Feb. 6, 1940. J. P. ANDERSON 2,189,336

DUMP CAR

Filed Sept. 6, 1929 5 Sheets-Sheet 1

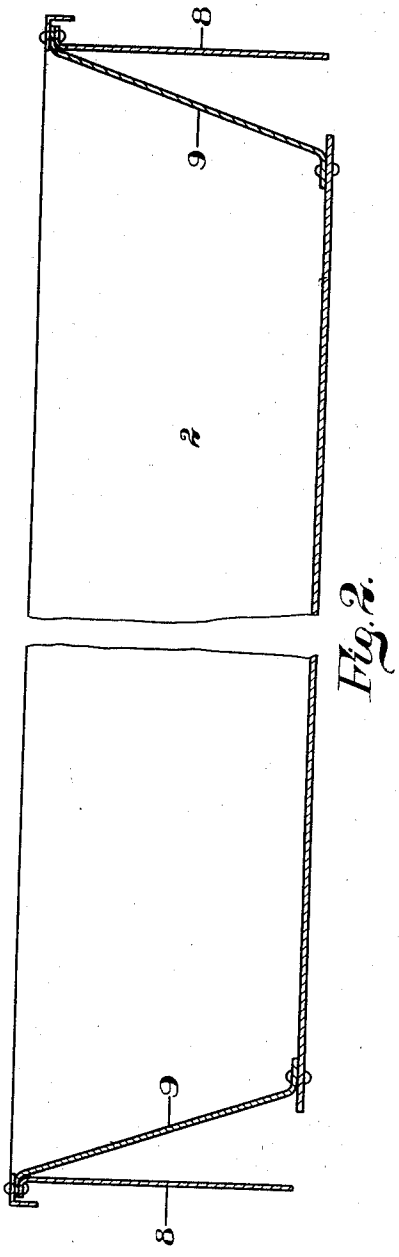


Fig. 2.

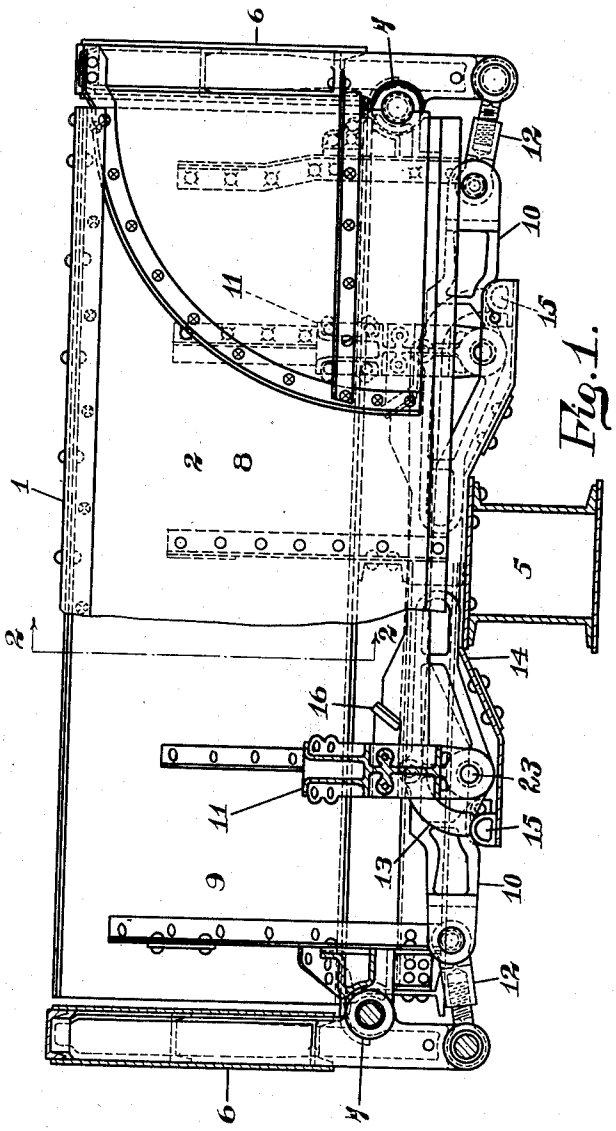


Fig. 1.

