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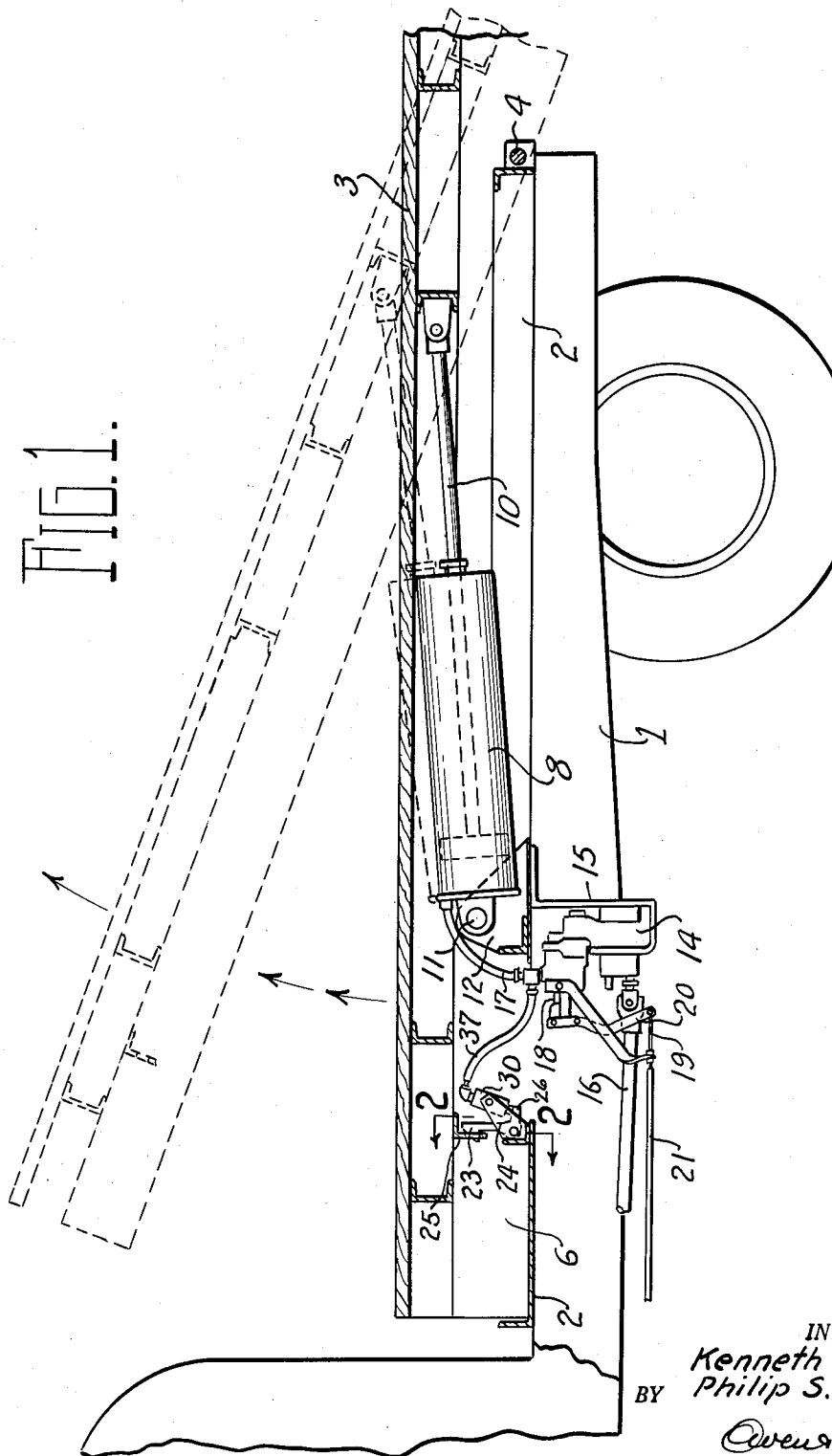
K. J. KING ET AL

