

Oct. 29, 1946.

J. D. BURNS

2,410,046

TAIL GATE OPERATING MECHANISM FOR DUMP TRUCKS

Filed Feb. 2, 1945

2 Sheets-Sheet 1

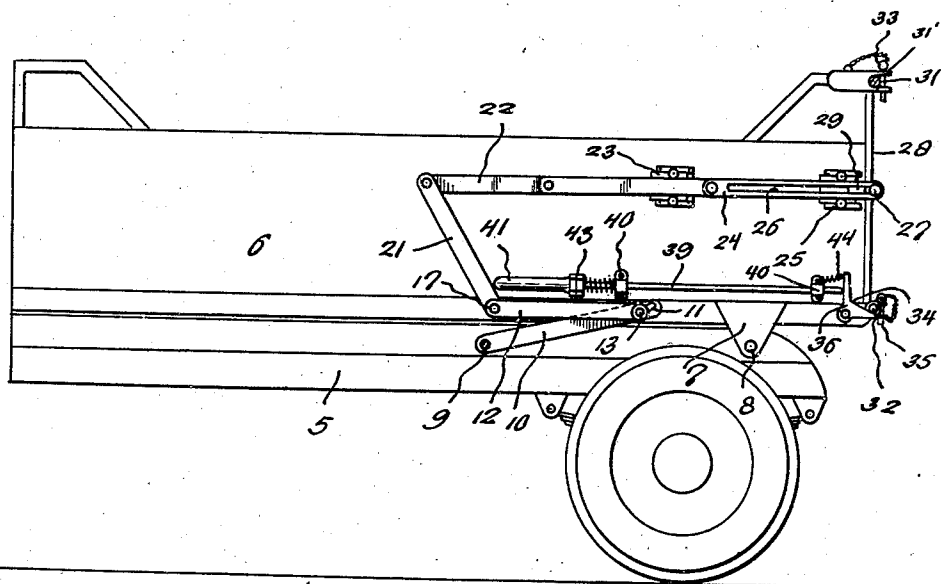


Fig. 1.

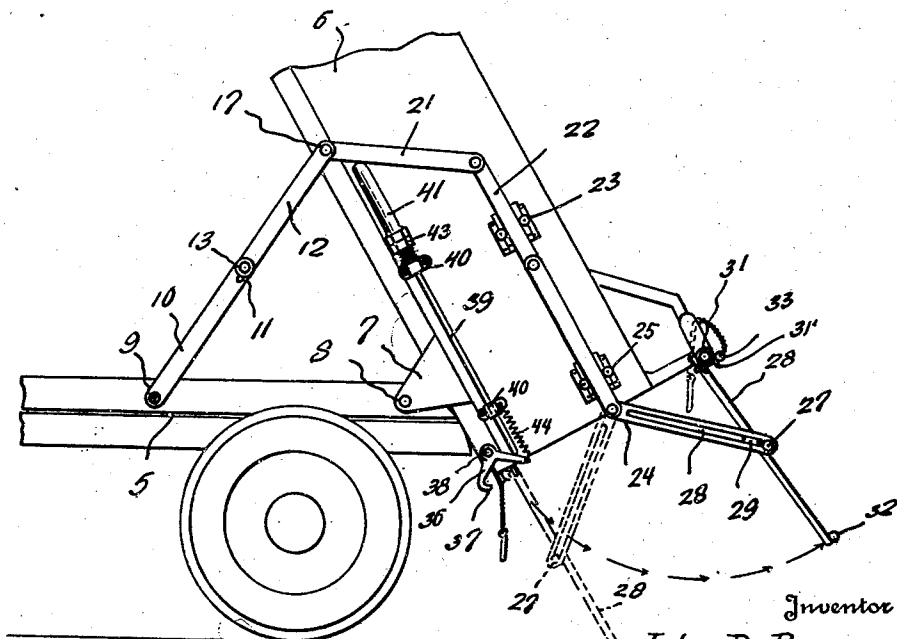


Fig. 2.

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2 Sheets-Sheet 2

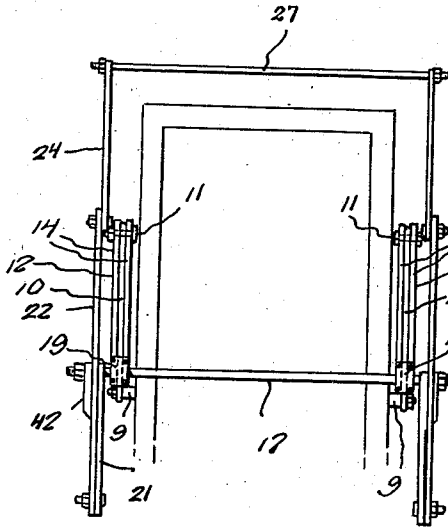


Fig. 3.

