Aug. 4, 1931. E. J. DONDLINGER 1,817,132

DUMPING GEAR

Filed Nov. 12, 1928 4 Sheets-Sheet 1

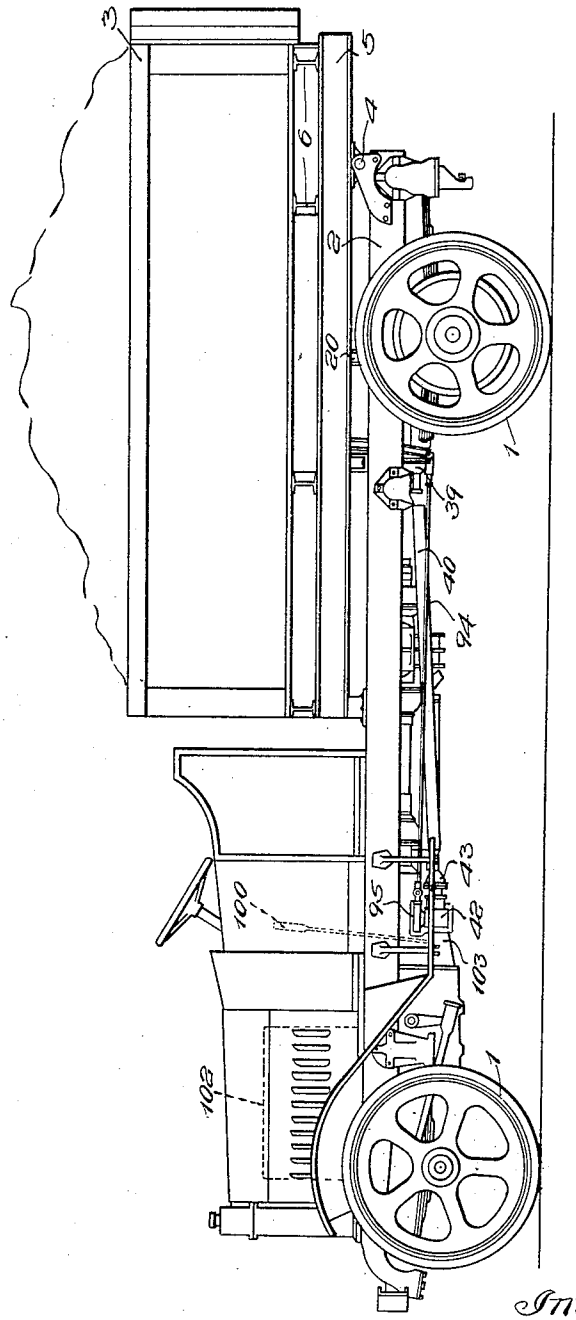


Fig. 1.

Witness:
William P. Kilroy

Inventor:
Eugene J. Dondlinger

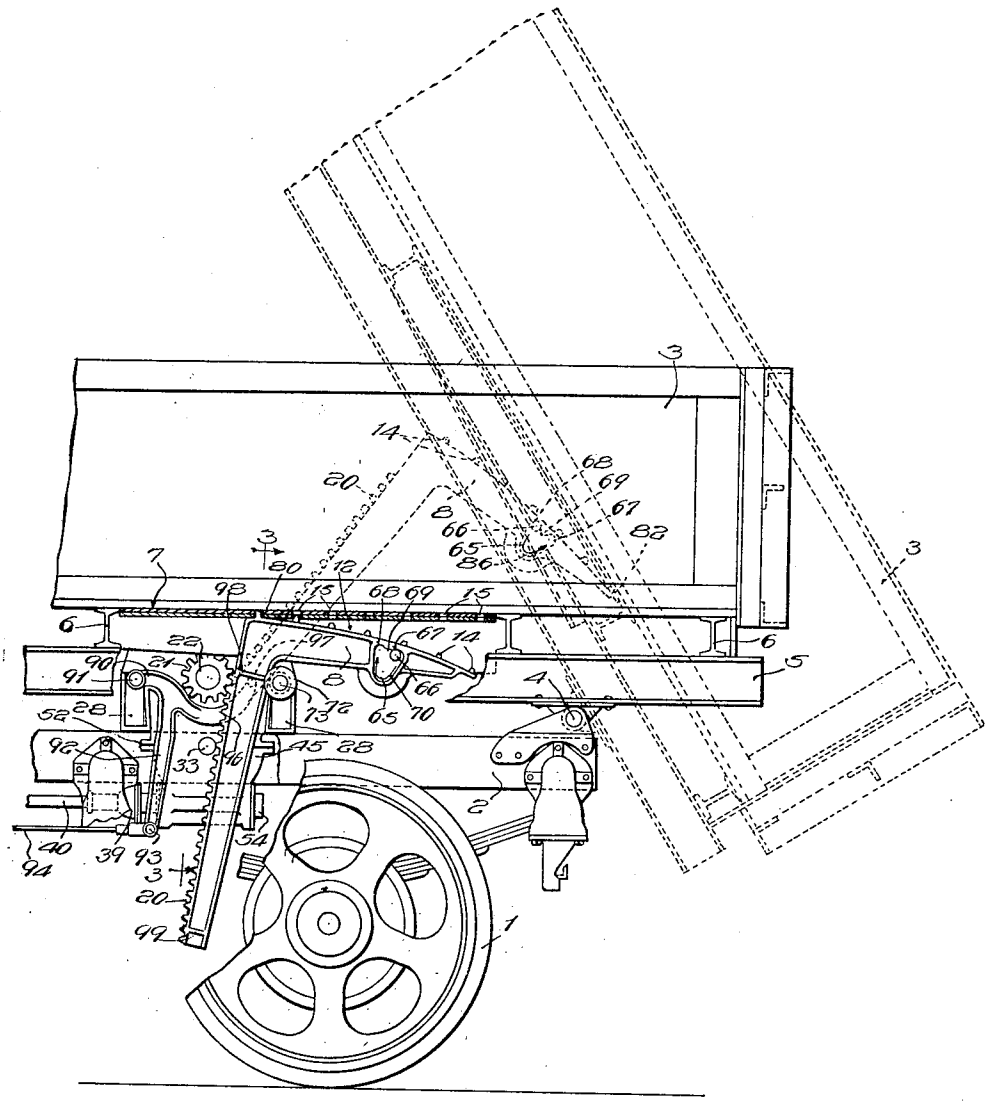
By Brown, Jackson, Boettcher & Dienner
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DUMPING GEAR