2,749,175

LATCH CONTROL FOR DUMP TRUCKS

Filed July 12, 1952

2 Sheets-Sheet 1



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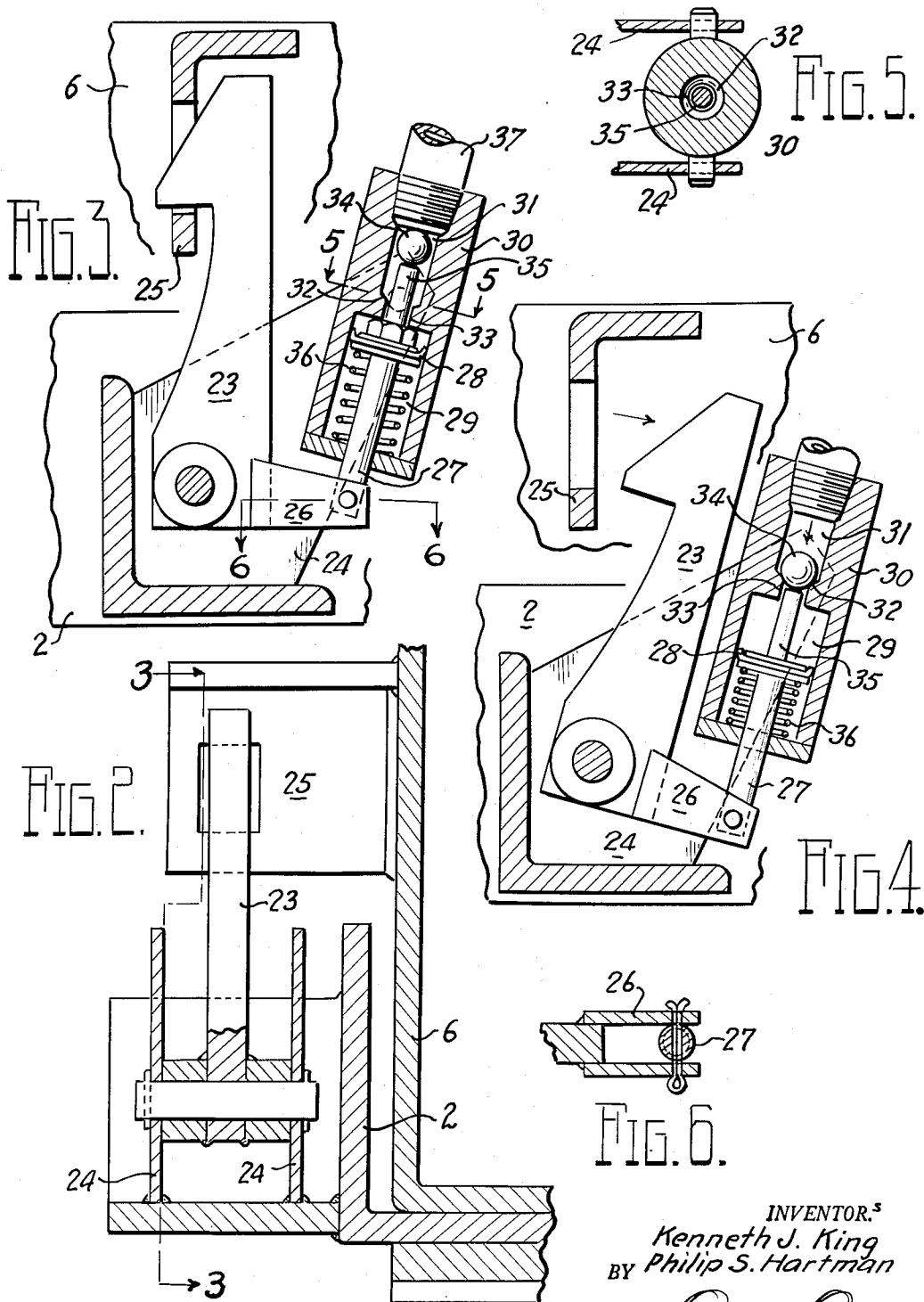
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LATCH CONTROL FOR DUMP TRUCKS

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2 Claims. (Cl. 298—22)

This invention relates primarily to latch operating means for dump trucks, and particularly to a means of this character employing hydraulic or other fluid pressure as the operating and controlling force.

