March 5, 1929. W. C. ANTHONY 1,704,274

DUMPING BODY

Filed Sept. 4, 1928 3 Sheets-Sheet 1

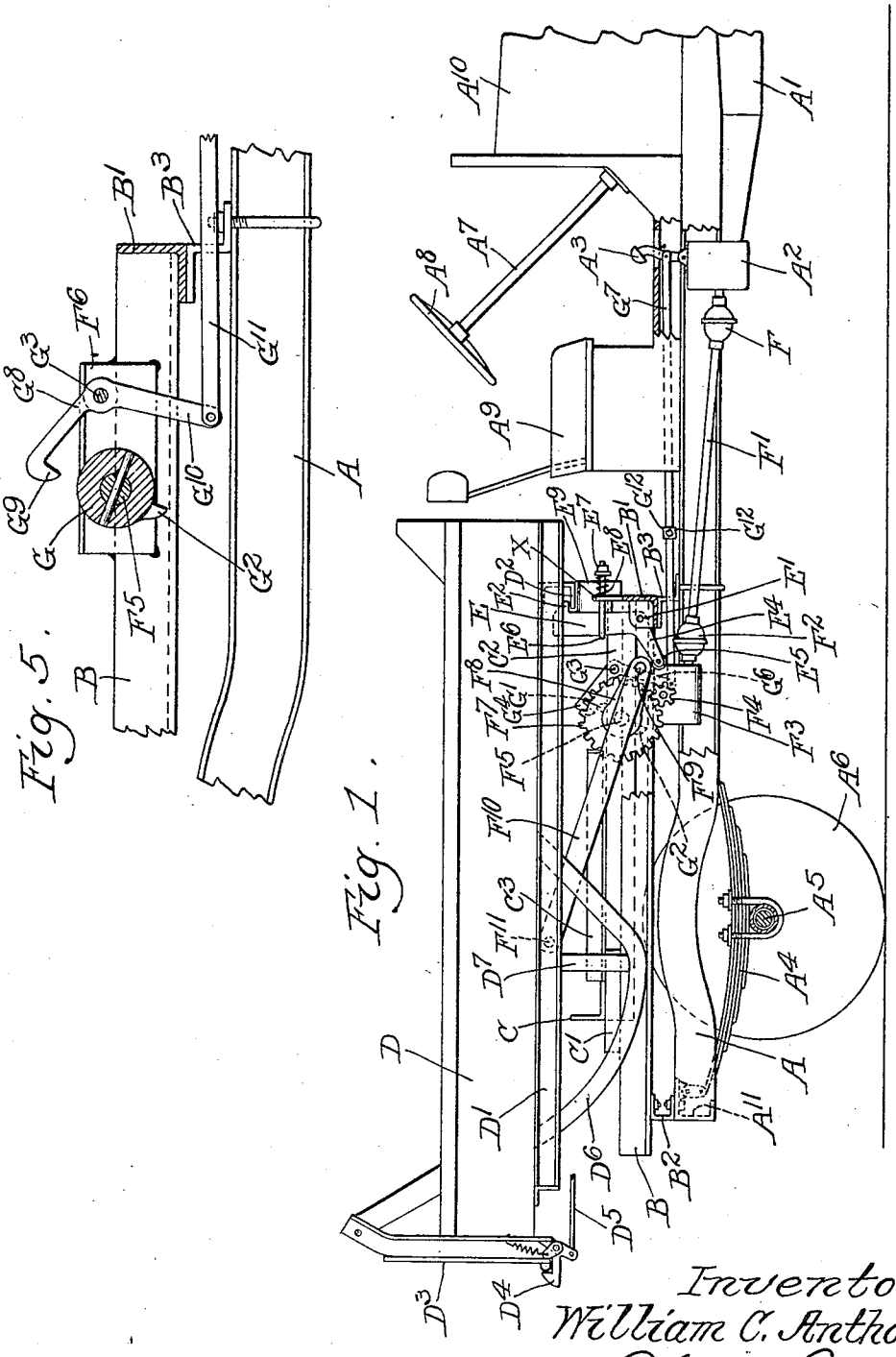


Fig. 1.

Fig. 5.