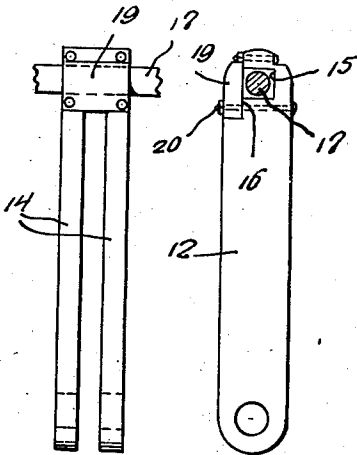


Fig. 9.

Fig. 10.



Fig. 11.

Fig. 12.

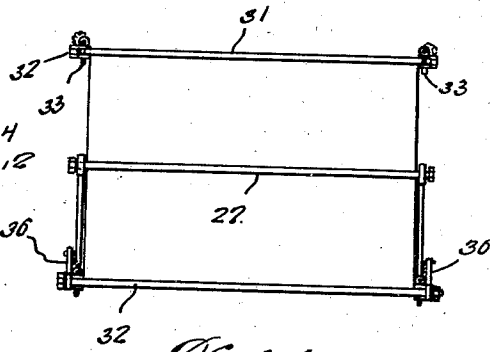


Fig. 4.

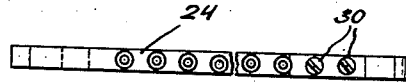


Fig. 5.

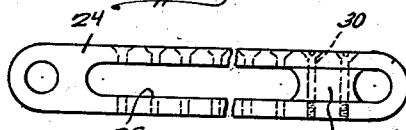


Fig. 6.

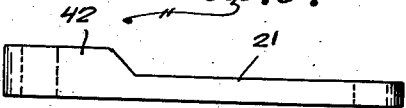


Fig. 7.

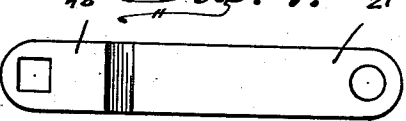


Fig. 8.

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UNITED STATES PATENT OFFICE

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TAIL GATE OPERATING MECHANISM FOR
DUMP TRUCKS

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Application February 2, 1945, Serial No. 575,852

4 Claims. (Cl. 298—23)

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The present invention relates to new and useful improvements in mechanism for operating the tail or end gate of dumping trucks and more particularly to a mechanism of this character adapted for automatically swinging the tail gate to open and closed positions as the body is raised and lowered thereby to facilitate the discharge of material from the dump truck.

One of the important objects of the present invention is to provide a simple and positive mechanism for automatically opening the tail gate when the dump truck body is raised for the purpose of discharging the material therefrom and for automatically restoring the tail gate to a closed position as the body is lowered.

A further object of the invention is to provide an automatic tail gate operating mechanism of this character in which the tail gate is automatically latched in its closed position by the dropping of the dump truck body, thereby avoiding the necessity of special latching mechanism to insure against accidental discharge of the contents of the truck.

A still further object of the invention is to provide means for pivotally mounting and swinging the tail gate at either its upper or lower edge together with mechanism operated by a raising movement of the body of the truck to swing the tail gate into its open position from either its upper or lower edge.

Hitherto considerable difficulty has been encountered in structures of this character in that the several parts of the mechanism do not function together under all conditions and are more or less complicated and it is an object of the present invention to provide a combined latching and opening device or mechanism which will not only be relatively simple in construction but which will function perfectly under all conditions.

In carrying out the invention I provide common means for operating the linkage mechanism for opening the tail gate and the push rod which actuates the tail gate latching mechanism. Thus a single actuating mechanism serves a dual purpose.

A further important object of the present invention is to provide a latching mechanism for the tail gate which includes a push rod operated by linkage mechanism for moving the tail gate into its open position upon a raising movement of the truck body and in which adjustable means is provided for the push rod to insure prompt and positive releasing of the latch prior to the opening movement of the tail gate.

A still further object of the invention is to

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provide an apparatus of this character of simple and practical construction, which is efficient and reliable in operation, relatively inexpensive to manufacture and install in operative position on a conventional type of dump truck body without necessitating any material changes or alterations in the construction thereof and which otherwise is well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout and in which:

Figure 1 is a side elevational view showing the body in its lowered position and with the tail gate closed.

Figure 2 is a similar view showing the body raised and with the tail gate open.

Figure 3 is a top plan view of the tail gate operating mechanism.

Figure 4 is a rear elevational view thereof.

Figure 5 is an edge elevational view of the adjustable link connected to the tail gate.

Figure 6 is a side elevational view thereof.

Figure 7 is an edge elevational view of another of the links pivoted to the truck body.