It is old in the use of dump trucks having tiltable bodies to provide a latch means for normally locking the body against tilting and to also provide hydraulic hoisting means for tilting the body after release of the latch means, and to provide a common manually operable mechanical control for these two means.

The primary object of the present invention is the provision in combination with a fluid pressure operated hoist means for tiltable truck bodies, of means connected to such means and operable by initial low operating pressures therein to actuate the associated latch means to release the truck body for tilting before sufficient pressure is built up in the hoist means to raise the truck body and then to permit return of the latch to normal locking position when the hoisting means is relieved of its fluid raising pressure, and to provide, in connection with such means, a valve which will automatically close the connection between the pressure source and the pressure responsive latch operating means, thus eliminating high pressures from such means and obviating the use therein of expensive and complicated structures adapted to prevent pressure leakage under high pressures.

Further objects and advantages of the invention will be apparent from the following detailed description, and from the accompanying drawings, in which—

Fig. 1 is a vertical sectional view of a dump truck embodying the invention, with parts broken away, and with the body frame shown in full lines in lowered position and in dotted lines in tilted position;

Fig. 2 is an enlarged fragmentary section on the line 2—2 in Fig. 1;

Fig. 3 is an enlarged section on the line 3—3 in Fig. 2 showing the latch in engaged position;

Fig. 4 is a similar section to Fig. 3, with the latch shown released;

Fig. 5 is a cross-section on the line 5—5 in Fig. 3, with parts broken away, and

Fig. 6 is a fragmentary section on the line 6—6 in Fig. 3.

Referring to the drawings, 1 designates a truck frame, 2 a hoist frame stationarily mounted thereon and 3 the truck body or dump frame that is pivotally connected to the hoist frame at 4 for tilting movements relative thereto, as is common in dump trucks. The respective side sills 6 of the body frame 3, when in lowered position, rest on the frame 2. The pivotal connection 4 between the two frames is located at the rear end of the truck frame 1 and short of the rear end of the body frame 3, as is common in dump trucks.

A hydraulic hoist means between the hoist frame 2 and the body frame 3 is conventionally shown and comprises at least one cylinder 8 and its cooperating plunger 10 with the forward end of the cylinder pivotally connected at 11 to a bracket 12 on the hoist frame. The

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rear end of the plunger is connected to the under side of the body frame forwardly of the pivotal connection 4. The admission of fluid pressure to the forward end of the cylinder forces the plunger outward and effects an upward tilting of the body frame, as well understood in the art.

The fluid pressure which is preferably hydraulic, and may, therefore, be referred to as such or as oil, is generated by a pump 14 mounted on a bracket 15 suspended from the hoist frame 2 between the side sills of the truck frame 1 and is driven by a power take-off shaft 16 from the truck motor (not shown). The outgoing side of the pump has connection with the forward or pivoted end of the cylinder through a conduit 17, the pressure to which from the pump is controlled by a valve 18 that is operated from the cab through a flexible rod or wire 19 and lever 20. The rod 19 extends through a guide tube 21.

A latch 23 is pivoted to a bracket 24 on the hoist frame 2 forward of the cylinder 8 and has an upwardly projecting catch arm that engages over a stationary catch member 25 on the under side of the body frame 3 to prevent tilting of the body frame from normal lowered position. A short arm 26 projects rearward from the inner pivoted end of the latch 23 and is connected by a rod 27 (Figs. 3 and 4) to a plunger 28 operating in the chamber 29 of a cylinder 30. This cylinder preferably stands upright and is pivoted for rocking movements to the bracket 24. A valve chamber 31 is provided in the opposite end of the cylinder 30 and has a tapered valve seat 32 at its inner end in restricted communication with the inner end of the chamber 29 through a passage 33. A valve 34, in the present instance, of ball type, is positioned in the chamber 31 and normally engages the seat 32 to close the passage 33 when the plunger 28 is lowered a predetermined extent in the cylinder. A stem 35 projects from the plunger 28 through the passage 33 and up into the valve chamber 31 to unseat the valve 34 when the plunger moves to the upper or inner end portion of its stroke. The length of projection of the stem 35 into the valve chamber is sufficient to hold the valve unseated until the plunger has lowered sufficiently to release the latch. The plunger 28 is normally held at the inner end of its stroke by a coiled expansion spring 36 disposed between the plunger and the outer end of the chamber 29. The rod 27 works freely through an opening in such end.