Filed Nov. 12, 1928 4 Sheets-Sheet 2

Fig. 2.



Witness:
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DUMPING GEAR

Filed Nov. 12, 1928 4 Sheets-Sheet 3

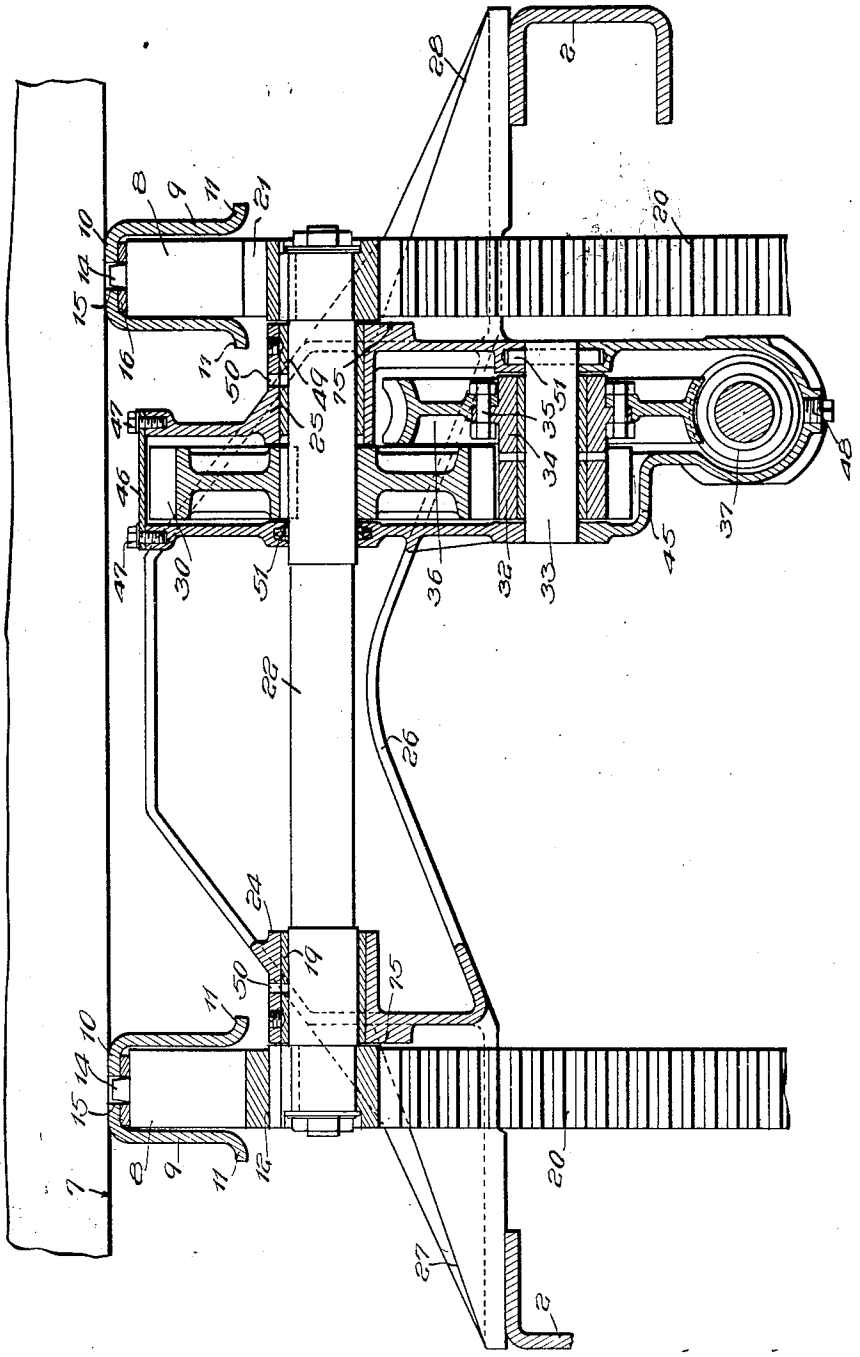


Fig. 3.

Witness:
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Aug. 4, 1931. E. J. DONDLINGER 1,817,132

DUMPING GEAR

Filed Nov. 12, 1928 4 Sheets-Sheet 4

Fig. 4.