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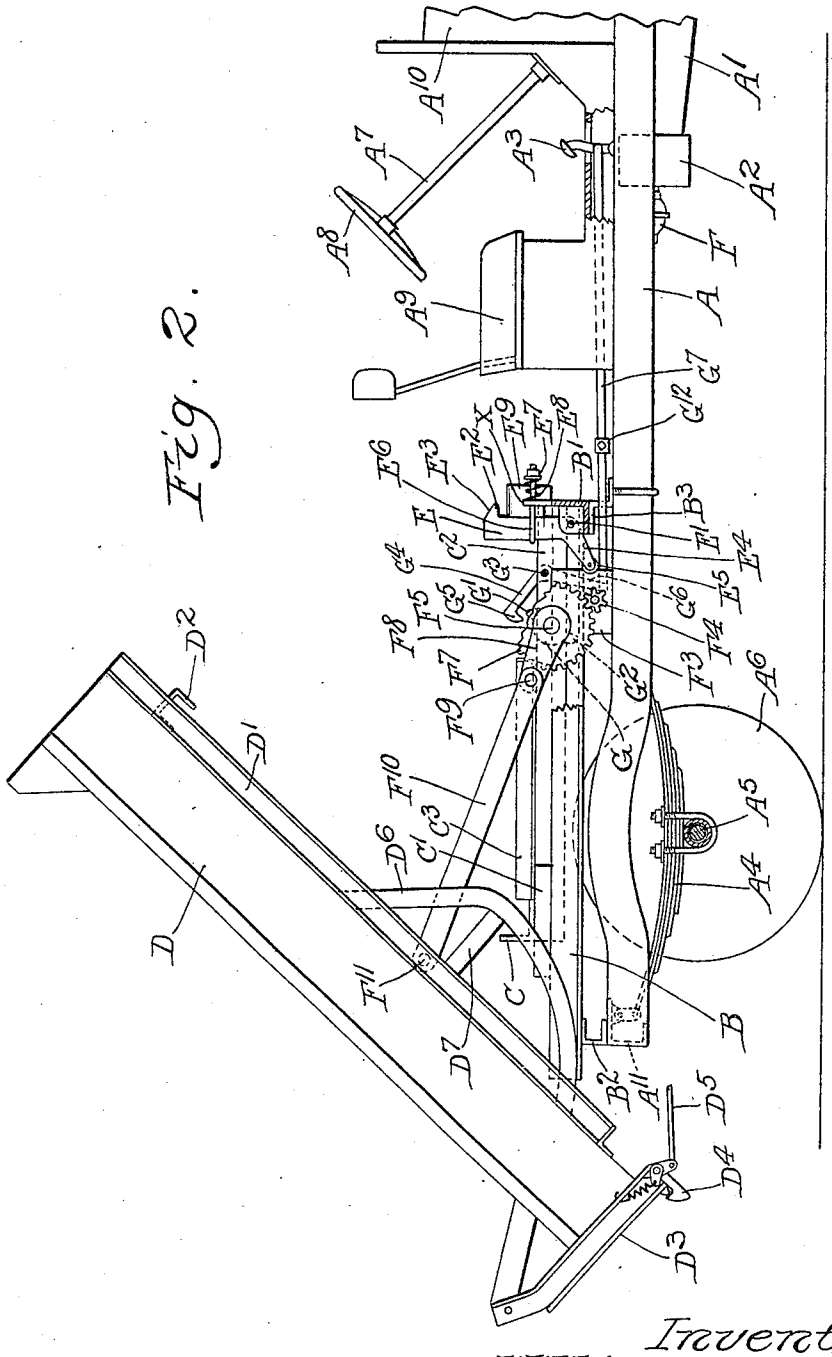


Fig. 2.

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Fig. 3.