The outer end of the valve chamber 31 is in communication with the conduit 17, or the outgoing side of the pump 14, through a flexible tube or conduit 37 preferably of smaller diameter than the conduit 17, so that when the control valve 18 is opened fluid pressure from the pump passes both to the hoisting cylinder 8 and to the cylinder 30 of the latch operating mechanism. Inasmuch as the pressure required to move the plunger 28 against the tension of the spring 36 and release the latch 23 is so very much less than that required to actuate the hoisting plunger 10, the latch release is effected during the initial flow of the pressure fluid through the conduits 17 and 37 and before sufficient pressure is present in the cylinder 8 to move the hoisting plunger.

In operation, when the controls are placed in the hoist position, pressure starts to build up in the hydraulic system to raise the truck body 3. When this pressure reaches approximately 15 to 20 pounds per square inch, the pressure on the plunger 28 overcomes the force of the spring 36 as well as any releasing resistance of the latch 23, thus causing the plunger to move downward or outward and impart a releasing movement to the latch. The line pressure then continues to build up sufficiently to raise the dump truck. If the body is free of load a pressure of from 70 to 90 pounds per square

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inch is ordinarily required to raise it, and if the body is loaded the required pressure is proportional to the load. The lowering of the plunger 28 and stem 35 permits the valve 34 to lower to its seat in the cylinder. When the dump body returns to rest on the truck frame, rather than on the hoist mechanism, the operating pressure returns to zero and the spring 36 returns the latch to the position to engage the cooperating catch member 25.

The purpose of the valve 34 in the latch control cylinder is to prevent the exertion of high hoisting pressures on the packing of plunger 28, thus eliminating the likelihood of leakage of oil past the plunger 28, which in turn eliminates the necessity of packing around the rod 27 and the provision of means to dispose of any oil that would leak past the plunger 28. In addition to savings in manufacturing cost, the eliminating of packings is a great contribution to the proper performance of the unit in that a considerable amount of friction is thereby avoided. This reduction of friction causes the latch to have a much sharper action, to disengage more swiftly and at lower line pressures, and to reset instantly as the line pressure returns to zero. Furthermore, a long service-free plunger life is expected because the plunger is not subjected to pressures greater than required to compress the spring 36 and move the latch.

We wish it understood that our invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described our invention, what we claim as new, and desire to secure by United States Letters Patent is:

1. In a dump truck having a hoist body pivotally mounted for vertical tilting movements, fluid pressure actuated means operable to tilt said body, a latch normally holding said body against tilting from reclining position, fluid operated means for releasing said latch, and a fluid pressure line from a pressure source having connection with both said body tilting means and said latch releasing means, the improvement comprising a

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valve in the pressure line connected with said latch releasing means and operable to close said connection to the supply source when the latch has been released by a predetermined pressure less than the minimum pressure required to operate the body hoisting means.

2. In a dump truck having a hoist body pivotally mounted for vertical tilting movements, fluid pressure actuated means operable to tilt said body, a latch normally holding said body against tilting from reclining position, fluid operated means for releasing said latch, and a fluid line from said source having connection with both said body tilting means and said latch releasing means, said latch releasing means including a cylinder, a plunger operating in said cylinder and connected to said latch to impart releasing movement thereto from movement in one direction of the plunger when a predetermined pressure is present in said line, the improvement comprising spring means resisting movement of the plunger in latch releasing direction, a valve in said fluid pressure line held open by said plunger when the latter is in normal position and seating to close said line to the cylinder when a pressure sufficient to overcome said spring pressure, and which is less than that required to operate the hoist mechanism, is present in said line.

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