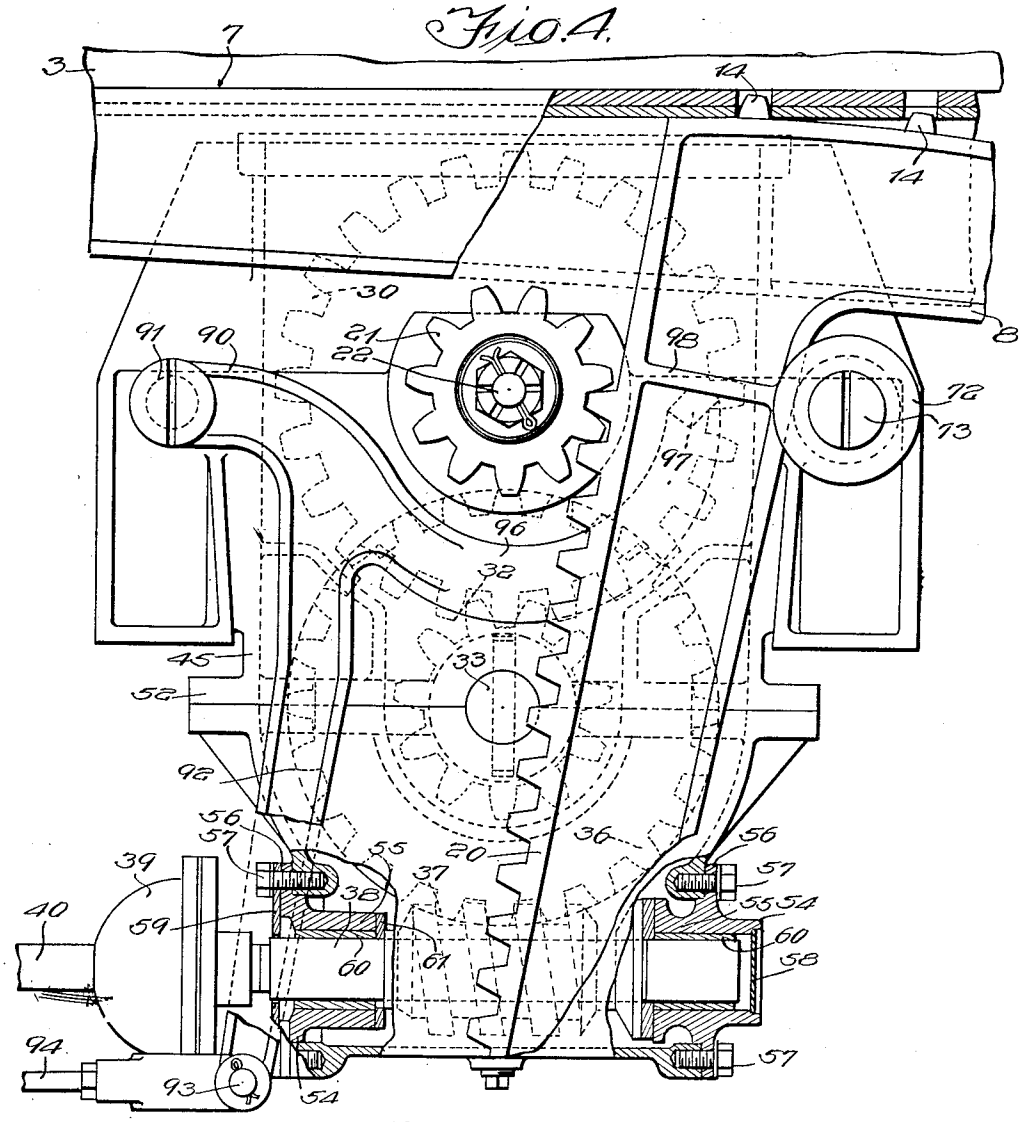
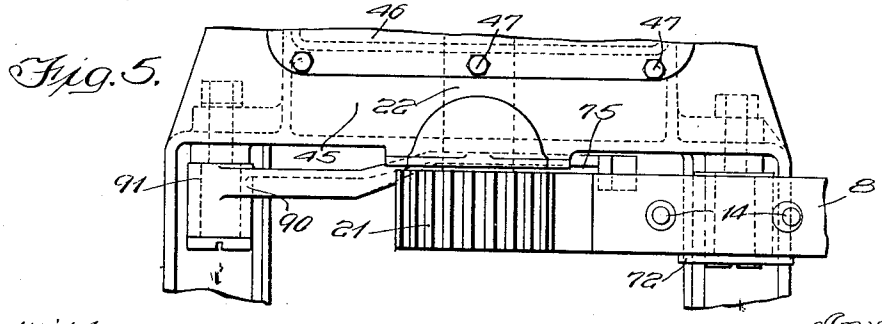


Fig. 5.



Witness:
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Inventor:
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Patented Aug. 4, 1931

1,817,132

UNITED STATES PATENT OFFICE

EUGENE J. DONDLINGER, OF CHICAGO, ILLINOIS

DUMPING GEAR

Application filed November 12, 1928. Serial No. 318,723.

This invention relates to a dumping gear for trucks and the like. The invention is particularly applicable to use in dumping vehicle bodies, but I do not intend to limit the invention to such use only.

It is well known that, in tilting a dumping body, the greatest power is required upon the initial lifting of the body to start the dumping operation and the greatest strain upon the mechanism comes at this time. As the body is tilted up, the power required becomes less until the point is reached where the material is all dumped from the body and merely the empty body needs to be supported. As the body is raised, the weight is balanced more and more over the hinge or pivot for the body or placed more and more upon this hinge or pivot until fully raised or tilted position is reached, in which position the body is substantially balanced over the hinge or pivot therefor, or at least the major portion of the weight is placed upon the body hinge or pivot at this time.