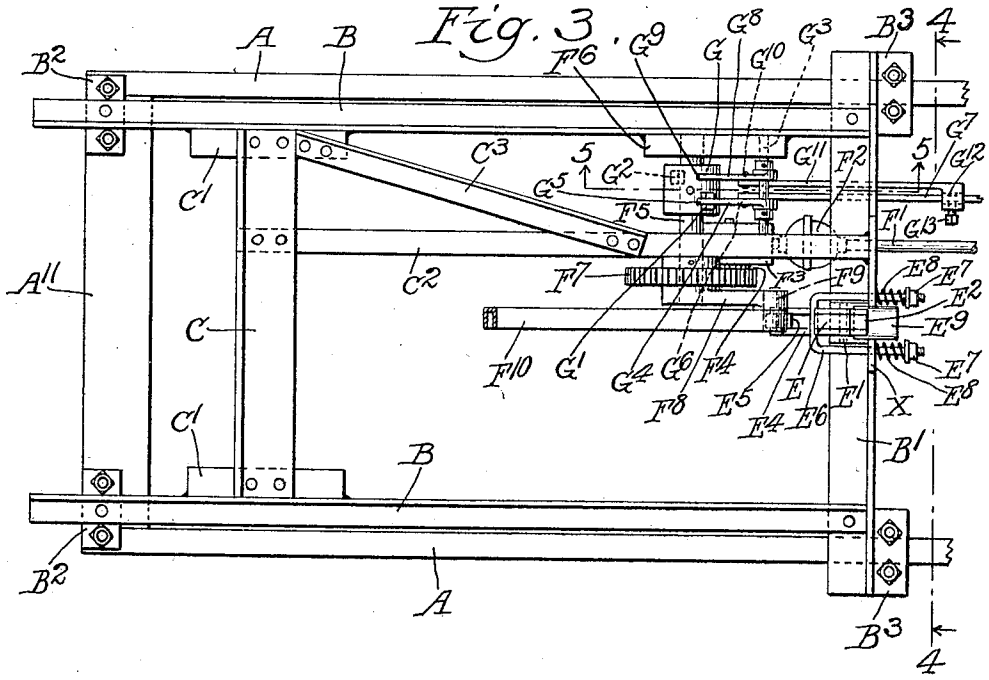
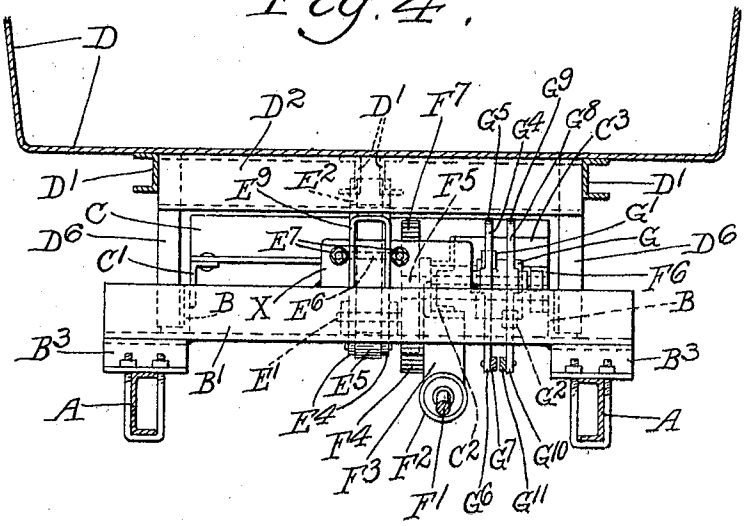


Fig. 4.



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Patented Mar. 5, 1929. 1,704,274

UNITED STATES PATENT OFFICE.

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DUMPING BODY.

Application filed September 4, 1928. Serial No. 303,699.

This invention relates to a dumping body and particularly to a dumping body in which a mechanism is provided for causing the body to dump. It has for one object to provide in connection with such a body a dumping mechanism which is non-reversing,—that is to say, a dumping mechanism in which the actuating parts accomplish both the raising and lowering of the body by moving in the same direction. Another object is to provide in connection with a power dumping body a moving contact between the body and its support. An other object is to provide in connection with a power dumping body means for moving the body to the rear as it is dumped a distance greater than that due to the tipping of the body alone. Another object is to provide in connection with a power tipping body greater movement to the rear than that which would take place if the body were tilted about a fixed pivot. Another object is to provide in connection with a dumping mechanism of the type herein an automatic throw-out whereby the mechanism is automatically stopped when the body has reached its full dumping position. A further object is to provide an automatic throw-out whereby the body is stopped when it has reached the full loading or undumped position. Other objects will appear from time to time in the course of the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a side elevation with parts in section and parts broken away showing the body in the undumped position;

Figure 2 is a similar view showing the body in the dumped position;

Figure 3 is a plan view of the vehicle frame, the body supporting frame and the dumping mechanism with the body removed;

Figure 4 is a transverse vertical cross section taken on line 4—4 of Figure 3;

Figure 5 is a detailed, longitudinal, vertical cross section on an enlarged scale, taken on line 5—5 of Figure 3 showing the automatic throw-out mechanism.

