Jan. 25, 1927. 1,615,671

W. F. BATHO

DUMP CAR

Filed Dec. 24, 1925 4 Sheets-Sheet 1

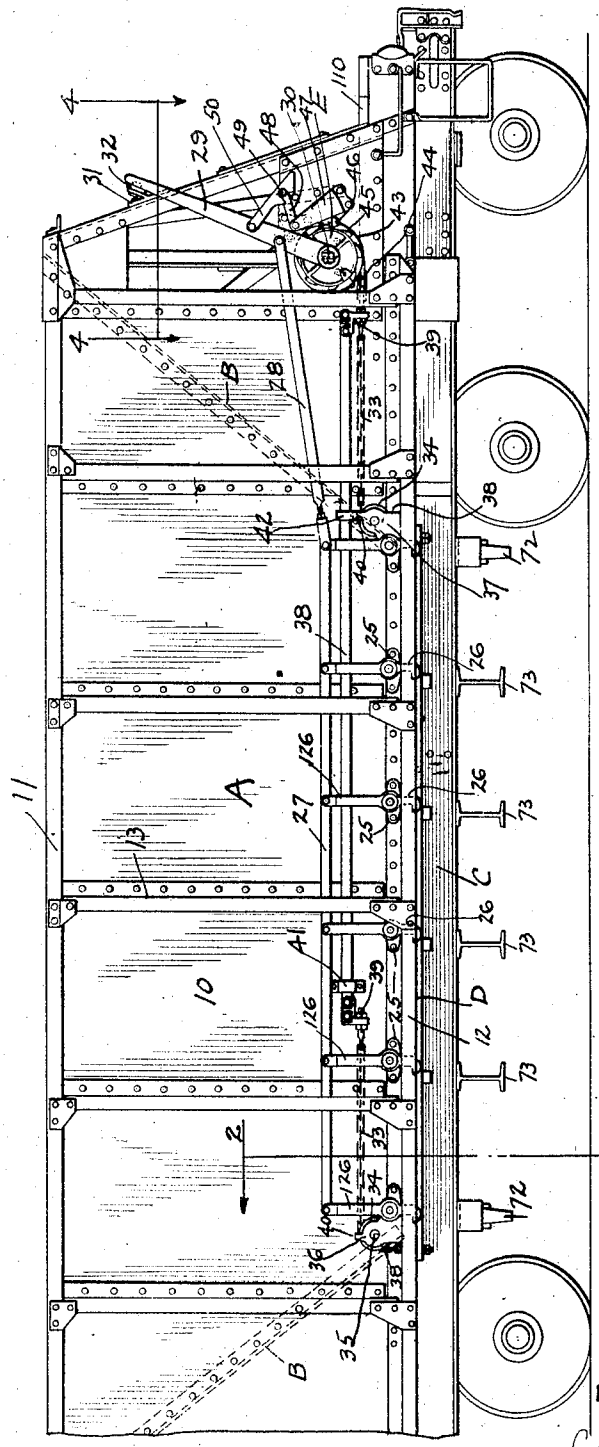


FIG. 1.