According to my present invention, I provide simple and effective means for securing maximum power or leverage for the initial operation of lifting and I decrease the power or leverage and increase the speed of operation as the body rises and the load becomes lighter. More particularly, I provide a hoisting device for transmitting the lifting power, which device operates through a variable leverage. This is secured by the use of a rocker arm or rocker means, which gradually shifts the application of the lifting effort or power rearwardly or toward the body hinge or pivot as the body rises. As the lifting effort is applied with the body in horizontal position, the rocker arm applies this effort through a maximum leverage or farthest from the body hinge or pivot and, as the body rises, the rocker arm shifts the application of the lifting effort toward the body hinge or pivot. This decreases the leverage of application to provide a more uniform application of the lifting force, that is, a more uniform ratio between the lifting force and the weight of the load against which said force acts and, at the same time, the speed of the tilting movement of the body increases as the power or leverage of power application decreases. This increases the speed of the dumping operation. The rocker arm is actuated by a straight rack, as distinguished from the curved rack and application of the lifting effort to the same point on the body throughout the tilting or dumping range, as resorted to heretofore in the art.

For the purpose of locating the rocker on the body and holding the body from going back over rearwardly at the upper limit of the dumping operation, keeper means is preferably provided on the body, although it is contemplated that this means may be varied, or even omitted, within the scope of the present invention. The rocker arm and body are also preferably provided with complementary spaced projections and recesses, which are adapted to be successively engaged or interlocked to keep the parts properly correlated and particularly at the proper angle. By the use of the rocker means employed and the shifting of the lifting effort toward the hinge or pivot of the body on the vehicle frame, a greater dumping angle is also obtained with a rack or strut of less length.

The fundamental feature of novelty is the employment of a rocker arm or rocker means which, although preferably integral with the rack, could be made separate therefrom, and the shifting of the application of the lifting effort or power toward the body hinge or pivot thereby. Another feature is in the use of a straight rack and the increased dumping angle obtained with a straight rack of less length by the use of the rocker means referred to. Another feature is in the keeper means for locating the rocker on the body and for holding the body from going back over rearwardly at the upper limit of the dumping operation and another feature is in the cooperating projections and recesses on the body and rocker means for keeping the parts properly correlated and at the proper angle.

The manner of operation of the straight rack serves merely to transmit the lifting

effort or power to the rocker means and the manner of operation of this rack enables it to work down through and below the vehicle frame and it may be readily arranged so as to not conflict with other requirements of the frame.

In order to acquaint those skilled in the art with the manner of constructing and practicing the present invention, I shall now describe a particular embodiment of the invention in connection with the accompanying drawings, in which:

Figure 1 is a side elevational view of a motor dumping truck, showing an embodiment of the present invention in connection therewith;

Figure 2 is an enlarged fragmentary side elevational view, showing the gear train of the truck body of Figure 1, with parts broken away to more clearly reveal the dumping gear of the present invention;

Figure 3 is a fragmentary transverse section, taken substantially on the line 3—3 of Figure 2;

Figure 4 is an enlarged fragmentary side elevational view, showing the gear train and straight rack means for imparting the lifting effort or power to the rocker means of the dumping gear; and

Figure 5 is a fragmentary top plan view.

The vehicle or truck selected for illustration has the usual or any suitable running gear, including the wheels 1, and is provided with the usual or any suitable frame, which includes the sills or longitudinal side frame members 2. This frame preferably, though not necessarily comprises a part of the chassis of the vehicle. A separate frame might be provided and such a separate frame could be secured on the chassis. The dumping body 3 is pivoted or hinged at 4 to the frame members 2 as well understood by those skilled in the art. This dumping body 3 preferably has a sub-frame 5 and the body 3 may be mounted upon this sub-frame 5, as by means of the cross-beams 6, although this is all immaterial and may be varied widely within the scope of the present invention.

Underlying the bottom 7 of the body 3 are a pair of rocker arms 8. These rocker arms 8 are disposed longitudinally of the body 3, one beneath each of the opposite sides of the body, as shown in Figure 3. For holding the body 3 against lateral displacement from the rocker arms 8, as for example, where the vehicle is on a steep lateral grade, the bottom of the body 3 is preferably provided with a pair of downwardly opening channels 9. The bases of these channels 9 are suitably secured at 10 to the bottom of the body 3 and their cross-sections are proportioned to individually receive the rocker arms 8, the depending side flanges of the channels 9 providing suitable lateral retention for preventing the lateral displacement above referred to.

The lower marginal edges of the side flanges of the channels 9 are preferably turned or flared out slightly, as indicated at 11. The upper surfaces 12 of the rocker arms 8 are preferably rounded, as shown, to provide the desired rocker action upon the bottom of the body 3. In order to keep the rocker arms 8 properly correlated and at the proper angle with respect to the bottom of the body 3, the upper rounded surfaces 12 of these arms 8 are preferably provided with spaced protuberances 14 for successive engagement in complementary recesses or sockets 15. The recesses 15 are shown as formed in the upper bases of the channels 9, which bases may be provided internally of the channels with suitable strips 16 having registering recesses for giving the recesses 15 the desired depth, so that the protuberances or teats 14 may properly engage therein without projecting from the recesses or into engagement with the bottom wall of the body overlying said recesses. The protuberances 14 are preferably tapered, as shown, to properly engage and interlock with the recesses 15 in the rocking action of the arms 8 upon the bottom of the body 3.

Each of the rockers 8 is provided with a straight rack 20. In the illustrated embodiment, one of the straight racks 20 is shown as being formed integral with each of the rockers 8, but it is to be understood that the racks may be formed separately from the rockers and joined or otherwise operatively connected therewith.

The straight formation of these racks 20 simplifies the formation of the rack teeth and the greater dumping angle provided by the rocking action of the rockers 8 permits these racks 20 to depend down substantially vertically, without interfering with road clearance requirements, because with the present invention the greater dumping angle is obtained with a rack of less length.

