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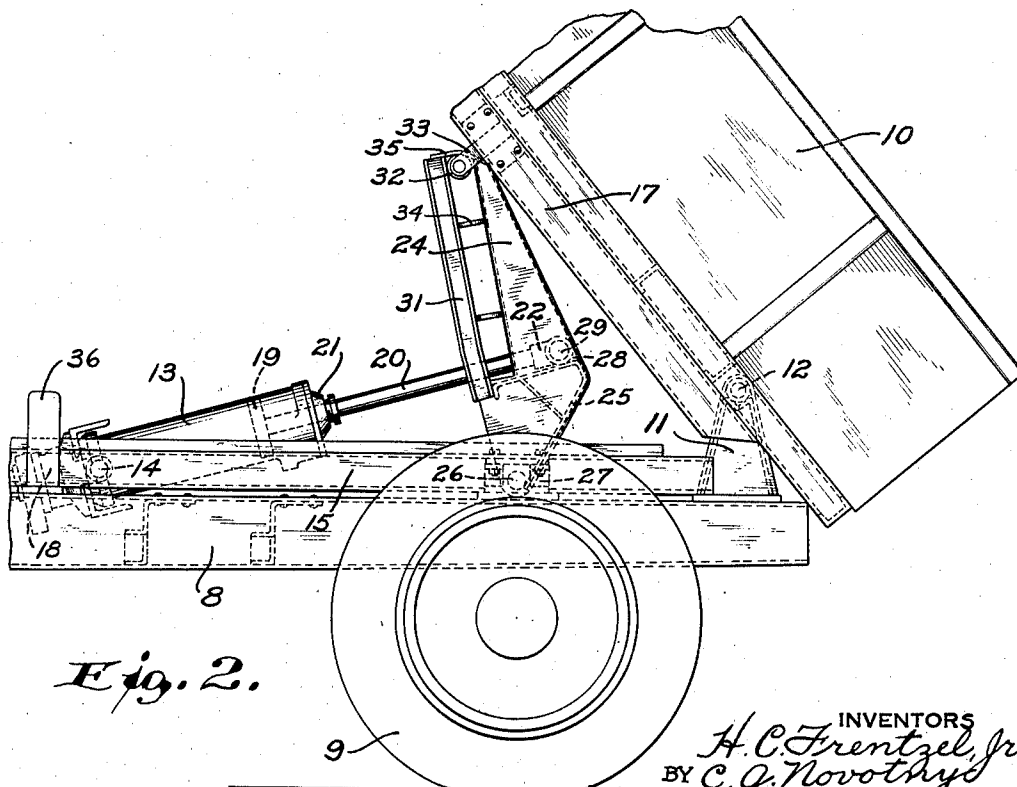
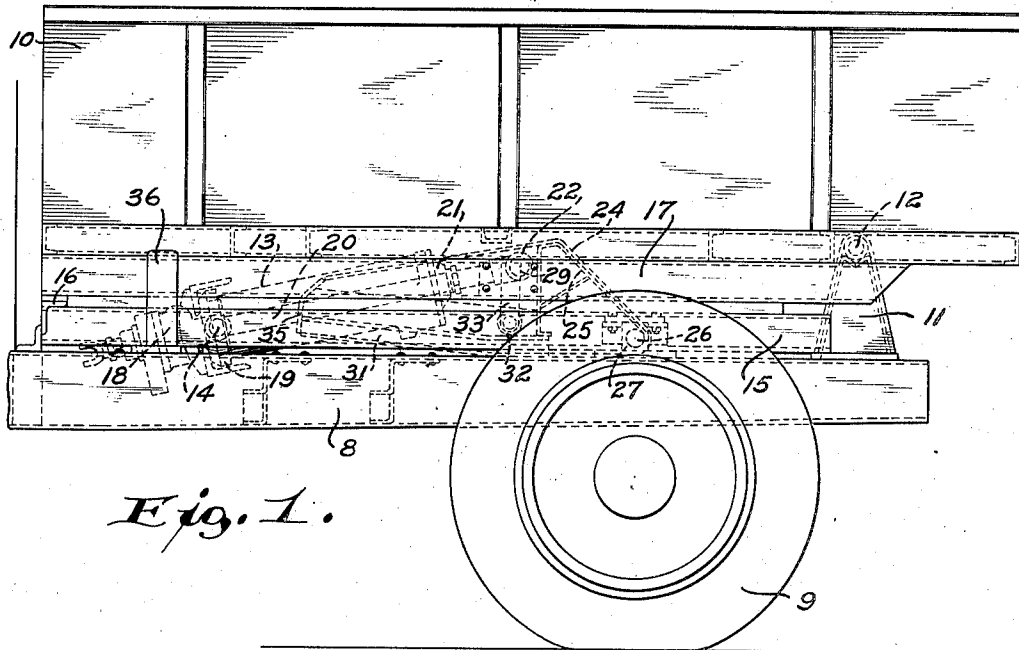
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2,190,870