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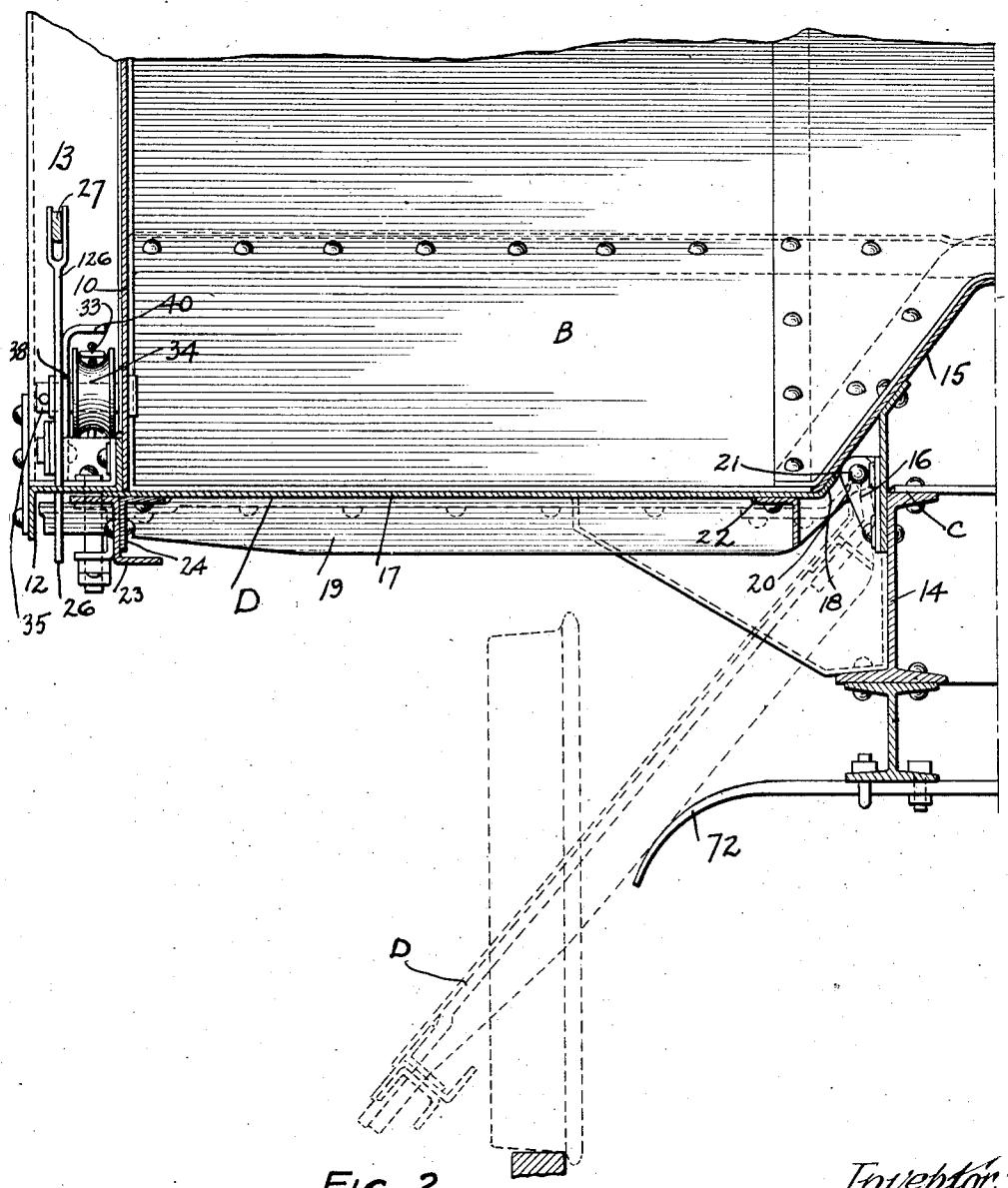


FIG. 2

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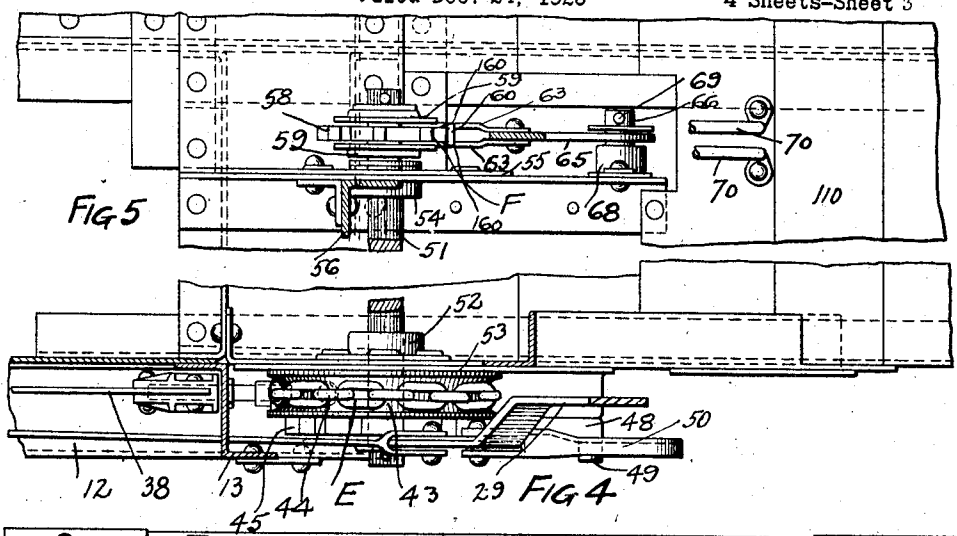