Figure 8 is a plan view thereof.

Figure 9 is an edge elevational view of the double arm providing an operative connection between the rock shaft carried by the truck body and the link pivoted to the truck frame.

Figure 10 is a side elevational view.

Figure 11 is a plan view of the adjustable block for the adjustable link member, and

Figure 12 is an edge elevational view thereof.

Referring now to the drawings in detail wherein for the purpose of illustration I have disclosed a preferred embodiment of the invention, the numeral 5 designates a truck frame having a truck body 6 pivoted adjacent the rear ends of the frame by means of the bracket 7 and pivot pin 8; the body being adapted for raising and lowering movement in any conventional manner well known in the art.

A pair of transversely extending pins 9 are carried by the frame 5 and to which a pair of links 10 are pivotally attached at one end, the links 10 having an inclined slot 11 formed adjacent their other ends and to which double arms 12 are pivotally attached by means of pins 13 carried at one end of the arms 12.

The arms 12 are formed of spaced parallel members 14 between which the slotted end of

the link 10 is positioned and pivoted thereto on the pin 13.

The other ends of the members 14 are formed with square-shaped openings 15 formed in a cut-out edge 16 of the members 14 and adapted for receiving the square-shaped portion of a rock shaft 17 journaled transversely in the bottom of the truck body 6. The shaft is retained in the openings 15 by means of a removable plate 19 secured in the cut-out portion 16 by means of bolts or the like 20. The plates 19 also serve to secure the members 14 to each other in spaced parallel relation as will be apparent from an inspection of Figures 9 and 10 of the drawings.

To the outer ends of the rock shaft 17 are secured a pair of arms 21 for actuation by the rock shaft, the arms 21 extending upwardly at the sides of the truck body 6 and have their upper ends pivoted to the front end of a front link member of an articulate or toggle-type element 22 slidably mounted between a pair of guide rollers 23 secured to the adjacent sides of the truck body. The rear end of the toggle link member 22 is connected to the front end of a rear link member 24 which is also slidably mounted between a pair of guide rollers 25 secured to the adjacent sides of the truck body. The link member 24 is formed with a longitudinally extending slot 26 in the rear end of which is pivotally received a rod 27 projecting at opposite ends outwardly from the adjacent side edge of a tail or end gate 28, the rod 27 being positioned intermediate the upper and lower portions of the tail gate.

An adjusting block 29 is slidably mounted in the slot 26 of the link member 24 and secured in longitudinally adjusted position therein by means of bolts 30 (see Figs. 5 and 6 for clarity), the block 29 thus being adjustable when desired, to permit an initial movement of the links 22 and 24 prior to the opening of the tail gate 28 and thus permit a predetermined raising movement of the truck body before the opening of the tail gate.

The tail gate 28 is provided with upper and lower rods 31 and 32 projecting at their opposite ends laterally from the side edges of the tail gate, the outer ends of the upper rod 31 being received within substantially U-shaped brackets 31' for pivotal movement therein and retained in position in the brackets by means of a locking pin 33.

The outer ends of the lower rod 32 are similarly received between substantially U-shaped brackets 34 for pivotal mounting therein and retained in position in said brackets by means of a locking pin 35.

Accordingly, the tail gate 28 may be pivoted at either its upper or lower edges by removing one pair of the locking pins 33 or 35 and the tail gate thus may be opened upwardly as shown by the full line position in Figure 2 of the drawings, or may be opened downwardly as shown by the dotted line position.

The lower rod member 32 is also secured against opening movement of the tail or end gate 28 by means of a latch member 36 of substantially L-shaped construction having a hook 37 at its lower end for engaging the rod 32, the latch being pivoted at the junction of its vertical and horizontal portion to the side of the truck body 6 by means of a pin 38 and the vertical portion of the latch member is engaged by the rear end of a longitudinally extending push rod 39 slidably mounted in guides 40 attached to the side of the truck body.

The front end of the push rod 39 is provided

with an elongated hollow head 41 threadedly attached to the front end of the push rod for adjusting the head longitudinally thereon, the front end of the head being disposed in the path of an enlargement 42 formed at the lower edge of the arm 21 (see Fig. 3).

The head 41 is secured in its longitudinally adjusted position on the rod 39 by means of a lock nut 43.

The latch member 36 is yieldably retained in its raised position with the hook 37 in engagement with the rod 32 by means of a coil spring 44 connecting the upper end of the latch member with one of the guides 40. The spring also serves to retain the push rod 39 in its forwardly disposed position with the head 41 bearing against the rear edge of the arm 21 as will be apparent from an inspection of Figure 1 of the drawings.