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DUMP CAR

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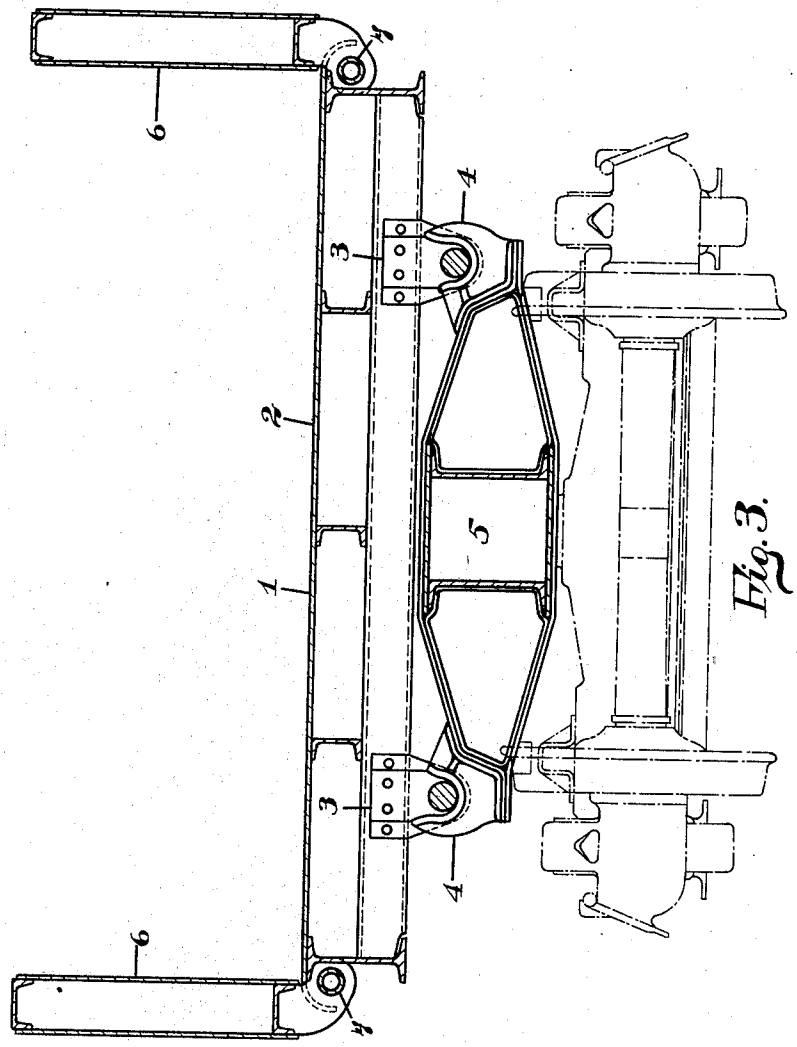


Fig. 3.

