention is to provide a telescopic hoist in which when the pistons for elevating the truck body reach their uppermost position, the fluid under pressure which moves the pistons, will automatically stop and thus eliminate any injury to the parts.

A further object of the invention is to provide a telescopic hoist of the fluid type having means for by-passing the oil from one side of the piston to the supply tank to permit the pistons to move downwardly from their upper position.

A further object of the invention is to provide a telescopic hoist having a fixed tank for receiving and holding the displaced oil when the pistons are in their lower positions.

A further object of the invention is to provide a telescopic hoist of the fluid type in which the piston rods and toggle joint levers are so connected to the truck and dump body as to exert the maximum lifting force with the minimum application of power.

A further object of the invention is to provide a telescopic hoist of the fluid type having a gear pump, a check valve and a rotary valve for forcing and controlling the flow of the fluid from one side of the pistons to the supply tank for automatically holding the truck body in any position of adjustment.

A further object of the invention is to provide a telescopic hoist which is of simple construction, is strong and durable and is well adapted for the purpose described.

With the above and other objects in view the invention consists of the improved telescopic hoist and its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a side view of a motor truck part provided with the improved telescopic hoist, the view also illustrating, by dotted lines, the body portion of the truck in different tilted positions;

Fig. 2 is a side view on a larger scale of portions of the truck with the telescopic hoist connected thereto;

Fig. 3 is a top view of the parts shown in Fig. 2;

Fig. 4 is a front view of the cylinders and parts connected thereto, some of the parts being in section;

Fig. 5 is a vertical sectional view thereof taken on line 5—5 of Fig. 4, other parts being broken away to show interior construction;

Fig. 6 is a vertical sectional detail view of the upper portion of one of the cylinders;

Fig. 7 is a side detail view of the controlling valves and connected parts; and

Fig. 8 is a vertical sectional detail view taken on line 8—8 of Fig. 7.

Referring to the drawings, the numeral 8 indicates a portion of a motor truck, 9 the side members of the chassis or frame, 10 the cab or seat portion and 11 the tiltable load carrying body of the truck. Said body portion is mounted upon upper spaced side

I-beams 12 which form part of the hoist mechanism. Lower spaced side I-beams 13 forming the lower portion of the hoist mechanism are rigidly mounted upon the side members 9 of the truck by brackets 14. Said lower side beams 13 at their opposite end portions are connected together in spaced relation by transverse pairs of I-beams 15 which have upwardly extending brackets 16 for supporting the body beams 12 thereon when said beams are in their lower position.

The longitudinally extending beams 12 and 13 are connected together by means of diagonally extending pairs of lever arms 17 and 18 which cross each other and are pivotally connected together by a transverse pivot shaft 19. The levers 17 are formed in two parts and the adjacent ends of the parts overlap each other and are pivotally connected to the pivot shaft 19 by bearings 20 and 21. The bearings 20 of the forward or lower lever parts are bifurcated while the bearings 21 of the upper or rear lever parts 17′ are single and extend between the bifurcations 20 and have forwardly projecting stop portion members 23 which adjustably engage stop bolt members 24. Said bolt members are mounted on an operating rod member 25 which slidably extends transversely through the lower portions of the members 17 and is provided with handles 25′ at its opposite ends. A coiled spring 26 surrounding the rod and interposed between one of the members 17 and a collar mounted on the rod yieldingly holds the bolt members 24 in their innermost or stopping positions. The bifurcated portions of the bearings 20 are provided with spaced bolt member openings 28 arranged concentrically around the operating rod 25 so that the bolt members 24 may be extended into any of the pairs of bolt openings 28 to lock the two portions of the levers 17 together against independent movement to adjust the angle of the tilt of the truck body.

The upper ends of the lever portions 17′ are pivotally connected to brackets 29 by pivot pins 30 and said brackets are mounted on a transverse angle member 31 connected to the I-beams 12 and forming part of the upper frame.

The lower ends of the levers 17 are connected together by a transverse member 32 and a fixed angular shaft 33 and rollers 34 journaled on the outer end portions of said shaft 33 extend into and have a rolling engagement with the inner flanges of the I-beams 13 when the truck body is raised or lowered.

The lower curved end portions of the other lever arms 18 are connected to brackets 35 by pivot pins 36 and said brackets are mounted on the adjacent transverse I-beams 15. The forward end portions of the levers 18 are connected together by a transverse angle member 37 and by diagonal braces 38, and an angled shaft 39 extending through and mounted fast to the lever arms 18 at their outer ends has rollers 40 journalled thereon which extend into and have a rolling engagement with the inner flanges of the I-beams 12.