Each rack 20 meshes with one of a pair of pinions 21, suitably secured upon the opposite ends of a transverse shaft 22 for rotation therewith. Shaft 22 is journalled at 24 and 25 in suitable bearings, which may be formed integral with a saddle frame or bracket 26, extending transversely across the vehicle frame members 2 and suitably supported at its opposite ends at 27 and 28 thereon, it being understood that these ends 27 and 28 may be bolted or otherwise suitably secured to the frame members 2. A gear 30, also fixed upon the shaft 22 to turn therewith, meshes with a smaller pinion 32, suitably journalled upon a short shaft 33. The pinion 32 is shown as having an integral extension neck or hub 34 to which is secured, as by bolts 35, a worm wheel 36

which, upon rotation, rotates the pinion 32 therewith. Worm wheel 36 meshes with a worm 37 (Figures 3 and 4). Worm 37 is splined upon, or otherwise connected, to turn with a shaft 38, which shaft 38 is, in turn, drivingly connected through a universal joint 39 and extension shaft 40, with any suitable power takeoff from the vehicle transmission or other motor driven part, where the dumping gear is applied to a motor truck.

In Figure 1, the power take-off connection to the extension shaft 40 is shown as being from the change speed transmission 42 to the forward end of the shaft 40, but this may vary. The forward end of shaft 40 is shown as being connected with the transmission 42 through a universal driving connection 43.

Worm 37, worm wheel 36, pinion 32 and spur gear 30 constitute a reduction gearing between the rearward end of the shaft 40 and the transverse hoist shaft 22 and this gearing is preferably enclosed within a suitable case or housing 45, preferably formed integral with the bracket or frame 26. The top of the case 45 is provided with a removable cover 46, which may be secured in place by cap screws 47 and the bottom of the case 45 beneath the worm 37 is provided with a removable drain plug 48. The bearings 24 and 25 are, preferably, provided with bearing sleeves 49, which may be of brass, bronze or other suitable material and suitable openings 50 are provided for lubricating these bearings. Shaft 33 is journalled at its opposite ends in the case 45, which may be provided with suitable oil seal pockets 51. Case 45 may be split at 52 to permit removal of the bottom portion of the case.

Shaft 38 is journalled at its opposite ends in bearing members 54, having inwardly projecting hub portions 55 and annular flanges 56 secured around coaxial openings 57 in case 5, as by means of cap screws 57.

A disc 58 suitably secured in the rearward bearing member 54 seals the passage therethrough rearwardly and a plate 59, secured to the forward bearing member 54, is provided with an opening permitting the extension of the shaft 38 and this plate 59 tends to seal the forward bearing member forwardly. Bearing sleeves 60 are provided within the bearings 54 and suitable rings 61 are interposed between the opposite ends of the worm 37 and the respective bearings 54.

For the purpose of locating the rocker arms 8 on the body 3 and for holding the body from going back over rearwardly at the upper limit of the dumping operation, each of the rocker arms 8 is provided with a keeper opening or pocket 65 and the body 3 is provided with a pair of lateral pins 66, one engaging in each of the keepers 65. The upper portion of the keeper pocket 65, as viewed in Figure 2, has a pair of depressions 67 and 68 separated by a depending projection 69. In the normal horizontal position of the body 3 as shown in full lines in Figure 2, the pins 66 are positioned in the depressions 67 substantially as shown in Figure 2 and, as the body tilts upwardly, the pins 66 travel through the paths indicated by the arrows 70 (Figure 2) to position in the depressions 68, as indicated in the dotted line tilted position in Figure 2. Suitable guide rollers 72 may be journalled at 73 upon the bracket or frame 26 for cooperation with the adjacent edges of the rack bars 20. The shoulders 75 on the frame 26, adjacent the racks 20, form stops for limiting or preventing transverse inward displacement of the racks 20.

The operation of the device is as follows:

Normally, when the body 3 is lying flat or horizontally upon the frame 2, the straight rack arms or struts 20 extend downwardly below the frame 2 and tangentially with respect to the meshing pinions 21. As power is applied to the cross shaft 22 through the take-off, extension shaft 40, worm 37, worm wheel 36, pinion 32 and gear 30, the rotation of the pinions 21 moves the rack bars 20 upwardly from their normal full line positions toward the positions shown in dotted lines in Figure 2, which dotted line positions are reached at the limit of the tilting or dumping movement of the body. With the body in horizontal position, the forwardmost projections 14 of the rocker arms 8 are engaged in recesses 15 on the bottom of the body and the initial lifting effort or power is applied to the bottom of the body through the forward ends of the rockers 8 at substantially the points 80 in Figure 2. As the body rises, the rearwardly spaced projections are successively engaged with the rearwardly spaced recesses or openings 15 and the application of the lifting effort or power is gradually shifted rearwardly along the upper surfaces of the rockers 8 to substantially the points 82 at the limit of the tilting movement. The relatively great leverage or radii from the hinges or pivots 4 to the points of power application 80 imposes great initial power to take up the load where its effect and strain on the dumping gear is greatest.

Then, as the body and load rise, the shifting of the application of the lifting effort rearwardly gradually decreases the leverage or radii from the hinge or pivot 4 to the point of application of the lifting effort. This decreases the power as the body rises and the load becomes lighter and, at the same time, the speed of the tilting movement of the body increases as the power or leverage of power application decreases.