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DUMP CAR

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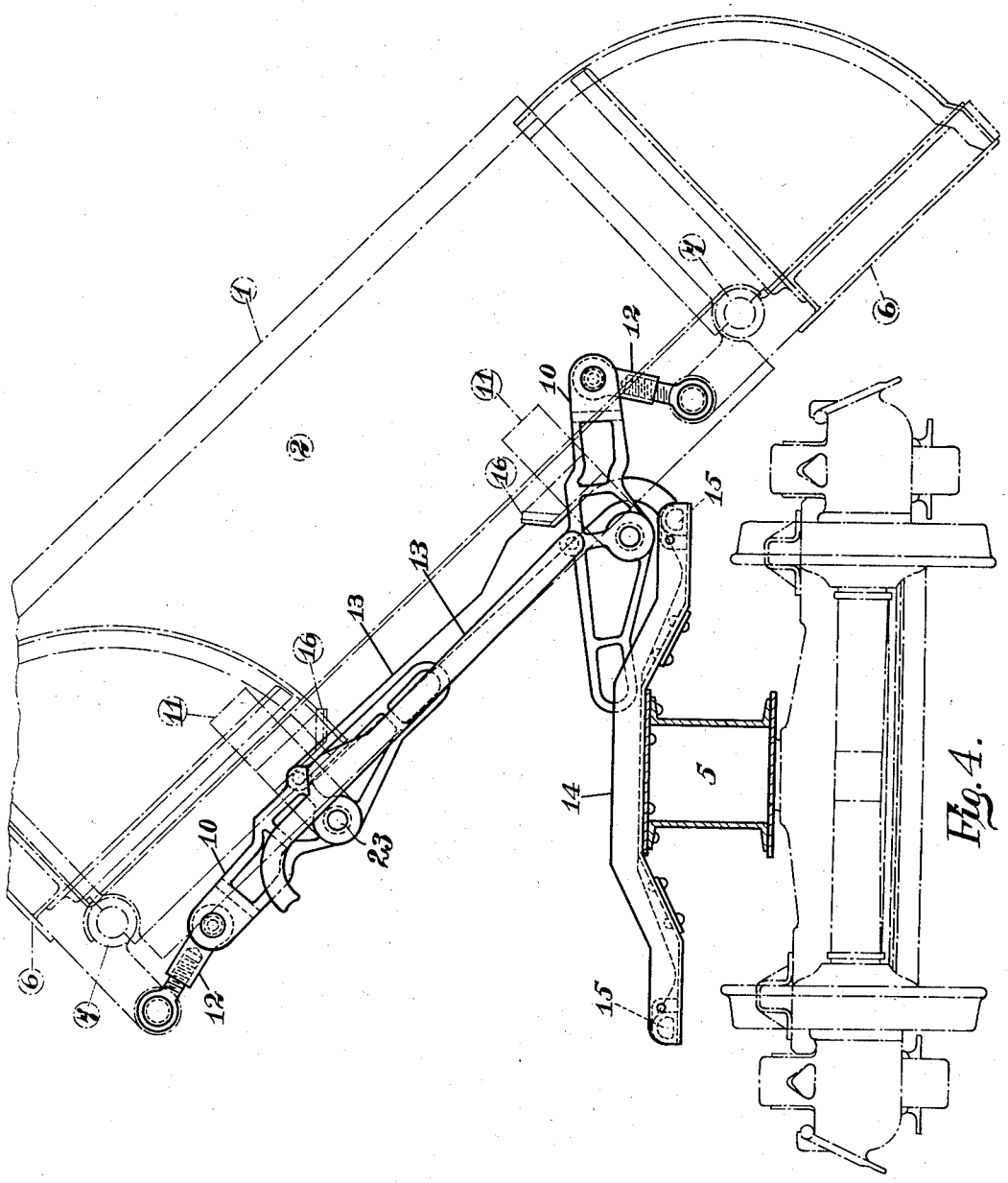


Fig. 4.

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DUMP CAR

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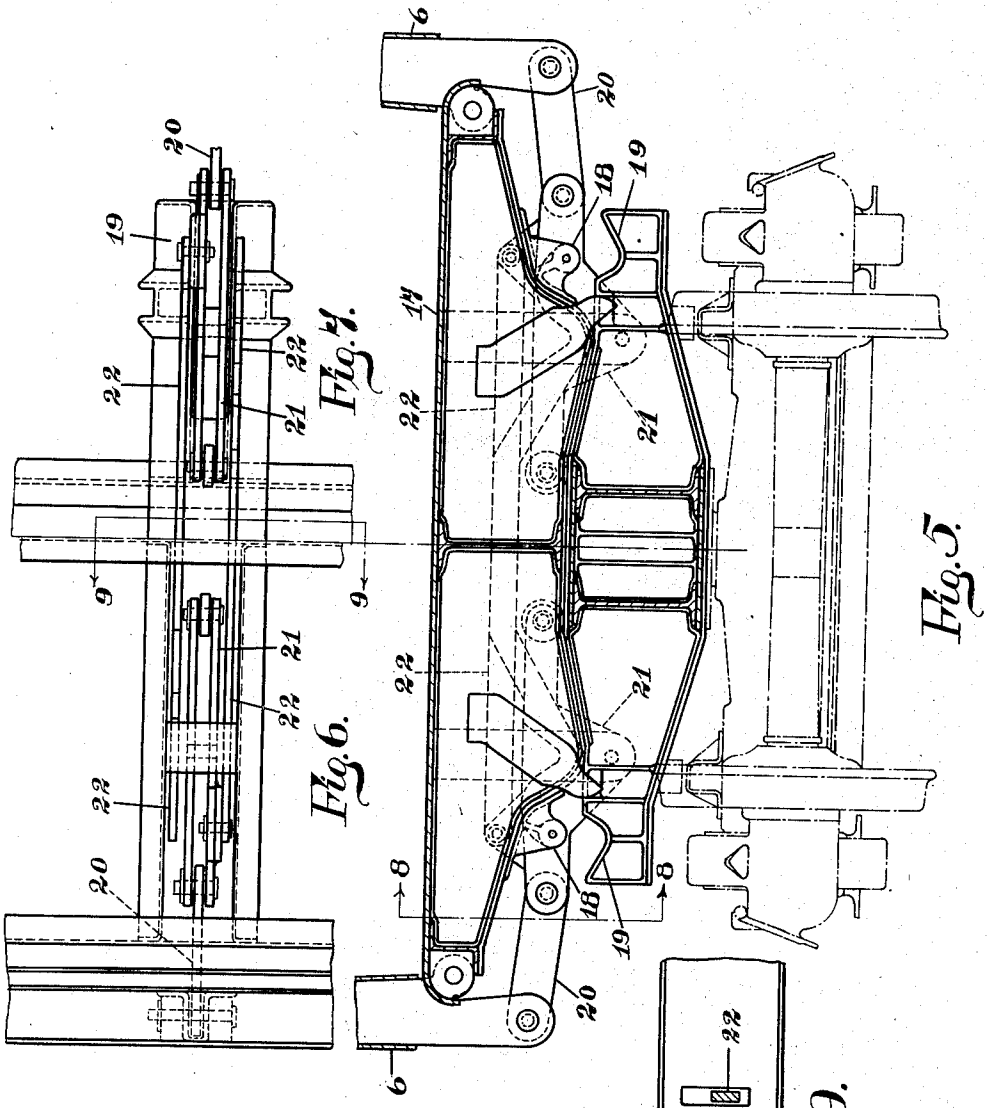