FIG 5

FIG 4

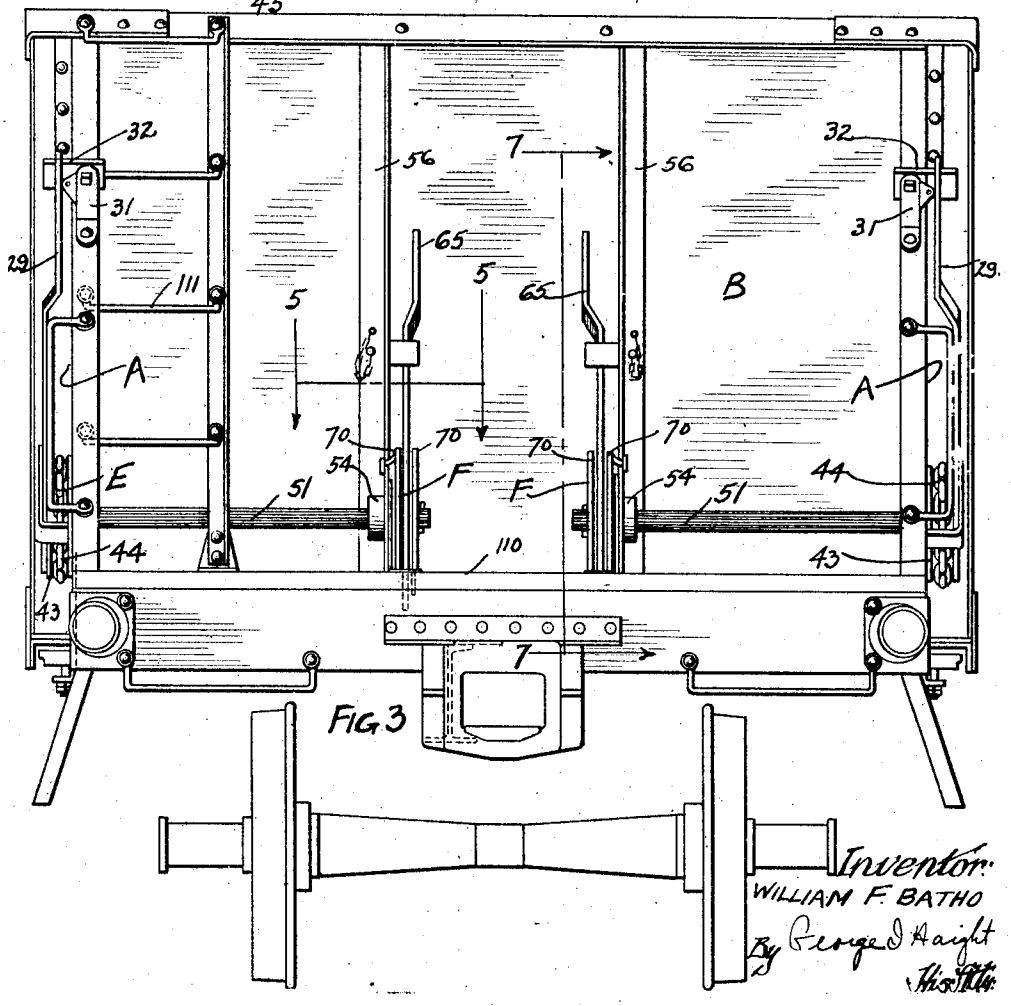


FIG 3

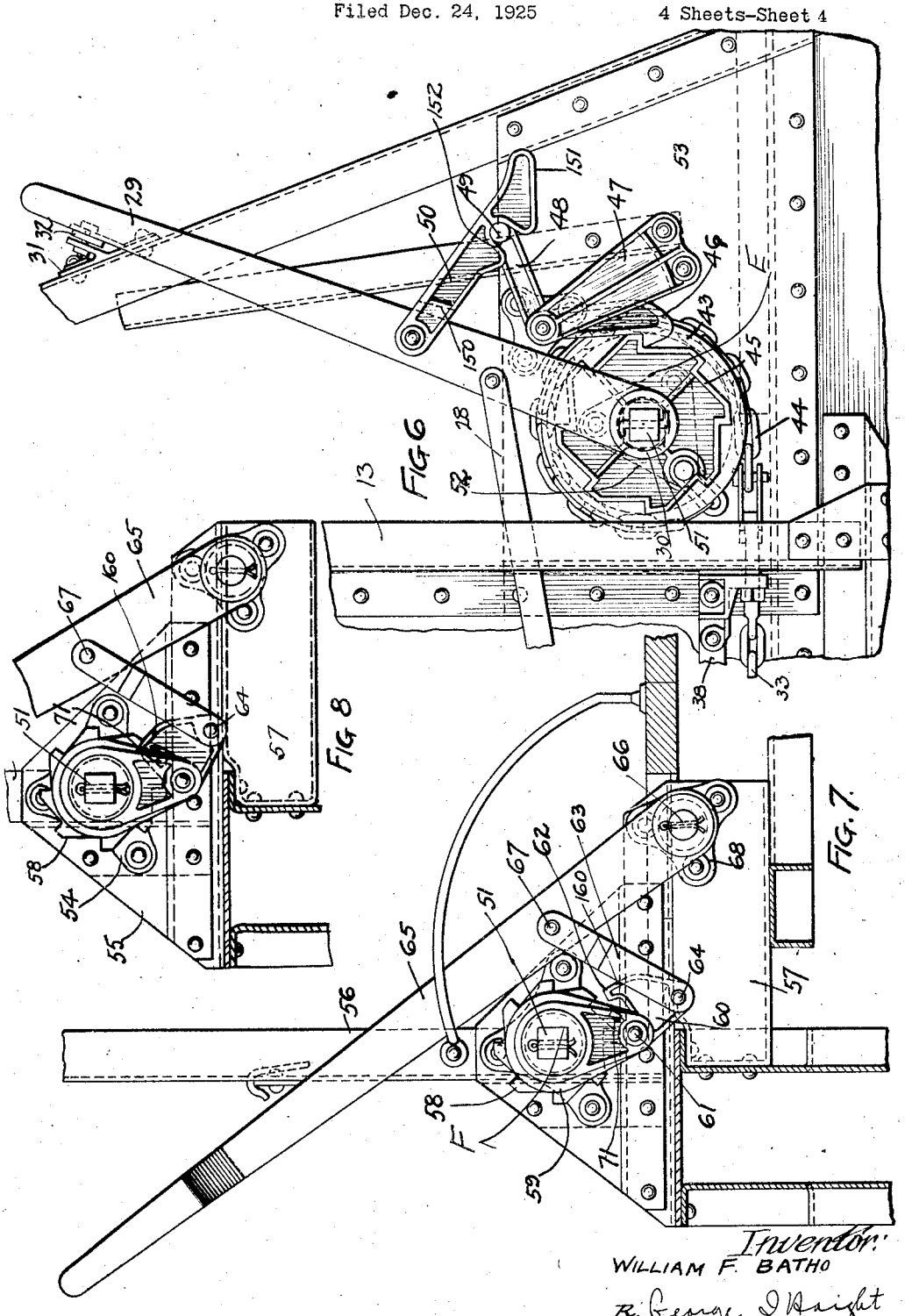
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DUMP CAR

Filed Dec. 24, 1925 4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

WILLIAM F. BATHO, OF CHICAGO, ILLINOIS, ASSIGNOR TO ENTERPRISE RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DUMP CAR.

Application filed December 24, 1925. Serial No. 77,461.

My invention relates to improvements in dump cars.

It is an object of the invention to provide means for actuating door winding mechanism through oscillations of a lever in such a manner that the actuating means will move in unison with the winding mechanism in one direction and move independently thereof in the opposite direction.

It is also an object of this invention to provide dump door raising mechanism having locking means in conjunction with independent door latching mechanism so related to the raising mechanism, that the locking means of the raising mechanism will be automatically released upon actuation of the latching mechanism to release the door.

Other and further objects of the invention will more fully and clearly appear from the description and claims hereinafter following.

In the drawings Figure 1 is a side elevational view of a portion of a car embodying my invention. Fig. 2 is a vertical transverse sectional view through a portion of the car as shown in Fig. 1; Fig. 3 is an elevational end view of the car; Fig. 4 is a fragmentary horizontal sectional view through a portion of the car above the outer end of the door raising and locking mechanism, the section corresponding substantially to the line 4—4 of Fig. 1. Fig. 5 is a horizontal sectional view through a portion of the car above the winding actuating mechanism, and corresponding substantially to line 5—5 of Fig. 3. Fig. 6 is an enlarged fragmentary side elevational view of one end portion of the car showing the door winding mechanism and pawl locking mechanism therefor, together with the lever for operating the latching mechanism. Fig. 7 is a vertical sectional view showing the door raising actuating mechanism in inoperative position, the section being taken on a line corresponding substantially to line 7—7 of Fig. 3. And Fig. 8 is a view similar to Fig 7 but showing the door raising actuating mechanism in its operative relation with respect to the ratchet wheel.