BODY DUMPING MECHANISM

Filed April 20, 1939

2 Sheets-Sheet 1



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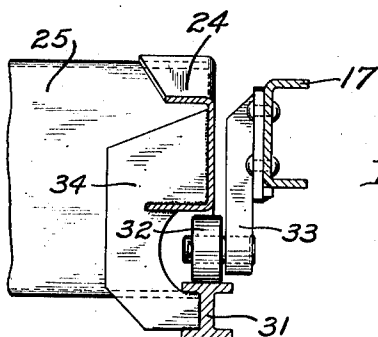
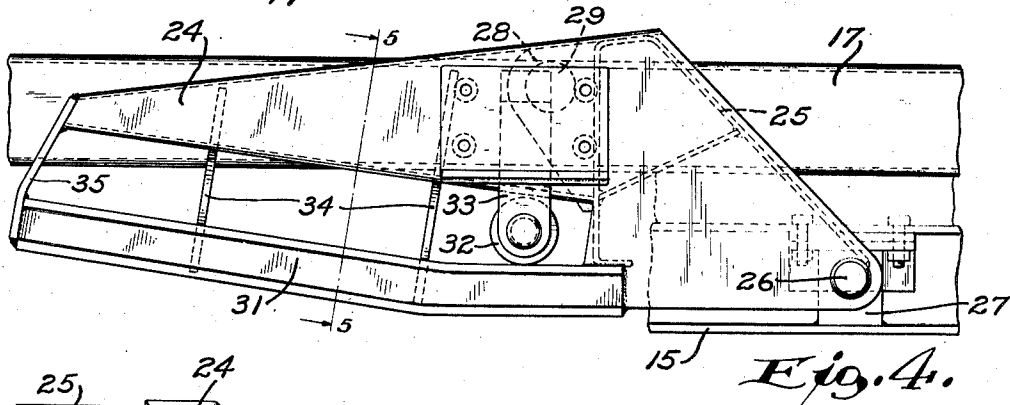
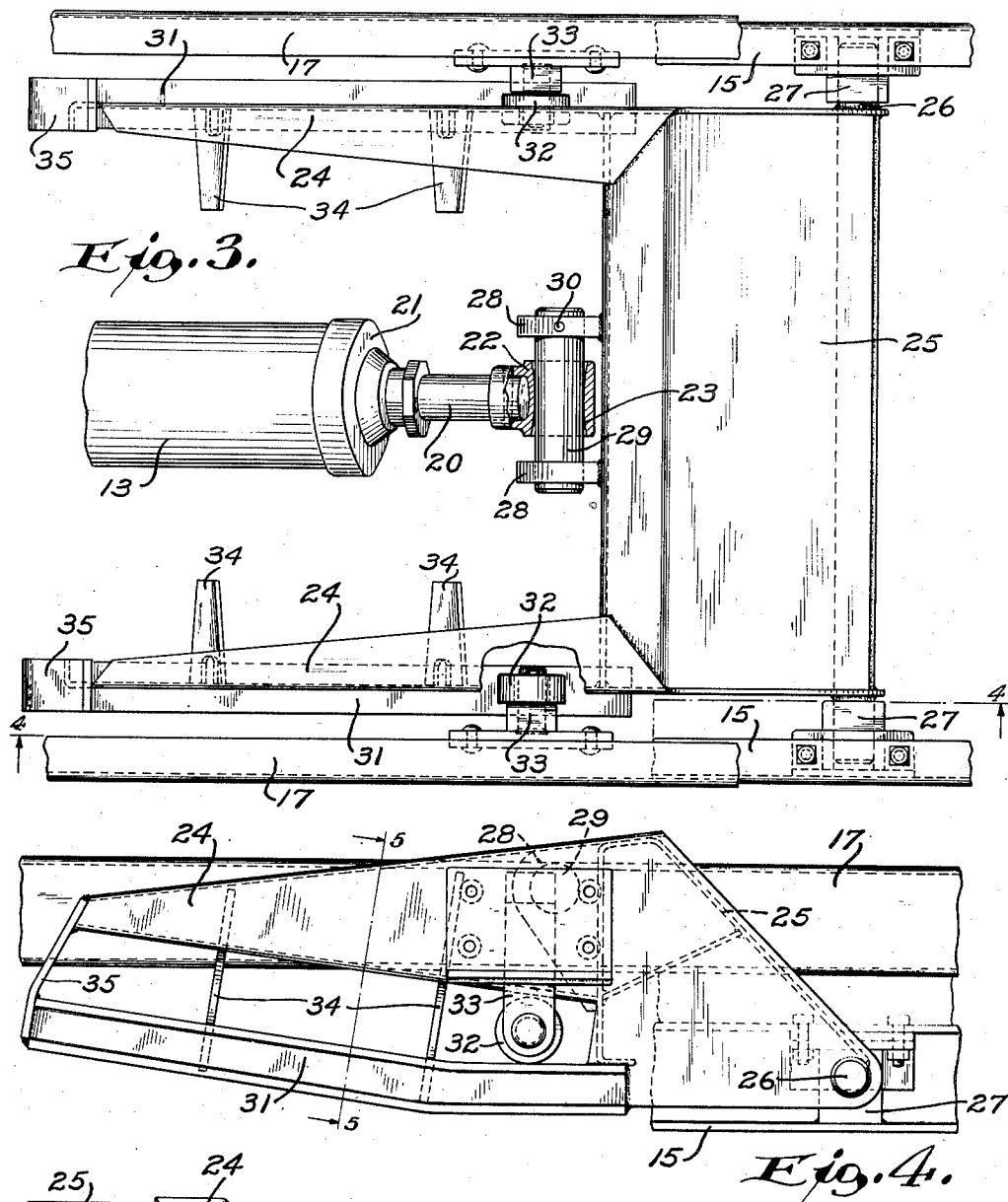
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,190,870