Fig. 5.

Fig. 4.

Fig. 6.

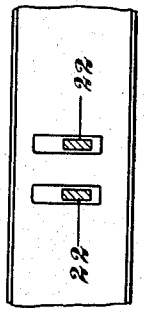


Fig. 9.

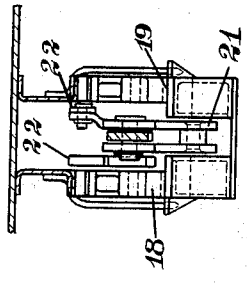


Fig. 8.

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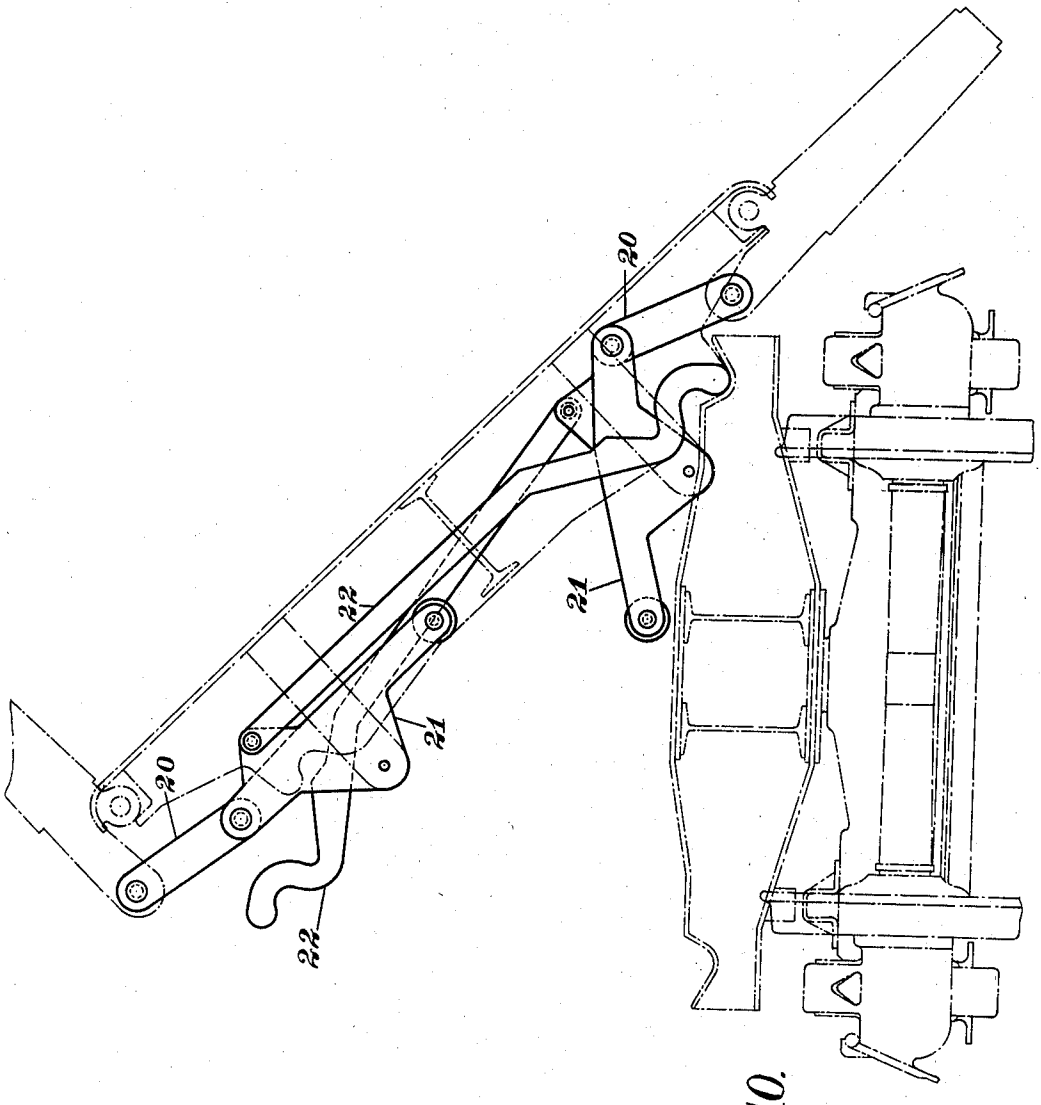