My invention is illustrated as applied to a car having vertical sides A—A, sloping end floors B—B, center sill structure C, and dumping doors D—D hinged to the center sill structure on the opposite sides thereof and adapted to extend outwardly to the car sides. Each side wall A includes side plate 10, top chord 11, bottom chord 12 and side stakes 13, the latter being preferably of Z-shape formation. The center sill structure C includes channel shaped members 14—14 having a surmounting ridge 15, and beneath the ridge are secured a number of hinge brackets as indicated at 16.

Inasmuch as the dumping doors, and mechanism therefor, on the respective sides of the car are of similar construction, the description will be confined to one side of the car. Each dumping door is formed of a plate member 17 flanged upwardly as at 18 beneath the sloping ridge 15 of the center sill. Each door is reinforced on its under side by a series of hinge beams 19 formed at their inner ends with hinge eyes 20 adapted to receive hinge pins 21, whereby the door is mounted upon the brackets 16. Each door is reinforced longitudinally of the car, adjacent the rear edge thereof, by an angle member 22, and adjacent the free edge of the door by a beam structure formed by a Z-shaped member and angle member as indicated at 23 and 24 respectively. The hinge beams 19 are extended outwardly of the free edge of the door through perforations in the beams 23 and 24. Pivoted on brackets 25 fixed to the side of the car, adjacent each floor beam 19, are hooks 26, the lower ends of which are adapted to engage beneath the outer projecting ends of the floor beams 19 to support the door after it has been raised to a substantially closed position. The hooks are each formed with an upward extension 126, and the series of hook extensions along the side of the car are connected by a horizontal bar 27 which is adjustably connected at one end by a link 28 to an operating and locking lever 29 supported on the car structure from a pivot disposed in fixed relation to the car structure, as indicated at 30. Adjacent the upper end of the lever 29 there is provided on the car structure a bracket 31, on which is pivotally mounted a locking bar 32 to swing in the path of the said lever 29 to lock the same when the supporting hooks are in latching position beneath the door.

As the doors are of considerable weight, power multiplying raising means are provided to raise the doors to such a position that the lower ends of the hooks 26 may be brought into engagement with the corre-

sponding floor beams 19, and the door wedged to a closed position making a tight fit with the car side. In a preferred form the raising mechanism includes two or more flexible members or chains 33 which pass over suitable pulleys 34, which are rotatably mounted, as indicated at 35, in suitable brackets 36 and 37 respectively, said brackets preferably resting on the lower chord 12 of the car side, and each of said brackets including an outer vertical wall 38 through which the pulley supporting pivot 35 extends. The elements 33 are connected to the doors, and after passing over the pulleys 34, extend horizontally towards one end of the car, and are adjustably secured to a bodily movable bar 38, as indicated at 39. The bar 38 is guided and maintained in operative relation at one end with the adjacent pulley 24 by a lip 40, which is disposed above the adjacent element 33. The bar member 38 extends through perforations in the vertical side stakes 13 and additional guides are provided as indicated at 41 and 42 respectively, the guide 41 being affixed directly to the car structure and guide 42 being formed as an integral extension of the bracket structure 37.

For the purpose of moving the bar 38 longitudinally in order to raise the door a winding device, indicated at E, is provided, said device including a winding drum 43 disposed substantially in alignment with the reciprocating bar 38, and connected thereto by means of a flexible member or chain 44. Co-operable with the drum 43, and preferably formed integrally therewith, is a ratchet wheel member 45, with which is co-operable a hook shaped locking pawl 46, said pawl 46 being mounted on a bracket 47, and formed with a weighted arm or extension 48 which extends rearwardly and has a laterally projecting lug 49 extending substantially in the plane of the door hook locking and operating lever 29. Co-operable with the said lug 49 is a hook-shaped catch 50 which is pivotally mounted on the lever 29 and formed with an abutment 150 adapted to support the said catch 50 relatively to the lever 29 so that as the lever is moved rearwardly the catch will be in position to engage with the lug 49 of the said pawl 46, the end of the catch being bevelled as indicated at 151 so that the latch is automatically displaced a sufficient amount to permit a recess 152 in the catch to engage the lug 49 and lock the pawl 46 relatively to the lever 29.