A pair of spaced cylinders 41 provided with upper outwardly projecting portions 42 have alined trunnion recesses 43 for receiving the inwardly extending trunnions 44 of the trunnion brackets 45. Said trunnion brackets extend over and are bolted to the I-beams 13. The cylinders 41 are pivotally supported from said trunnions and extend upwardly therefrom and are provided with inner tubular piston cylinders 46 which contain pistons 47. Both the piston cylinders 46 and the pistons 47 have packing rings 48 and 49 and the pistons are provided with piston rods 50 which extend upwardly through stuffing nuts 51 in the upper end portions of the piston cylinders 46 and at their upper ends are formed with bearings 52 which extend around the pivot shaft 19. The piston cylinders 46 also extend through stuffing nuts 53 to form tight closures between the piston cylinders and the cylinders 41. The piston cylinders 46 have openings 46′ through their lower end portions to permit the fluid medium to enter and press against the pistons 47. As thus arranged the upward movement of the piston cylinders and the pistons will lift the truck body to the desired height and tilt the same and the pivotal connections of the cylinders with the I-beams will permit the cylinders and pistons to tilt while the body is traveling its arc of movement.

The cylinders 41 are formed with lower duct ports 54 which extend upwardly and are connected to the outlet port 55 of a rotary gear pump 56 connected to both spaced cylinders 41. Said outlet port is provided with a spring pressed ball valve 57 which opens with the flow of the fluid towards the duct ports 55 to force the pistons upwardly. When forced upwardly the valve holds the pistons in the upper positions. The pump inlet duct 58 extends rearwardly from the pump gears 59 and a part flexible pipe 60 connects the duct to a storage tank 61 which is mounted on the rear portion of the lower frame 13 so that when the pump is in operation the fluid will be drawn from the storage tank by the pump and forced beneath the pistons to elevate and tilt the body.

An automatically actuated valve 62 intersects the duct 58 and its arm 63 is connected to a lever 64, and the lever is connected to an actuating rod 65 which extends forwardly and is slidably connected to the fixed transverse member, and is provided with inner and outer collars so that when the lever 64 moves rearwardly to elevate the body, it will engage the inner of these collars and will cause the valve to turn and substantially close the duct to the tank when the pistons are in their up-

permost position and when the lever is moved forwardly it will engage the outer collar to open said tank duct. A by-pass duct 66 extends from the duct 58 adjacent the valve 62 and a controlling valve 67 intersects said duct 66 to permit the fluid medium to circulate through the pump without doing any damage to the parts when the pistons are in their lowermost position. The valve 67 also serves to permit the fluid medium to flow beneath the pistons to and through the flexible tubes 60 and back into the tank 61 when it is desired to lower the dump body. A controlling rod 68 connecting to the arm 69 of the valve 67 extends to a control lever 70 mounted in the cab of the truck.

The pump 56 is of the ordinary two gear type and one of the gears is provided with a shaft 71 having a universal joint connection 72 with a shaft 73 extending to a power take off 74 of the transmission 75 of the truck. A rod 76 extending from the take off 74 to a control lever 77 mounted in the cab of the truck provides for controlling the actuation of the take off.

In the event that any of the fluid medium or oil seeps by the piston rings it is permitted to flow back to the tank 61 through flexible tubes 78 and 79, the tubes 78 extending between the cylinders 41 and the tank 61, and the tubes 79 extending between the piston cylinders 46 and the said tank. The seepage oil mentioned will drain back to the tank when pistons and piston cylinders are in their upper position.

In operation the transmission control lever is turned to start the rotation of the pump which will draw oil from the tank and force it through the ducts and into the lower portions of the cylinders 41 and piston cylinders 46. The pressure of the oil will now force the pistons 47 or the piston cylinders 46 or both upwardly to tilt or elevate and tilt the truck body as indicated by dotted lines in Fig. 1, the tilt or elevation being controlled by the position of the bolts 24 in the holes 28.

While only three adjusting holes are shown it is to be understood that more or less adjusting holes may be used so that the body may be elevated to a horizontal position or to any angle between a horizontal and a vertical position.

When the pistons reach their uppermost position the valve 62 will be automatically turned to substantially close off the supply of oil from the tank so that the continued operation of the pump cannot do any harm to the parts. The pump may be stopped at any point of the elevation of the body as the check valve 57 will stop the return flow of the oil and the parts will remain at rest. While the pump is in operation to elevate the body the valve 67 is of course closed and when it is desired to lower the body the said valve is opened as shown in Fig. 5 to permit the oil to flow therethrough and directly into the tube 60 and the tank, the speed of lowering being controlled by the turning of the valve to increase or decrease the size of the opening through which the oil flows.