BODY DUMPING MECHANISM

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Application April 20, 1939, Serial No. 268,882

8 Claims. (Cl. 298—22)

The present invention relates generally to improvements in the art of transporting and unloading bulk material, and relates more specifically to improvements in the construction and operation of vehicular body dumping mechanisms.

Generally defined, an object of our present invention is to provide an improved vehicular load carrying body dumping assemblage, which is simple and durable in construction, and which is also highly effective in use.

It has heretofore been common commercial practice to tiltably mount a load carrying body on a vehicle, and to utilize a hydraulic jack or hoist for tilting the body to dump the load therefrom. Many and varied types of mechanisms for transmitting motion from the hoist to the body and for converting the reciprocating motion of the jack piston into oscillatory movement of the body, have also been proposed and utilized with more or less success. One such prior mechanism is disclosed in Patent No. 2,136,231, granted November 8, 1938, wherein the load carrying body and the hoist cylinder are pivotally suspended respectively from the rear and front portions of the chassis frame and the outer end of the hoist plunger or piston rod coacts with a crosshead which is directly pivoted to side lifting arms swingably mounted upon the frame and having guide rails which coact with rollers carried by the body so as to swing the latter about its pivot when the hoist is operated. While the use of such rollers riding upon laterally separated side lifting arms or levers of this type to swing the body about its pivot, is desirable, it has also been found desirable in order to prevent excessive wear on the lever pivots and on the hoist parts, to provide a certain amount of flexibility between the hoist and the body tilting arms or levers, so that when the body is not uniformly loaded as is frequently the case, the laterally separated lifting arms may deflect or move slightly and independently of each other without excessively stressing the pivotal connections between these arms and the hoist parts. This will prevent uneven loading of the body from buckling or bending the hoist plunger or piston rod, and will permit the piston and its rod to maintain its parallel direction of travel with respect to the cylinder, thus eliminating rapid wear on the rod, piston and cylinder.

The present invention, therefore, has for its object, the provision of an improved, motion transmitting mechanism interposed between a fluid pressure actuated jack and a tiltably body, which will positively prevent excessive wear on the relatively reciprocable parts of the jack due to off-center or unequal loading of the body.