The means for actuating the winding drum 43 by imparting a movement of rotation thereto is indicated at F. Said actuating mechanism is connected with the winding means E by means of a rotary shaft 51, the assembled mechanism presenting a windless-like device journalled at one end adjacent the side of the car in a bearing bracket 52 which in turn is carried by a gusset plate 53, the opposite or inner end of said shaft being journalled in a bearing bracket 54 carried by a supporting framework including a vertical gusset member 55, which in turn is suitably supported by portions of the framework of the car structure as indicated at 56 and 57 respectively. The spacing of the winding mechanism E an appreciable distance from the actuating mechanism F permits the disposition of a ladder 111 therebetween without interfering with the operation of the door operating device and also provides for safe and convenient operation from the platform 110 of the car. The actuating mechanism proper as indicated at F includes: a ratchet member 58 fixedly mounted on the shaft 51; oscillatable arms 59—59 rotatably mounted on the opposite sides of said ratchet member; a detent member 60 disposed between the arms 59—59 and pivotally mounted thereon as indicated at 61, said member 60 having a pallet 62 adapted to engage with the teeth of the ratchet member 58; connections 63—63 pivoted to the detent 60 at an appreciable distance from its pivot 61 as indicated at 64; and a lever 65 pivoted to the car structure on a fixed pivot 66 and also to the connection 63, as indicated at 67, whereby rotation of the shaft 51 will be effected through a series of oscillations of the said lever 65 in a manner as will be described hereinafter. The pivot 66 on which lever 65 is mounted is preferably in the form of a trunnion formed integrally with a bracket 68 secured to a fixed part of the car and mounted at an appreciable distance from the operating shaft 51. Said trunnion is perforated outwardly of the lever and a pin 69 is inserted therein to retain the parts in operative relation. The lever 65 moves between guides 70—70 which maintain the lever against sidewise movement and also limit the forward movement of the same.

The operation of the winding and actuating device is as follows: Assuming the door D to be open with the parts positioned as in Fig. 7, the operator moves the lever 65 in a clockwise direction thereby rotating the detent 60 until such time as the pallet 62 is brought into engagement with one of the teeth of the ratchet member 58 which will induce interlocking action between the ratchet member 58, and the oscillatable members 59 (the parts then assuming the position shown in Fig. 8). For the purpose of preventing undue strain on pivot 61 stops 71 are provided on the inner face of oscillating members 59 which engage with detent 60 when pallet 62 is in full engagement with its co-operating tooth of the ratchet member 58, and thus limit the pivotal action of detent 60 relatively to the members 59. The

operator then continues the movement of the lever 65 in a clockwise direction to impart sufficient rotary movement to the shaft 51 so that the locking pawl 46 may be engaged with the next succeeding tooth on ratchet member 58, and thereafter he reverses the movement of lever 65, moving it in anti-clockwise direction, thereby rotating detent 60 in a direction to cause pallet 62 to move away from the teeth of ratchet wheel 58 and so permitting the oscillatable members 59 to move independently of the ratchet wheel. Relative movement between detent 60 and link 63 is limited by laterally projecting wings 160 formed integrally with member 60 and which engage with link members 63. These oscillating operations of the lever 65 are successively repeated until such time as the door D is substantially closed, at which time the lever 29 operating the latches 26 is moved rearwardly until the latching hooks 26 are well beneath the door beams 19, and thereafter the lock 32 is turned into the path of the lever 29 locking the same securely into position. As lever 29 is moved rearwardly to its locking position the latch 50 is in such a relation, due to the wall 150 abutting against the edge of the lever 29, that the bevelled portion 151 will ride upon the lateral projection 49 of the locking pawl permitting sufficient movement of the catch to enable the walls of the recess 152 to interlock with the said projection 49.

Assuming that it is desired to discharge the load in the car with the parts in locked position as indicated in Fig. 6, the lock 32 is released and the lever 29 moved forwardly in a direction to move the supporting hooks 26 away from beneath the floor beams 19 of the door. As the lever 29 moves to release the door the catch 50 moves in unison therewith, thereby disengaging pawl 46 from the ratchet wheel member 45 so that the drum 43 is free to rotate in an unwinding direction and the door opens due to the weight of the lading thereon, as will be understood. In the open position the weight of the doors is supported by suitable buffers 72 and 73 which are preferably carried by the center sill structure.