A more uniform application of the lifting force, that is, a more uniform ratio between the lifting force and the weight of the load against which the force operates is obtained and the speed of the dumping operation is increased. In addition, the decrease in the leverage and the relatively small radius of application toward the limit of the dumping or tilting movement of the body provides a relatively great dumping or tilting movement with a relatively slight movement of the straight rack bar 20. In this manner, a greater dumping angle may be obtained with a rack or strut of less length and the rack 20 may depend substantially vertically below the vehicle frame 2 and, at the same time, provide the desired dumping angle, without necessitating making the rack of such a length as to interfere with adequate road clearance requirements. As already pointed out, the box or keeper openings 65 allow different positions of the pins 67, which travel in the direction of the arrows 70 from the upper depressions 67 to the opposite upper depressions 68. The successive engagement of the upper projections 14 on the upper surfaces of the rockers 8, with the openings 15, maintains the parts properly correlated and keeps the rocker and rack arms at the proper angles.

The keeper means 65, 66 holds the body from going over backward or rearwardly at the limit of the tilting or dumping operation and this keeper means holds the rocker arms in position when the body is down.

For the purpose of returning the body to its normal horizontal position, the take-off means is reversed in any suitable or preferred manner, as well understood in the art. This rotates the cross shaft 22 in the opposite direction and the pinions 21 thereupon drive the racks 20 downwardly from the tilted position to the normal horizontal position, as shown in full lines in Figure 2. Obviously, as the body is returned to its horizontal position, the rocker arms 8 gradually shift the effective point of the load thereon forwardly. At the same time, the pins 66 return in the direction of the arrow 86 in Figure 2 to the depressions 67.

The device may be provided with suitable means for discontinuing the power application at the upper and lower limits of movement of the tilting body 3. While this means may be varied widely, the illustrated mechanism for this purpose comprises a trip arm 90 pivoted at 91 upon the bracket or frame member 26, for example. The depending arm 92 of the trip arm 90 is connected at 93 with a rod or other suitable longitudinal extension 94, which is connected at its forward end with suitable means 95 illustrated more or less diagrammatically in Figure 1, for disconnecting the power application to the extension shaft 40 by the longitudinal shifting movement of the rod 94 in either direction.

The other arm 96 of the trip member 90 is arched under the adjacent pinion 21 and is turned out at its free ends at 97 for cooperation with a cross web or abutment 98 on the rack bar 20. The cross web or abutment 98 is adjacent the upper end of the rack bar 20 and adjacent its lower end this bar has a second cross web or abutment 99 also cooperable with the projection 97 on the arm 96.

The power disconnecting means 95 may be of any existing or other suitable type, well understood in the art, and it is not believed that a detailed disclosure of the same is necessary here. Suffice it to say that, as the body is tilted upwardly, the lower abutment 99 approaches the projection 97 and, at the limit of the upward tilting movement, engages this projection 97 and swings the arm 90 about its pivot 91, which shifts the rod or connection 94 rearwardly and cuts off or disconnects the power application to the dumping gear. As the body 3 is returned to a horizontal position, the abutment engages the projection 97 at the limit of the downward movement and this again swings the arm 90 about the pivot 91, which shifts the rod 94 forwardly and again disconnects or discontinues the power application to the dumping gear. It is understood, of course, that the application of the power to the dumping gear is controlled from the driver's seat, as by means of a suitable lever indicated more or less diagrammatically at 100 in Figure 1.

With the body in horizontal position, the power from the vehicle is connected with the dumping gear by appropriately shifting the lever 100 and, after the power has been automatically disconnected at the limit of the upward tilting movement of the body, it may be again connected with the dumping gear to return the body to its horizontal position by again shifting the lever 100. The engine or power plant of the particular truck illustrated is indicated at 102 and the change speed transmission from which the dumping gear power take-off is connected is indicated at 103.

I do not intend to be limited to the details shown or described. I claim:

1. In combination, a frame, a platform pivoted thereto, a rocker hung loosely upon and movable relative said platform for imposing the lifting effort upon the platform by rocking coaction therewith, said rocker having a curved side for rocking engagement with the bottom of the platform, said curved side shifting its engagement with the platform continuously toward the platform pivot over the entire platform lifting operation to continuously shorten the distance from the platform pivot on the frame to the

rocking engagement of the rocker with the platform, means for actuating said rocker, keeper means on the rocker for holding the platform against tilting back over rearwardly at the limit of its tilting movement and for locating the rocker on the platform, and pin means on the platform projecting into said keeper means and having orbital movement therein.

2. In combination, a frame, a platform pivoted thereto, a rocker hung loosely upon and movable relative said platform for imposing the lifting effort upon the platform by rocking coaction therewith, said rocker having a curved side for rocking engagement with the bottom of the platform, said curved side shifting its engagement with the platform continuously toward the platform pivot over the entire platform lifting operation to continuously shorten the distance from the platform pivot on the frame to the rocking engagement of the rocker with the platform, means for actuating said rocker, means on the platform for preventing relative transverse displacement between platform and rocker, complementary and successively engaged means on platform and rocker for holding the rocker positioned with reference to the platform, keeper means on the rocker, and pin means projecting from the platform into said keeper means and having orbital movement therein.

3. In combination, a vehicle frame, a tilting body pivoted thereto, a gear journalled on the frame, a straight rack meshing with said gear and actuated thereby, a rocker connected with said rack and actuated by said rack, said rocker having a rounded surface for coaction with the tilting body to apply a lifting effort thereto and to shift the application of the lifting effort along the body to decrease the leverage and increase the speed of tilting action as the body rises, the body having a series of spaced apertures, a series of projections extending from the rounded surface of said rack and successively engageable in said apertures, and an inverted channel on the body for receiving said rocker.

4. In combination, a vehicle frame, a tilting body pivoted thereto, a gear journalled on the frame, a straight rack meshing with said gear and actuated thereby, a rocker connected with said rack and actuated by said rack, said rocker having a rounded surface for coaction with the tilting body to apply a lifting effort thereto and to shift the application of the lifting effort along the body to decrease the leverage and increase the speed of tilting action as the body rises, a keeper on the rocker and a pin projecting from the body into said keeper and having orbital movement therein.