Like parts are designated by like characters throughout the specification and drawings.

A is a vehicle frame. A^1 indicates generally the engine of the vehicle. A^2 is a power take-off. A^3 is a pedal controlling the power take-off. A closure is provided in connection with the take-off, but its details form no part of the present invention and therefore it is not illustrated. For the purpose of the invention it is sufficient that it is a power take-off and means are provided for connecting and disconnecting it from the body dumping mechanism. A^4 is a vehicle spring, of which there are normally two for suporting the rear axle A^5 which carries wheels A^6. The details of the vehicle itself are not important in the present invention, which is applicable to any vehicle carrying power for dumping. A^7 indicates the steering column and A^8 the steering wheel. A^9 is an operator's seat. A^{10} is the engine hood. A^{11} is a cross member at the rear of the vehicle frame A.

A sub-frame is mounted on the vehicle frame and is made up of the side members B which are preferably in the form of tracks and a forward cross member B^1. At its rear the sub-frame is supported upon the vehicle frame by means of supporting sections B^2. These may be in the form of a pair of members or they might be a single member extending fully across the vehicle frame. At its forward end the sub-frame is supported on members B^3. These members also may be a pair of members or they may be a single member extending fully across the vehicle. Their purpose is to raise the sub-frame slightly and to form an attachment for it.

C is a cross member joined to the side members B, B of the sub-frame. It is preferably of angular cross section and is fastened to members C^1, C^1 which are themselves also joined to the side members B, B. C^2 is a longitudinal bracing member joined to the member C at its rear end and at its forward end joined to the cross member B^1. C^3 is an angular bracing member joined at one end to one of the members C^1 and preferably also abutting against the cross member C. At its other end it is joined to the longitudinal member C^2.

D is a body adapted to cary a load. It has beneath it and fastened to it a sub-frame D^1 which includes adjacent its forward end a cross member D^2. This member may be made in channel section as shown. D^3 is a hinged tail gate normally held closed by a latch D^4 which may be opened by a connecting rod D^5. The details of this latch and latch open-

ing mechanism are not shown as they form no particular part of the present invention. D^6, D^6 are rockers supported on the under side of the body D and preferably joined to the frame D^1. D^7, D^7 are bracing members positioned within the rockers D^6 and adapted to strengthen them and to assist in supporting the body.

E is a latch member pivotally supported at E^1 on the cross member B^1. It is provided with the hook portion E^2 which has an inclined face E^3. At its opposite end it has a lateral projection E^4 which preferably carries a roller contact member E^5. It is embraced by a U-shaped member E^6 which passes through an extension X on the forward web of the cross member B^1. At its outer ends the U-member E^6 is threaded and carries nuts E^7, E^7 which confine springs E^8, E^8. These springs at one end bear against the web of the cross member B^1 and at the other against the nuts E^7, thereby drawing the U-member E^6 against the latch member and tending to hold it in the locking position and against an abutment E^9 which is mounted on the cross member B^1. When the body is in the loading or undumped position, the cross member D^2 of the body frame D^1 rests upon the abutment E^9 and the lower flange of the member D^2 is engaged by the hook E^2. The U-member E^6 and the springs E^8 hold the hook against displacement and thus prevent accidental tipping of the body due to accidental unlatching of its forward end.

F is a universal joint through which a connection is made from the power take-off A^2. F^1 is a shaft upon the universal joint F. F^2 is a second universal joint. F^3 is a reduction gear of any suitable type. It is not illustrated in detail as the invention is not limited to any particular form of reduction gear. A shaft projects from the reduction gear and carries a pinion F^4. F^5 is a second shaft pivoted in the base member C^2 and at its outer end in the member F^6. F^7 is a gear carried by the shaft F^5. F^8 is a crank arm fixed on the shaft F^5 adapted to rotate it. At its other end it is pivotally connected at F^9 with a connecting rod F^{10} which is itself pivotally connected to a portion of the sub-frame D^1 as at F^{11}.