I have herein shown and described what I now consider to be the preferred manner of carrying out my invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

What I claim is:

1. In a dump car, the combination with a car side; of pulleys carried thereby; a bodily movable bar; flexible members secured to said bar and depending from said pulleys; a dumping door to which said flexible members are connected; a winding drum carried by the car structure; and a flexible member connected to said drum and bar whereby the bar may be moved longitudinally by rotation of the drum to raise the door.

2. In a dump car, the combination with a dumping door; of door raising mechanism including a bar, flexible connections between said bar and door, and means for moving the bar; locking means for the bar; independent retaining means for supporting the door in final closed position; and interengaging means adapted to connect the door retaining means with the door raising locking means, whereby release of the door raising means is automatically effected coincidentally with release of the door retaining means.

3. In a dump car having a dumping door, the combination with supporting means for retaining the door in closed position; of means adapted to lock said door retaining means in door closing position; door raising mechanism including a shiftable bar and flexible connections between said bar and door; a winding device adapted to move the bar to raise the door; pawl and ratchet mechanism acting on the winding device to lock the same against retrograde movement; and means connected with the door retaining means adapted to automatically move the winding device pawl mechanism to inoperative position when said door supporting means are released.

4. In a dump car, the combination with a dumping door; of a door winding and raising mechanism, said mechanism including a ratchet wheel; an oscillatable member adapted to pivot about the same center of rotation as the ratchet wheel; a pawl pivotally carried by the oscillatable member; and means having a pivotal connection with the pawl at one side of its pivotal connection with the oscillatable member, whereby movement of said means in one direction will move the pawl into engagement with the ratchet wheel, and cause the said oscillatable member to move in unison with the ratchet wheel, and movement of said means in the opposite direction will move the pawl to an inoperative position with respect to the ratchet wheel and permit free movement of the oscillatable member relatively to the ratchet wheel.

5. In a dump car, the combination with a dumping door; of a rotary member having a ratchet wheel connected therewith; door raising means including a flexible connection adapted to wind on the rotary member to raise the door; an oscillatable member; a detent pivoted to the oscillatable member, said detent having a pallet engageable with said ratchet wheel; a power transmitting member connected to the detent in such a manner that movement of the power transmitting member in a direction to effect

winding movement of the flexible member to raise the door will first move the pallet into engagement with the ratchet wheel and thereafter cause said oscillatable member to move in unison with the rotary member.

6. In a dump car, the combination with a dump door winding mechanism; of a ratchet wheel movable in unison with said mechanism; a member mounted to oscillate relatively to the said ratchet wheel; a pivotally mounted pawl carried by said oscillatable member; a lever mounted independently of said ratchet wheel; and a connection between said lever and said pawl whereby movement of the lever in one direction will cause gripping engagement between the pawl and the ratchet wheel and cause the oscillating member to move in unison with the ratchet wheel.

7. In a dump car, the combination with a door winding mechanism; of a ratchet wheel adapted to move in unison with said mechanism; an oscillatable member mounted independently of said ratchet wheel; an operating lever mounted independently of the oscillating member; and connecting means between said lever and oscillatable member, said means including an eccentric member connected to said oscillatable member and said lever whereby movement of the lever in one direction produces a binding engagement between the oscillatable member and the ratchet wheel, while permitting free movement of the oscillatable member with reference to the ratchet wheel in the opposite direction.

8. In a dump car, the combination with a shaft adapted to be rotated; the combination with a toothed member fixedly mounted thereon; oscillatably mounted plates disposed on each side of said ratchet member; a detent pivotally mounted between said plates, said detent having a pallet adapted to engage with the toothed member; a power transmitting connection secured to said detent; means for imparting movement to said power transmitting connection, said detent being constructed so as to have its pallet moved into engagement with the toothed member when the power transmitting connection is moved in a direction to effect winding movement of the shaft, and adapted to move away from the toothed member when the power transmitting connection is moved in the opposite direction.

9. In a dump car, the combination with a dumping door; of supporting means for locking said door in closed position; a lever pivoted at the side of the car for operating said supporting means; raising means adjacent said lever for raising the door, said raising means including a ratchet wheel; a pawl pivotally mounted on the car structure adapted to engage the ratchet wheel, said pawl having an arm outstanding therefrom; a pawl catch member pivotally mounted upon the operating lever, said catch being adapted to engage with the projecting arm on the pawl when the doors are in closed position and locked.