A more specific object of the invention is to provide a simplified hydraulically actuated body dumping mechanism of the general type disclosed

in the above identified patent, but wherein the hoist elements are not directly attached to the side levers and are thus effectively relieved from abnormal stresses.

Another specific object of our invention is to provide a new and useful body dumping mechanism of the type wherein laterally spaced simultaneously swingable side arms or levers coact through guide rails and rollers with the tiltably body, and are swingable in union by means of a single intervening fluid pressure actuated jack having flexible association with the levers remote therefrom.

Still another specific object of this invention is to provide a quick acting, powerful and durable body dumping assemblage, which can be readily applied to a vehicle and which may be manufactured and sold at moderate cost.

These and other specific objects and advantages of the present invention will be apparent from the following detailed description.

A clear conception of an embodiment of our invention and of the mode of constructing and of operating a body dumping mechanism built in accordance with our improvements, may be had by referring to the drawings accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a side elevation of one of the improved vehicular dump body assemblages, showing the dump body disposed in normal horizontal load carrying position;

Fig. 2 is a similar view of the assemblage, showing the load confining body in extreme tilted position;

Fig. 3 is an enlarged part sectional plan view of the motion transmitting mechanism, the dump body having been removed and only a fragment of the actuating hoist being shown;

Fig. 4 is a similarly enlarged side elevation of the improved motion transmitting mechanism, as viewed along the line 4—4 of Fig. 3; and

Fig. 5 is a transverse section through one of the side levers and the adjacent body beam, the section being taken along the line 5—5 of Fig. 4.

Although the invention has been illustrated herein as being specifically embodied in a hydraulically actuated rear dump body assemblage associated with a conventional motor driven truck, it is not intended to thereby unnecessarily restrict the scope or utility of the improvement, since the new combination of elements is more generally applicable to other types of jacks, bodies and vehicles.

Referring to the drawings, the frame or chassis 8 of the conventional transporting vehicle is mounted upon rear propelling wheels 9 in the usual manner, and the load confining body 10 is tiltably supported upon the rear of the chassis 8

by means of a relatively high bracket 11 and a pivot 12. The hydraulic hoist for tilting the body 10 has a cylinder 13 swingably suspended at its lower end by means of trunnions 14 from the forward portion of an auxiliary frame 15 which is rigidly supported upon the vehicle chassis 8, and the front portion of the frame 15 is provided with a transverse beam 16 upon which the front ends of the lower body reinforcing beams 17 are adapted to rest when the body 10 is in normal load carrying position as shown in Fig. 1. The body beams 17 are ordinarily located beneath and near the opposite sides of the body 10, and the body may be additionally strengthened by means of other beams and framing as shown. The rear of the body 10 may also be provided with the usual end gate for confining the load therein, and this gate has been omitted from the disclosure.

As previously indicated, the hydraulic hoist cylinder 13 is swingably suspended from the frame 15 by means of trunnions 14, and a pump 18 which is operable from the propelling motor of the vehicle and which is associated with the lower end of the cylinder 13 near the trunnions 14, is adapted to supply liquid such as oil under pressure to the piston displacement chamber. The hoist plunger or piston 19 is reciprocable in the cylinder 13, and has a piston rod 20 which penetrates the upper cylinder head 21 and is provided with a connector or fitting 22 having a transverse opening 23 therethrough which is constricted at its center and enlarged at both ends as clearly illustrated in Fig. 3. The fitting 22 is rigidly attached to the outer extremity of the piston rod 20, and the fitting 22, rod 20 and piston 19 are reciprocable relative to the cylinder 13 but are swingable therewith about the axis of the trunnions 14.

Swingably suspended from the auxiliary frame 15 rearwardly of the trunnions 14 and forwardly of the pivot 12, are two laterally separated side arms or levers 24 which are located in proximity to the body beams 17, and are interconnected at their lower pivoted ends by means of a transverse box beam 25 formed of heavy metal plate. The levers 24 are swingably suspended from the fixed frame 15 by means of a pivot shaft 26 the outwardly projecting ends of which are journaled in bearings 27 secured to the side beams of the frame 15; and the transverse beam 25 is provided at its medial front portion with two spaced ears 28 in which a pivot pin 29 is fixedly anchored by a locking pin 30. The pin 29 coacts loosely with the reduced central portion of the opening 23, in the piston rod fitting 22, as shown in Fig. 3, and it is noteworthy that the pin 29 is located remote from the side levers 24 and from the lever pivot shaft 26. The lower front portions of the levers 24 are provided with rigid parallel rails 31 along which rollers 32 are adapted to travel, and these rollers 32 are journaled on side brackets 33 which are firmly attached to the adjacent body beams 17, see Figs. 3, 4 and 5. The rails 31 are rigidly attached to their carrier levers 24 by means of ribs 34 and end stops 35, and the auxiliary frame 15 may be provided with side guide plates 36 for guiding the front portions of the beams 17 during lowering of the body 10.