5. In combination, a frame, a body pivoted on said frame, means for tilting said body about its pivot on the frame to discharge the contents from said body, said means comprising a rocker hung loosely upon said body and movable relative thereto, said rocker being shiftable to and from the body at its loose hanging connection with the body and from end to end, one end of said rocker initially engaging the bottom of the body, and the opposite end being initially spaced from and out of engagement with the body with the spacing between said rocker and body continuously increasing from the body engaging end to the opposite end of the rocker, and the loose hanging of the rocker upon the body permitting the initially engaged end of the rocker to move from engagement with the body and the opposite end of the rocker toward engagement with the body with a continuous shifting of the engagement of the rocker with the body longitudinally along the bottom of the body toward the pivot on the frame for continuously shortening the distance from the pivot to the rocking engagement of the rocker with the body, said continuously shifting engagement of the rocker with the body being from one end of the rocker to the other end and over the entire tilting movement of the body.

6. In combination, a frame, a body pivoted on said frame, means for tilting said body about its pivot on the frame to discharge the contents from said body, said means comprising a rocker hung loosely upon said body and movable relative thereto, said rocker being shiftable to and from the body at its hanging connection with the body and from end to end, one end of said rocker initially engaging the bottom of the body, and the opposite end being initially spaced from and out of engagement with the body with the spacing between said rocker and body continuously increasing from the body engaging end to the opposite end of the rocker, the loose hanging of the rocker upon the body permitting the initially engaged end of the rocker to move from engagement with the body and the opposite end of the rocker toward engagement with the body with a continuous shifting of the engagement of the rocker with the body longitudinally along the bottom of the body toward the pivot on the frame for continuously shortening the distance from the pivot to the rocking engagement of the rocker with the body, said continuously shifting engagement of the rocker with the body being from one end of the rocker to the other and over the entire tilting movement of the body, and means for actuating said rocker.

7. In combination, a frame, a body pivoted on said frame, means for tilting said body about its pivot on the frame to discharge the contents from said body, said means comprising a rocker hung loosely

upon said body and movable relative thereto, said rocker being shiftable to and from the body at its hanging connection with the body and from end to end, one end of said rocker initially engaging the bottom of the body, and the opposite end being initially spaced from and out of engagement with the body with the spacing between said rocker and body continuously increasing from the body engaging end to the opposite end of the rocker, the loose hanging of the rocker upon the body permitting the initially engaged end of the rocker to move from engagement with the body and the opposite end of the rocker toward engagement with the body with a continuous shifting of the engagement of the rocker with the body longitudinally along the bottom of the body toward the pivot on the frame for continuously shortening the distance from the pivot to the rocking engagement of the rocker with the body, said continuously shifting engagement of the rocker with the body being from one end of the rocker to the other and over the entire tilting movement of the body, and means for actuating said rocker, said rocker actuating means comprising a straight rack connected with the rocker.

8. In combination, a frame, a body pivoted on said frame, means for tilting said body about its pivot on the frame to discharge the contents from said body, said means comprising a rocker hung loosely upon said body and movable relative thereto, said rocker being shiftable to and from the body at its hanging connection with the body and from end to end, one end of said rocker initially engaging the bottom of the body, and the opposite end being initially spaced from and out of engagement with the body with the spacing between said rocker and body continuously increasing from the body engaging end to the opposite end of the rocker, the loose hanging of the rocker upon the body permitting the initially engaged end of the rocker to move from engagement with the body and the opposite end of the rocker toward engagement with the body with a continuous shifting of the engagement of the rocker with the body longitudinally along the bottom of the body toward the pivot on the frame for continuously shortening the distance from the pivot to the rocking engagement of the rocker with the body, said continuously shifting engagement of the rocker with the body being from one end of the rocker to the other and over the entire tilting movement of the body, and means for limiting the tilting of the body and for holding the body against tilting back over rearwardly at the limit of its tilting movement upon the frame.

9. In combination, a frame, a body pivoted on said frame, means for tilting said body about its pivot on the frame to discharge the contents from said body, said means comprising a rocker hung loosely upon said body and movable relative thereto, said rocker being shiftable to and from the body at its hanging connection with the body and from end to end, one end of said rocker initially engaging the bottom of the body, and the opposite end being initially spaced from and out of engagement with the body with the spacing between said rocker and body continuously increasing from the body engaging end to the opposite end of the rocker, the loose hanging of the rocker upon the body permitting the initially engaged end of the rocker to move from engagement with the body and the opposite end of the rocker toward engagement with the body with a continuous shifting of the engagement of the rocker with the body longitudinally along the bottom of the body toward the pivot on the frame for continuously shortening the distance from the pivot to the rocking engagement of the rocker with the body, said continuously shifting engagement of the rocker with the body being from one end of the rocker to the other end and over the entire tilting movement of the body, and means on the body for preventing relative transverse displacement between the body and the rocker.

10. In combination, a frame, a body pivoted on said frame, means for tilting said body about its pivot on the frame to discharge the contents from said body, said means comprising a rocker hung loosely upon said body and movable relative thereto, said rocker being shiftable to and from the body at its hanging connection with the body and from end to end, one end of said rocker initially engaging the bottom of the body, and the opposite end being initially spaced from and out of engagement with the body with the spacing between said rocker and body continuously increasing from the body engaging end to the opposite end of the rocker, the loose hanging of the rocker upon the body permitting the initially engaged end of the rocker to move from engagement with the body and the opposite end of the rocker toward engagement with the body with a continuous shifting of the engagement of the rocker with the body longitudinally along the bottom of the body toward the pivot on the frame for continuously shortening the distance from the pivot to the rocking engagement of the rocker with the body, said continuously shifting engagement of the rocker with the body being from one end of the rocker to the other and over the entire tilting movement of the body, and means for holding the rocker positioned with reference to the body.