10. In a dump car, the combination with a dumping door; of a door winding mechanism including a member rotatably mounted on the car structure; a ratchet wheel adapted to rotate in unison with said rotatable member; a gravity actuated pawl adapted to engage said ratchet to lock the rotatable member against unwinding, said pawl having a lateral extension disposed at an appreciable distance from its pivot; door supporting and locking means; a lever for actuating said supporting means, said lever being mounted to have pivotal movement about the same center as the rotatable member; and a catch movable with the lever, said catch being adapted to gravitate into engagement with the lateral extension on the pawl when the supporting means is in supporting position beneath the door.

11. In a dump car, the combination with a dumping door; of hooks on the car side adapted to support the door; a lever operating said hooks; winding mechanism carried by the car structure, said winding mechanism being adapted to rotate about the same pivot as the said lever; a ratchet wheel fixedly secured to said winding mechanism; a pawl pivotally mounted upon the car structure, said pawl being adapted to gravitate into engagement with the ratchet wheel; a catch member carried by the lever and adapted to engage with the locking pawl, thereby releasing the said pawl when the hooks are displaced from their supporting position beneath the door.

12. In a dump car, the combination with a dumping door; of a series of hooks pivotally mounted on the car structure and adapted to engage beneath the door to maintain the same in locked position; a lever pivotally mounted upon the car and adapted to move the hooks; raising means for the door comprising: a bodily movable member, flexible connections extending from the bodily movable member to the door; winding mechanism adapted to shift the bar longitudinally; a ratchet wheel on said winding mechanism; a pawl pivotally mounted on the car structure adapted to lock the ratchet wheel against retrograde movement; and a gravity actuated member carried by the hook actuating lever, said gravity actuating member being adapted to engage with the locking pawl when the hooks are in locked position beneath the doors.

13. In a dump car, the combination with the car side; of a dumping door adapted to abut said side; a bodily shiftable member carried by the car side; flexible connections

connected to said member and door; a winding drum carried at the car side; a flexible connection between said drum and the shiftable member whereby the door may be raised by rotation of the drum; means inwardly of the car side for imparting a movement of rotation to the drum; locking means carried at the car side and adapted to secure the drum against retrograde movement; independent locking mechanism for the doors carried at the car side; and interengaging means between the said door locking mechanism and the locking means for the drum whereby the last named locking means is moved to an inoperative position consequent upon release of the locking mechanism.

14. In a dump car, the combination with a door operating shaft; of a ratchet wheel fixedly mounted upon the shaft; an oscillatable member mounted to have movement independently of said ratchet wheel; a rocking member pivotally mounted upon said oscillatable member, said rocking member having a pallet engageable with the ratchet wheel; power transmitting means acting upon the rocking member at an appreciable distance form its pivotal connection with the oscillatable member whereby the rocking member will have its pallet forced into engagement with the ratchet wheel when the power transmitting means is moved in one direction, and moved away from the ratchet wheel when said power transmitting means is moved in the opposite direction; and means for limiting the movement of the rocking member relatively to the oscillatable member.

15. In a dump car, the combination with a door operating shaft; of a ratchet wheel fixedly mounted upon the shaft; an oscillatable member mounted to have movement independently of said ratchet wheel; a rocking member pivotally mounted upon said oscillatable member, said rocking member having a pallet engageable with the ratchet wheel; power transmitting means acting upon the rocking member at an appreciable distance from its pivotal connection with the oscillatable member, whereby the rocking member will have its pallet forced into engagement with the ratchet wheel when the power transmitting means is moved in one direction, and moved away from the ratchet wheel when said power transmitting means is moved in the opposite direction; and means for limiting the movement of the rocking member relatively to the power transmitting means.

16. In a dump car having a platform; the combination with a dumping door; of a windlass mechanism adapted to raise the door, said mechanism including winding means at the side of the car and actuating means disposed inwardly of the side of the car; a shaft connecting said winding and actuating means; and a ladder rising from the platform and disposed intermediate said winding and actuating means.

17. In a dump car, the combination with a dumping door; of means for raising said door including a rotary shaft, means arranged to swing about the axis of said shaft, an engaging element pivotally carried by said swinging means, and operating mechanism having a connection with said swinging element, whereby movement of said mechanism away from said shaft effects engagement of said swinging element with said shaft to rotate the same, and movement of said mechanism toward said shaft effects release of said swinging element.

In witness that I claim the foregoing I have hereunto subscribed my name this 19th day of December, 1925.

WILLIAM F. BATHO.