G is a cam member fixed on the shaft F^5. It is provided with a cam part G^1 and a second cam part G^2. These parts are substantially 180° apart and in the form of the invention shown herewith, they are off-set so that they lie in different, although parallel vertical planes from each other. G^3 is a shaft fixed at one end in the longitudinal member C^2 and at the other in the member F^6. It carries pivoted upon it a cam arm G^4 which has a nose G^5 adapted to be contacted by the cam member G^1. It has a lower extension G^6 which is pivotally joined to a connecting rod G^7 which is fastened to the pedal A^3 which operates the clutch mechanism to throw in and throw out the power take-off. G^8 is a second cam arm carrying a nose G^9, a lower projection G^{10} and a connecting rod G^{11}. This rod is provided with an off-set portion G^{12} which embraces the connecting rod G^7. G^{13} is a set screw. When the set screw is fastened, the connecting rod G^{11} and the connecting rod G^7 move together. It may be unfastened so that the connecting rod G^7 will move without causing movement of the connecting rod G^{11}. The cam nose G^9 is adapted to be contacted by the cam member G^2. The cam member G^1 will contact the nose G^5 of the cam arm G^4 and through it and through the connecting rod G^7 will operate the power take-off clutch to cut off the power just as the body has been brought back to the undumped position shown in Figure 1. Thus a careless operator cannot run the hoisting mechanism so as to lower the body and unlatch the mechanism. It has been found that sometimes this would happen and the body would be left unlatched, though practically in the horizontal position. When the body is thereafter driven over rough roads accidental tipping might occur. This automatic throw-out thus prevents movement of the body and prevents its being accidentally unlatched. Sometimes it is desirable to throw out the hoisting mechanism when the body has reached the full dumping position. When this is the case the set screw G^{12} is tightened and then when the body reaches the full dumping position the cam member G^2 will contact the nose G^9 of the cam lever G^8 and through the connecting rod G^{11} which is now attached to the connecting rod G^7 it will operate the clutch to cut out the power. There is thus provided a selective means whereby the power may be cut out automatically when the body moves to the full horizontal position and is latched and also there is provided a selective means whereby the hoisting mechanism may be automatically thrown out when the body has reached the full dumping position.

It will be seen by reference to the drawings and the foregoing description thereof that the truck to which the present invention is applied is one of that type in which gravity is utilized to a large extent in causing the tilting body to dump the load and in the restoration of the body, after the load has been dumped, to normal or horizontal position—these functions being secured by the employment of rockers located between the tilting body and the supporting chassis or vehicle frame. In apparatus of this character the body has a movement as a whole to the rear when it is elevated for dumping, and back toward the front as it is restored to normal position. The rockers or supports between the body and the vehicle frame are so disposed, in the form of invention illustrated, that the center of gravity of the load when

the body is normally filled is somewhat in advance of the vertical plane of the rocker supports on the chassis, with the result that the body is stably supported upon the vehicle, and the tendency thereof to tilt during transit is reduced to a minimum. However, a considerable part of the load is to the rear of the line of support, and this part counterbalances a corresponding portion in advance of the support so that the amount of power taken to cause the tilting body to dump the load is relatively small. I am thus able to utilize comparatively light mechanism for controlling the tilting movements of the vehicle body, such as illustrated in the drawing. As has been explained this mechanism is connected with a source of power in such manner that the turning shafts thereof are always driven in the same directions, thus making it unnecessary to employ a reversing mechanism as a part of the gearing that effects the tilting of the body, and thereby enabling a low-cost, as well as simple and light mechanism to be successfully used.

A body supported as illustrated in the drawings—that is upon rockers—has a compound movement while being dumped, including a tilting of the body about its supports—the lines of support shifting constantly during the tilting operations—and at the same time a bodily movement to the rear. This has necessitated the use of a novel motor-driven mechanism to control the tilting of the body in order that the proper movements may be imparted to the body, and such mechanism be located within the limited space available therefor in a practical dumping truck of the character to which my invention is adapted. It will be seen by reference to the drawings that the pitman link F^{10}, between the crank arm F^8 and the body of the vehicle, normally extends from the crank in an upwardly inclined direction toward the rear so that the thrust of the link to raise the body is in a rearward as well as an upward direction. It will also be seen that the pivotal connection F^{11} between the link F^{10} and the body is located on the far side of the center of the body that is toward the rear thereof, and preferably close to the vertical plane including the rocker supports of the truck body.