11. In combination, a frame, a body pivot-

ed on said frame, means for tilting said body about its pivot on the frame to discharge the contents from said body, said means comprising a rocker hung loosely upon said body and movable relative thereto, said rocker being shiftable to and from the body at its hanging connection with the body and from end to end, one end of said rocker initially engaging the bottom of the body, and the opposite end being initially spaced from and out of engagement with the body with the spacing between said rocker and body continuously increasing from the body engaging end to the opposite end of the rocker, the loose hanging of the rocker upon the body permitting the initially engaged end of the rocker to move from engagement with the body and the opposite end of the rocker toward engagement with the body with a continuously shifting engagement of the rocker with the body along the rocker from the initially engaged end to the opposite end of the rocker for the purpose of continuously shifting the engagement of the rocker with the body from one end of the rocker to the other and over the entire tilting movement of the body, means for actuating said rocker, said rocker actuating means comprising a straight rack connected with the rocker, and a gear journaled upon the frame and meshing with said rack for actuating said rocker.

12. In combination, a frame, a body pivoted on said frame, means for tilting said body about its pivot on the frame to discharge the contents from said body, said means comprising a rocker hung loosely upon said body and movable relative thereto, said rocker being shiftable to and from the body at its hanging connection with the body and from end to end, one end of said rocker initially engaging the bottom of the body, and the opposite end being initially spaced from and out of engagement with the body with the spacing between said rocker and body continuously increasing from the body engaging end to the opposite end of the rocker, and the loose hanging of the rocker upon the body permitting the initially engaged end of the rocker to move from engagement with the body and the opposite end of the rocker toward engagement with the body with a continuous shifting of the engagement of the rocker with the body longitudinally along the bottom of the body toward the pivot on the frame for continuously shortening the distance from the pivot to the rocking engagement of the rocker with the body, said continuously shifting engagement of the rocker with the body being from one end of the rocker to the other end and over the entire tilting movement of the body, said rocker having its body engaging edge rounded.

13. In combination, a frame, a body pivoted on said frame, means for tilting said body about its pivot on the frame for discharging the contents from the body, said means comprising a pair of rockers hung loosely upon said body and movable relative thereto, said rockers being shiftable to and from the body at their hanging connection with the body and from end to end, one end of each of said rockers initially engaging the bottom of the body and the opposite end being spaced from and out of engagement with the body with the spacing between the rockers and body continuously increasing from the body engaging ends to the opposite ends of the rockers, the loose hanging of the rockers upon the body permitting the initially engaged ends of the rockers to move from engagement with the body and the opposite ends of the rockers toward engagement with the body with a continuously shifting engagement of the rockers with the body along the rockers from their initially engaged ends to their opposite ends for the purpose of continually shifting the engagement of the rockers with the body from one end of each rocker to the opposite end and over the entire tilting movement of the body, means for actuating said rockers, said rocker actuating means comprising a straight rack connected with each rocker, a cross shaft mounted on the frame and a pair of gears on said shaft and meshing with each said racks for actuating said rockers.

14. In combination, a frame, a body pivoted on said frame, means for tilting said body about its pivot on said frame for discharging the contents from the body, said means comprising a generally L-shaped member hung loosely upon the body and movable relative thereto, one leg of said generally L-shaped member forming a rocker having one end adapted for initially engaging the bottom of the body and the opposite end spaced from and out of engagement with the body with the spacing between said rocker and body continuously increasing from the body engaging end to the opposite end of the rocker, the loose hanging of said generally L-shaped member upon the body permitting the initially engaged end of the rocker to move from engagement with the body and the opposite end of the rocker toward engagement with the body with a continuously shifting engagement of the rocker with the body along the rocker from the initially engaged end to the opposite end for the purpose of continuously shifting the engagement of the rocker with the body from one end of the rocker to the other and over the entire tilting movement of the body and the other leg of said generally L-shaped member forming a straight rack for actuating said rocker, an actuating gear meshing with said rack, means for limiting move-

ment of the body and for holding the body against tilting back over rearwardly at the limit of its tilting movement upon the frame, and means on the body for preventing relative transverse displacement between the body and rocker.

15. In combination, a vehicle frame, a tilting body pivoted thereto, a rotary element carried by said frame, a reciprocable member operable by said element, and a rocker associated with said member and movable thereby, said rocker having a surface coacting with said body to apply upward pressure thereto at points progressing along said body to decrease the leverage and increase the speed of tilting as the body rises.

16. In combination, a vehicle frame, a tilting body pivoted thereto, a pinion rotatably supported upon said frame, a reciprocable rack movable by said pinion, and a rocker formed integral with said rack and movable thereby, said rocker having a surface coacting with said body to apply upward pressure thereto at points progressing along said body to decrease the leverage and increase the speed of tilting as the body rises.

17. In combination, a vehicle frame, a tilting body pivoted to the rear portion of said frame, a pinion rotatably supported by said frame, a reciprocable straight rack operable by said pinion, means for maintaining said rack in engagement with said pinion while permitting oscillation of said rack, and a rocker formed integral with said rack and movable thereby, said rocker having a surface coacting with said body to apply upward pressure thereto at points progressing along said body to decrease the leverage and increase the speed of tilting as the body rises.

In witness whereof, I hereunto subscribe my name this 8th day of November, 1928.

EUGENE J. DONDLINGER.