In the operation of the device, when it is desired to swing the tail gate 28 upwardly on its upper pivot rod 31 the lower pair of locking pins 35 is removed from holding relation to the lower rod 32 and upon a raising movement of the truck body 6 the link 10 will pull the arm 12 downwardly whereby to rock the shaft 17 and move the arm 21 rearwardly, thus causing a rearward movement of the push rod 39 to release the latch 36 from engagement with the rod 32 and at the same time the links 22 and 24 are moved rearwardly to swing the tail gate upwardly into its open position and thus permit discharge of the contents of the truck body.

Upon a lowering movement of the truck body the tail gate 28 will likewise be lowered into its closed position and the lower rod 32 again engaged by the latch member 36 to lock the same against accidental opening movement.

When it is desired to swing the tail gate 28 downwardly the lower pair of locking pins 35 are retained in locking position with relation to the lower rod 32 and the upper pair of locking pins 33 removed and the raising movement of the truck body 6 will then swing the tail gate 28 downwardly as shown by the dotted lines in Figure 2 of the drawings. When opening the tail gate downwardly the head 41 may be adjusted so as to move the latter rearwardly out of engagement by the arm 21 and the latch 36 will thus be retained in engagement with the rod 32 to provide pivotal engagement for the rod without the use of the locking pin 35.

In order to insure the opening of the latch 36 prior to the opening movement of the tail gate the block 29 carried by the link 24 may be adjusted in the slot 26 to provide the necessary delayed engagement of the block with the rod 27.

In view of the foregoing description taken in conjunction with the accompanying drawings, it is believed that a clear understanding of the construction, operation and advantages of the device will be quite apparent to those skilled in this art. A more detailed description thereof is accordingly deemed unnecessary.

It is to be understood, however, that even though I have herein shown and described a preferred embodiment of my invention that the same is susceptible to certain changes fully comprehended by the spirit of the invention as herein described, and the scope of the appended claims.

Having thus described the invention, what I claim is:

1. A tail gate opening and closing mechanism for dump truck bodies and comprising a tail gate pivoted at its upper and lower edges for selectively swinging upwardly or downwardly into

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open position, means for locking one of said edges against opening movement while the other of said edges is free, a rock shaft journaled transversely of the truck body, arms secured to the shaft and extending respectively upwardly and downwardly therefrom, a link connecting the lower arm to a stationary part of the truck for rotating the shaft upon a raising and lowering movement of the truck body, means connecting the upper arm to an intermediate part of the tail gate to open and close the latter upon operation of the shaft, a latch means for one edge of the tail gate, and means operated by one of said arms for releasing the latch means upon initial raising movement of the body.

2. A tail gate opening and closing mechanism for dump truck bodies and comprising a tail gate pivoted at its upper and lower edges for selectively swinging upwardly or downwardly into open position, means for locking one of said edges against opening movement while the other of said edges is free, a rock shaft journaled transversely of the truck body, arms secured to the shaft and extending respectively upwardly and downwardly therefrom, a link connecting the lower arm to a stationary part of the truck for rotating the shaft upon a raising and lowering movement of the truck body, means connecting the upper arm to an intermediate part of the tail gate to open and close the latter upon operation of the shaft, a latch means for one edge of the tail gate, and a push rod slidably carried by the body for releasing the latch means, said push rod having one end disposed in the path of movement of one of said arms for actuation of the push rod.

3. A tail gate opening and closing mechanism for dump truck bodies and comprising a tail gate pivoted at its upper and lower edges for selec-

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tively swinging upwardly or downwardly into open position, means for locking one of said edges against opening movement while the other of said edges is free, a rock shaft journaled transversely of the truck body, arms secured to the shaft and extending respectively upwardly and downwardly therefrom, a link connecting the lower arm to a stationary part of the truck for rotating the shaft upon a raising and lowering movement of the truck body, means connecting the upper arm to an intermediate part of the tail gate to open and close the latter upon operation of the shaft, a latch means for one edge of the tail gate, a push rod slidably carried by the body for releasing the latch means, and a longitudinally adjustable extension on one end of the push rod and disposed in the path of movement of one of said arms for actuation of the push rod upon a raising movement of the body.

4. A tail gate opening and closing mechanism for dump truck bodies and comprising a tail gate pivoted at its upper and lower edges for selectively swinging upwardly or downwardly into open position, means for locking one of said edges against opening movement while the other of said edges is free, a rock shaft journaled transversely of the truck body, arms secured to the shaft and extending respectively upwardly and downwardly therefrom, a link connecting the lower arm to a stationary part of the truck for rotating the shaft upon a raising and lowering movement of the truck body, and links connecting the upper arm to an intermediate part of the tail gate to open and close the latter during said movement of the body, one of said last-named links including a slot and said tail gate having a pin positioned in the slot, and a block adjustably secured in the slot to limit movement of the pin therein.

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