It is to be understood that one or any number of cylinders and pistons may be used as desired without departing from the spirit and scope of the invention.

From the foregoing description it will be seen that the telescopic hoist is of very simple construction, is strong and durable and is well adapted for the purpose described.

What we claim as our invention is:

1. An elevating and tilting work instrumentality, comprising a lower frame, an upper frame tiltably connected to and bodily movable vertically from the lower frame, said frame members having inner upper and lower roller ways, an upper diagonally extending lever arm fixedly pivotally connected at its lower end to the rear end of the lower frame and at its upper forward end having rollers which enter the upper roller ways, a lower diagonally extending lever arm fixedly pivotally connected at its upper rear end to the rear end of the upper frame member and at its forward end having rollers which enter the lower roller ways, a transverse shaft carried by the upper lever arm, said lower lever arm being formed in two parts which overlap each other and are journaled on the transverse shaft, adjustable means for limiting the pivotal movement of the lever arm parts with relation to each other in one direction, a hoist carried by the lower frame member and having a movable part which is pivotally connected directly to the transverse shaft, and means controlling the operation of the hoist.

2. The combination with a motor truck having a dump body, of a means for elevating and tilting said body, comprising diagonally extending lever arms pivotally connected together, some of the arms at one end being pivotally connected to the truck and the others to the body and the opposite ends of said arms having respectively movable and pivotal connections with the truck and the body, a hoist pivotally carried by the truck and having one of its movable members pivotally connected to both of the lever arms to move the body vertically and tiltably, means for transmitting motion from the truck motor to the hoist, and means controlling the operation of the hoist.

3. The combination with a motor truck having a dump body, of a means for elevating and tilting said body, comprising lower longitudinally extending beam members connected to the truck, upper longitudinally extending beam members connected to the body, diagonally extending lever arms pivotally connected at their lower ends to the lower beam members and at their upper ends

having a pivotal and movable connection with the upper beam members, other diagonally extending lever arms pivotally connected at their upper ends to the upper beam members and at their lower ends having a pivotal and movable connection with the lower beam members, a hoist pivotally carried by the lower beam members and having one of its movable parts pivotally connected to both of the lever arms to move the body vertically and pivotally, means for transmitting motion from the truck motor to the hoist, and means controlling the operation of the hoist.

4. The combination with a motor truck having a dump body, of a means for elevating and tilting said body, comprising lower longitudinally extending beam members connected to the truck, upper longitudinally extending beam members connected to the body, an upper pair of spaced connected together diagonally extending lever arms pivotally connected at their lower rear ends to the lower beam members and at their upper forward ends having pivotal and roller engagement with the upper beam members, a lower pair of spaced connected together diagonally extending lever arms pivotally connected at their upper rear ends to the upper beam members and at their lower ends having pivotal and roller engagement with the lower beam members, a hoist pivotally carried between the lower beam members and having a movable part which is directly pivotally connected to medial portions of both pairs of lever arms, means for transmitting motion from the truck motor to the hoist, and means controlling the operation of the hoist.

5. The combination with a motor truck having a dump body, of a means for elevating and tilting said body, comprising a pair of lower longitudinally extending beam members connected to the truck and having inner roller ways, a pair of upper longitudinally extending beam members connected to the body and having inner roller ways, an upper pair of spaced connected together diagonally extending lever arms pivotally connected at their lower rear ends to the lower beam members and at their upper forward ends having rollers which travel in the roller ways of the upper beam members, a lower pair of spaced connected together diagonally extending lever arms pivotally connected at their upper ends to the upper beam members and at their lower forward ends having rollers which travel in the roller ways of the lower beam members, a hoist pivotally carried between the lower beam members and having a movable part which is directly pivotally connected to medial portions of both pairs of lever arms, means for transmitting motion from the truck motor to the hoist, and means controlling the operation of the hoist.

6. The combination with a motor truck having a dump body, of a means for elevating and tilting said body, comprising a pair of lower longitudinally extending beam members connected to the truck and having inner roller ways, a pair of upper longitudinally extending beam members connected to the body and having inner roller ways, an upper pair of spaced connected together diagonally extending lever arms pivotally connected at their lower rear ends to the lower beam members and at their upper forward ends having rollers which travel in the roller ways of the upper beam members, a lower pair of spaced connected together diagonally extending lever arms pivotally connected at their upper ends to the upper beam members and at their lower forward ends having rollers which travel in the roller ways of the lower beam members, said lower lever arms being formed in two parts which overlap each other, a transverse shaft pivotally connecting the two parts together and to the upper lever arms, adjustable members for limiting the pivotal movement of the lever arm parts with relation to each other in one direction to adjust the tilt of the body, a hoist pivotally carried between the lower beam members and having a movable part which is directly pivotally connected to the transverse shaft, means for transmitting motion from the truck motor to the hoist, and means controlling the operation of the hoist.