When assembling our improved body dumping mechanism, the hoist and the lever assemblage may be mounted upon the auxiliary frame 15 to form a unitary structure which may be handled as a unit and applied as such to a standard ve-

hicle and dump body assemblage. When this hoist and lever unit has been properly positioned and rigidly attached to the vehicle chassis 8, the brackets 33 and rollers 32 should be applied to the lower beams 17 of the dump body 10 so as to properly engage the rails 31, whereupon the mechanism is ready for normal operation.

During loading and normal transportation of the body 10, the body is resting in approximately horizontal position upon the front transverse beam 16, the rollers 32 are disposed at the rear ends of the lever rails 31, and the hydraulic hoist is contracted or in lowered position, as illustrated in Fig. 1. When it becomes desirable to dump or tilt the body 10 about its rear pivot 12, the pump 18 may be operated to introduce liquid under pressure into the lower piston displacement chamber of the cylinder 13, whereupon the hoist will be expanded or distended. The piston 19 and rod 20 will then travel upwardly toward the position shown in Fig. 2, causing the levers 24 to swing about the pivot shaft 26, and simultaneously causing the body rollers 32 to advance along the lever rails 31 whereby the levers become effective to gradually tilt the body 10 with increasing leverage and speed. During this tilting of the body 10, it swings about the rear pivot 12, while the hoist cylinder 13 simultaneously swings about the trunnions 14 and the pivot pin 29 revolves within the fitting opening 23. In order to lower or return the body 10 to normal transporting position, it is only necessary to release the liquid pressure in the cylinder 13, whereupon the weight of the body 10 will force the piston 19 and rod 20 downwardly thus causing the rollers 32 to travel rearwardly along the lever rails 31 and returning the hoist and the levers 24 to lowered position as in Fig. 1.

If the body 10 is not uniformly loaded, and a major portion of the load is at one side of the central plane of the body and hoist, one of the levers 24 will naturally be subjected to greater pressure than the other. The more heavily loaded lever 24 will then tend to distort, but the box beam 25 will prevent relative displacement of the two side levers 24 and will thus hold these levers in proper alignment, thereby preventing distortion in the body due to unequal loading. This will cause the pivot pin 29 to tilt slightly within the loosely fitting opening 23, and due to the special formation of this opening with enlarged end portions, this tilting of the pin 29 will not tend to throw the piston 19 and rod 20 out of true alignment with the cylinder 13, and head 21. The cylinder 13, piston 19 and rod 20 are thus effectively protected against excessive wear due to such distortion or wearing of the lever assembly resulting from abnormal or unequal loading of the body 10.

From the foregoing detailed description, it will be apparent that our present invention provides an improved body dumping mechanism which is simple and durable in construction and which is moreover highly efficient in operation. By utilizing spaced side levers 24 operable by a single intermediate hoist, and by causing the rollers 32, which are carried by the body 10, to coact with rails 31 on the levers 24, the body 10 may be readily tilted without necessity of applying excessive power during starting, and the tilting action will become more rapid as the body 10 reaches its finally tilted position. The special formation of the fitting 22 and its coaction with the pivot pin 29 is obviously such that the parts of the hydraulic hoist are protected to

the maximum extent, even when the body 10 is not uniformly loaded. The levers 24 are of extremely rigid construction, and are firmly united by the box beam 23, and these levers are of adequate strength to tilt the loaded body 10 under most abnormal conditions of loading. By mounting the hoist and lever assemblies on a common frame 15, these assemblies may be handled as a unit and may be readily applied to conventional trucks. The entire mechanism is obviously so simple that it may be manufactured and sold at moderate cost, and the improved lever mechanism has proven highly successful and efficient in actual commercial use.