Another feature to be noted is that the location of the contact roller E^5 of the latch E relative to the end of the crank F^8 that operates it is such that the latch is operated to release the body at the moment the crank is passing its forward dead center position, with the result that the unlatching operation takes place while the link F^{10} is being moved across the line passing through the centers of the pivotal connection F^{11} and shaft F^5 and hence is not operating to tilt the body, this tilting movement not commencing until the latch has been entirely released.

Commercial dumping trucks, to which my invention is particularly applicable, are very commonly operated over rough terrain and are intended to be driven at times at quite high speeds, and these conditions of use impose the necessity of making the frame of great strength to resist the torsions, strains, and jars to which it is subjected in ordinary uses. The construction of the truck frame or chassis therefore leaves but little free available space beneath the body in which to mount the power mechanism for tilting the truck, it being remembered that provision must be made for the necessary mechanism that is incident to an automotive vehicle of present day construction. Bearing these considerations in mind, I mount the principal parts of the mechanism for controlling the tilting movements of the body between the vehicle frame or chassis and the body, and in advance of the supporting rockers. As this mechanism is non-reversing the crank F^8 thereof is caused to make complete revolutions and is relatively short as compared with the link or pitman F^{10} connected therewith, which, as has been stated, extends rearwardly and upwardly to its connection at F^{11} with the body.

It is quite conceivable that a body, arranged and supported as illustrated in the drawings hereof, might be loaded so that either it will automatically dump and restore itself by gravity alone, or so that the center of gravity of the load will be to the rear of the line of support on the chassis or truck body. In such cases the gearing illustrated, including the link F^{10} and the uni-directional motor-driven mechanism, will operate either solely to control the tilting movements of the body or both to control and restrain them. However the body may be loaded, the mechanism shown serves to control the tilting movements thereof, and this control is effective without the expenditure of an excessive amount of power and is applied smoothly, preventing the slamming or excessive jarring of parts in operation with incident wear and tear on the apparatus.

It will be obvious that while I have shown an operative device, many changes may be made in the size, shape, number, relation and distribution of parts without departing materially from the spirit of my invention, and I wish, therefore that my showing be considered in a large measure diagrammatic.

The use and operation of this invention are as follows:

The body is assembled on a vehicle having a power source, in the general position shown. The automatic cut-off which stops the body when it reaches the full horizontal position when it has been latched is normally in operation. After a load has been taken on and the vehicle moved to the point where the load is to be dumped, the operator, through the clutch pedal of the power take-off, sets

the power take off in position and the gear F^7 rotates, and through the crank arm F^8 and the connecting rod F^{10}, the body is tipped. However, before the body may start its tipping movement it must be unlatched from the latch E. The parts are so proportioned that a slight rotation of the gear F^7 and the crank arm F^8 takes place before upward movement of the body starts. In this first stage of the movement of the crank arm F^8 the outer end of this arm contacts the roller E^5 on the extension E^4 of the latch E, depresses it and so moves the latch to disengage it from the body frame. Dumping movement of the body is now possible. As this takes place, the body moves not about a fixed pivot but moves rearwardly upon the rockers which support it upon the track. When the body has reached the proper dumping position it may be stopped there by the operator or if the automatic throw-out is in operation the body may be stopped at the full dumping position automatically. When the body has been dumped the operator again operates the clutch controlling the power take-off mechanism and so sets in operation the hoisting movement. Rotation of the gear F^7 continues in the same direction and the body is now moved to the horizontal position. As it moves to the full undumped position the member D^2 contacts the face E^3 of the latch E and springs it rearwardly against the resistance of the springs E^8. The latch rides over the member D^2 and engages it. Just when this is completed the automatic power shut off operates and the hoisting mechanism is stopped.