7. The combination with a motor truck having a dump body, of a means for elevating and tilting said body, comprising a pair of lower longitudinally extending beam members connected to the truck and having inner roller ways, a pair of upper longitudinally extending beam members connected to the body and having inner roller ways, an upper pair of spaced connected together diagonally extending lever arms pivotally connected at their lower rear ends to the lower beam members and at their upper forward ends having rollers which travel in the roller ways of the upper beam members, a lower pair of spaced connected together diagonally extending lever arms pivotally connected at their upper ends to the upper beam members and at their lower forward ends having rollers which travel in the roller ways of the lower beam members, said lower lever arms being formed in two parts which overlap each other, a transverse shaft pivotally connecting the two parts together and to the upper lever arms, one of said lever arm parts having projecting stop members, adjustable stop members carried by the other lever arm part for limiting the pivotal movement of the lever arm parts with relation to each other in one direction to adjust the tilt of the body when elevated, a hoist carried by the lower

beam members and having a movable part which is directly pivotally connected to the transverse shaft, means for transmitting motion from the truck motor to the hoist, and means for controlling the operation of the hoist.

8. The combination with a motor truck having a dump body, of a means for elevating and tilting said body, comprising a pair of lower longitudinally extending beam members connected to the truck and having inner roller ways, a pair of upper longitudinally extending beam members connected to the body and having inner roller ways, an upper pair of spaced connected together diagonally extending lever arms pivotally connected at their lower rear ends to the lower beam members and at their upper forward ends having rollers which travel in the roller ways of the upper beam members, a lower pair of spaced connected together diagonally extending lever arms pivotally connected at their upper ends to the upper beam members and at their lower forward ends having rollers which travel in the roller ways of the lower beam members, said lower lever arms being formed in two parts which overlap each other, a transverse shaft pivotally connecting the two parts together and to the upper lever arms, one of said lever arm parts having projecting stop members and the other part having openings arranged in a semi-circle, stop bolt members adjustably positioned in some of said openings for limiting the pivotal movement of the lever arm parts with relation to each other in one direction to adjust the tilt of the body when elevated, a hoist carried by the lower beam members and having a movable part which is directly pivotally connected to the transverse shaft, means for transmitting motion from the truck motor to the hoist, and means for controlling the operation of the hoist.

9. In combination, a lower frame, an upper frame tiltable and bodily movable relative to said lower frame, a lever arm fixedly pivotally connected at one end to one of said frames and movably pivotally connected at its opposite end to the other of said frames, a second lever arm fixedly pivotally connected at one end to one of said frames and movably pivotally connected at its opposite end to the other of said frames, one of said arms being formed in two parts pivotally connected together, adjustable means for limiting the pivotal movement of said arm parts relative to each other, and a hoist having a movable part directly pivotally connected to said arms to either tilt the upper frame or to move the latter bodily away from said lower frame.

10. In combination, a lower frame, an upper frame tiltable and bodily movable relative to said lower frame, a lever arm fixedly pivotally connected at one end to said lower frame and movably pivotally connected at its opposite end to said upper frame, a second lever arm fixedly pivotally connected at one end to said upper frame and movably pivotally connected at its opposite end to said lower frame, one of said arms being formed in two parts pivotally connected together, adjustable means for limiting the pivotal movement of said arm parts relative to each other, and a hoist having a movable part directly pivotally connected to said arms to either tilt the upper frame or to move the latter bodily away from said lower frame.

11. In combination, a lower frame, an upper frame tiltable and bodily movable relative to said lower frame, a lever arm fixedly pivotally connected at one end to said lower frame and rollably pivotally connected at its opposite end to said upper frame, a second lever arm fixedly pivotally connected at one end to said upper frame and rollably pivotally connected at its opposite end to said lower frame, said second arm being formed in two parts pivotally connected together, adjustable means for limiting the pivotal movement of said arm parts relative to each other, and a hoist having a movable part directly pivotally connected to said arms to either tilt the upper frame or to move the latter bodily away from said lower frame.

In testimony whereof we affix our signatures.

JULIUS P. HEIL.
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