It should be understood that it is not desired to limit this invention to the exact details of construction or to the precise mode of use, herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

We claim:

1. A dump body assemblage comprising, a vehicle chassis having a dump body pivotally associated therewith, an auxiliary frame mounted upon said chassis and having a hoist pivotally associated therewith, lifting levers disposed at the opposite sides of said body and pivotally mounted upon said frame and having rails forming trackways, brackets secured to said body in proximity to said levers and having thereon rollers which are movable along said trackways, a transverse beam rigidly interconnecting said levers and having a pivot pin rigidly attached thereto, and a fitting connecting the movable member of said hoist with said pin, said fitting being formed to permit lateral tilting of said pin without subjecting said hoist member to lateral stress due to said tilting.

2. A dump body assemblage comprising, a vehicle chassis having a dump body tiltably associated therewith, a hoist swingably associated with said chassis beneath said body and having a lifting member movable toward the body, lifting levers pivotally associated with said chassis near the opposite sides of said body and having trackways extending away from the pivots thereof, rollers carried by the opposite sides of said body and coacting with said trackways, means rigidly interconnecting said levers near the pivots thereof and having a rigid pivot bearing thereon remote from said levers, and a fitting carried by said lifting member and being loosely journaled on said bearing.

3. A dump body assemblage comprising, a vehicle chassis having a dump body tiltably associated therewith, a hoist swingably associated with said chassis beneath said body and having a lifting member movable toward the body, lifting levers pivotally associated with said chassis near the opposite sides of said body and having trackways extending away from the pivots thereof, rollers carried by the opposite sides of said body and coacting with said trackways, a transverse beam rigidly interconnecting said levers near the pivots thereof and having a pivot bearing rigidly attached thereto remote from said trackways, and a fitting carried by said lifting member and having a journal opening loosely embracing said bearing.

4. A dump body assemblage comprising, a vehicle chassis having a dump body tiltably associated with the rear end thereof, a hoist swingably associated with a forward portion of said chassis and having a lifting member movable upwardly toward said body, lifting levers piv-

otally associated with said chassis and having rectilinear trackways extending away from the pivots of said levers, rollers carried by said body remote from its axis of tilting and coacting with said trackways, means rigidly interconnecting said levers and having a pivot bearing thereon between said levers, and a fitting carried by said lifting member and being loosely journaled on said bearing.

5. A dump body assemblage comprising, a vehicle chassis having a dump body tiltably associated with the rear end thereof, a hoist swingably associated with a forward portion of said chassis and having a lifting member movable upwardly toward said body, lifting levers pivotally associated with said chassis and having rectilinear trackways extending away from the pivots of said levers, rollers carried by said body remote from its axis of tilting and coacting with said trackways, a transverse beam rigidly interconnecting said levers and having a pivot bearing rigidly attached thereto remote from said trackways, and a fitting carried by said lifting member and having a journal opening loosely embracing said bearing.

6. A dump body assemblage comprising, a vehicle chassis having a dump body tiltably thereon, a hydraulic hoist swingably associated with said chassis and having a piston rod movable toward said body, lifting levers pivotally mounted on opposite sides of said chassis near the opposite sides of said body and having elongated guideways therein, rollers carried by the opposite sides of said body and coacting with said guideways, a rigid transverse connection between said levers, a pivot pin rigidly attached to the medial portion of said connection remote from said guideways, and a fitting carried by said piston rod and having a journal opening embracing said pivot pin, said opening being constricted at its center and enlarged at its opposite ends.

7. A dump body assemblage comprising, a vehicle chassis having a dump body tiltably associated therewith, a hoist swingably associated with said chassis beneath said body and having a lifting member movable toward the body, lifting levers pivotally associated with said chassis near the opposite sides of said body and having trackways extending away from the pivots thereof, guide means associated with the opposite sides of said body and coacting with said trackways, means rigidly interconnecting said levers near the pivots thereof and having a rigid pivot bearing thereon between said levers, and a fitting carried by said lifting member and being loosely journaled on said bearing.

8. A dump body assemblage comprising, a vehicle chassis having a dump body tiltably associated therewith and comprising a main chassis frame and an auxiliary frame detachably mounted upon the main frame, a hoist tiltably associated with said auxiliary frame beneath said body and having a lifting member movable toward the body, lifting levers pivotally associated with said auxiliary frame near the opposite sides of said body and having trackways extending away from the pivots thereof, guide means associated with the opposite sides of said body and coacting with said trackways, means rigidly interconnecting said levers and having a rigid pivot bearing thereon between said levers, and a fitting carried by said lifting member and being loosely journaled on said bearing.

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