I claim:

1. In combination with an automotive vehicle, a dumping body mounted thereon, and mechanical means for dumping said body, said means including a mechanism adapted to be operated by the power source of the vehicle and adapted to raise and lower the body, and a support whereby said body is movably and tiltably carried on said vehicle, said support shaped to cause the body to move rearwardly as it is dumped, and a latch pivotally mounted on said vehicle and provided with a projecting part, means on said raising mechanism adapted to contact said projecting part and thereby automatically to unlatch the body to permit raising.

2. A truck provided with longitudinal tracks, a tilting body, rockers attached to the body and supported on the tracks constituting shifting supports for the body movable toward the rear as the body is tilted upwardly, and motor-driven means for controlling the movements of the body comprising a shaft driven in one direction only, and a crank carried by the shaft, these parts being arranged forward of the rockers and a link connection between the crank and the body normally inclined toward the rear when the body is in its horizontal position.

3. A truck, a dumping body, rockers carried by the body supported on the truck, constituting shifting fulcrums for the body movable toward the rear as the body is tilted to discharge position, motor-operated means arranged to be driven in one direction only for controlling the raising and lowering tilting movements of the body, including a link that is connected with the body at a point close to the vertical plane that includes the line of contact of the rockers with the truck frame when the body is in horizontal position, said motor operated means being substantially in advance of said point of connection of said link with said body.

4. In a dumping truck the combination of the truck frame, a tilting body, rockers carried by the body and having bearing upon the frame, the rockers being so shaped that the line of support of the body moves toward the rear as the body is tilted upwardly for dumping, and located so that the load in the body may be distributed on both sides of the line of support whereby the gravity of the load may be utilized in tilting the body, and relatively light, non-reversible mechanism rotating in one direction adapted to be put into connection with a rotating motor, including a crank and a link between the crank and body, the link being rearwardly and upwardly inclined when the body is horizontal whereby its thrust to tilt the body for dumping is delivered in a rearward and upward direction.

5. In a dumping truck the combination of the truck frame, a tilting body, rockers carried by the body and having bearing upon the frame, the rockers being so shaped that the line of support of the body moves toward the rear as the body is tilted upwardly for dumping, and located so that the load in the body may be distributed on both sides of the line of support whereby gravity may be utilized in tilting the body, and relatively light, power-driven means arranged to be operated in one direction only for controlling the movements of the body both to raise it for dumping and to lower it for restoration to normal position, the said means for controlling the movements of the body being located between the latter and the frame of the truck and comprising a relatively short crank and a long link located near the longitudinal center line of the body and extending upwardly and to the rear where it is connected with the body.

6. In a dumping truck the combination of the truck frame, a tilting body, rockers carried by the body and supported upon the truck frame, the rockers being disposed so that the load in the body may be on both sides of the line of support of the rockers on the frame whereby gravity may be utilized to assist in dumping the load, a latch supported on the truck frame for engaging with a part carried by the body to hold it horizontal while

the truck is in transit and mechanically driven means for controlling the tilting movements of the body, such means including a crank arranged to be turned in one direction only and a link between the crank and the body, the crank being near its forward dead center position when the body is in normal position and latched, and a projection connected with the latch extending into proximity to the crank and arranged to be operated thereby to release the latch and free the body as the crank passes its forward dead center position.

7. In a dumping truck, the combination of the frame, a rocker-supported dumping body carried by the frame, mechanism for causing and controlling the tilting movements of the body, both for dumping and for restoration to normal position, comprising a crank that is always rotated in the same direction and is located in advance of the longitudinal center of the body, and a link connecting the crank and the body the connection with the latter being on the far side of the center of the body so that it is to the rear of the longitudinal center thereof.

8. In combination with a vehicle, a dumping body mounted thereon, mechanically driven means operable always in one direction for both raising the body to dump the contents thereof and then lowering it to normal position, a power disconnecting device for disconnecting the said means from its source of power at will, automatic means connected and movable with the means that raise and lower the body for operating the power disconnecting device when the body comes to normal position, other automatically operating means for operating the power disconnecting device when the body is raised to dumping position, and means whereby the last said automatic means may be connected with or disconnected from the aforesaid power disconnecting device.

Signed at Streator, Ill., county of La Salle, and State of Illinois, this 20th day of August, 1928.

WILLIAM C. ANTHONY.