Fig. 10.

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Patented Feb. 6, 1940 2,189,336

UNITED STATES PATENT OFFICE

2,189,336

DUMP CAR

John P. Anderson, Koppel, Pa., assignor, by mesne assignments, to Pressed Steel Car Company, Inc., Pittsburgh, Pa., a corporation of Pennsylvania

Application September 6, 1929, Serial No. 390,731

27 Claims. (Cl. 105—276)

My invention relates to dump cars of the type having doors forming the walls of the body and being hinged adjacent the floor thereof to open outward and downward with the tilting of the car body.

An object of my invention is to provide a mechanism for each door which will automatically and selectively control the opening of the descending door when the body is tilting and return and lock said door into closed position when body is righted.

Another object of my invention is to provide a means for maintaining the inactive door closed when the body moves in dumping.

Another object of my invention is to mount the door mechanism entirely on the body and control the door by the tilting body moving the mechanism into engagement with the car underframe.

Referring now to the drawings: Fig. 1 shows an end of a car partly in section embodying my invention; Fig. 2 is a section taken longitudinally of the car body along the lines 2—2 of Fig. 1 showing the provision at the ends of the body for the movement of the door mechanism when the body is tilted; Fig. 3 is a transverse section through the car body and underframe, showing a means for supporting car body on the underframe; Fig. 4 is a transverse section through the car with the door mechanism and cooperating parts of the underframe being shown by full lines, and the body in tilted position by dot and dash lines; Fig. 5 is a transverse section through a car body and underframe embodying a modification of my invention; Fig. 6 is a partial plan view of the door mechanism in its relation to the car body; Fig. 7 is a partial plan view of the door mechanism in its relation to the car underframe; Fig. 8 is a section through the door mechanism along the lines 8—8 of Fig. 5; Fig. 9 is a section through the car underframe along the lines 9—9 of Fig. 6; Fig. 10 is a transverse section through the car with the body in fully tilted position and in dot and dash lines, and the resultant position of the door mechanism shown by full lines.

Referring now to the drawings in which like reference characters refer to like parts. Reference character 1 indicates a dump car having a body 2 mounted in stable equilibrium on trunnions 3, mounted in bearings 4 secured to the underframe 5 and adapted to tilt in said bearings to either side of the underframe. The side walls of the car body are formed by doors 6 mounted on hinges 7 adjacent the floor of the body and opening outwardly and downwardly at the side towards which the body is tilted. The end walls of the body are made rigid and in two parts comprising a substantially vertical portion 8 and an inwardly sloping portion 9 which is secured to the floor of the body. The spaces between the portions 8 and 9 of the end walls are provided to permit movement of the door mechanism when the body is tilted as will be later described.

The car body as described is designed to discharge the lading to the side of the underframe but it is to be understood that the door mechanism, to be later described, can be used equally as well on an end dump car. In the end dump car the end doors are hinged adjacent the floor of the body and the door mechanism is placed longitudinally of the body instead of transversely as stated in the following description.

The door mechanism comprises a member 10 pivotally mounted intermediate its ends on a member 11 secured to the body. One end of the member 10 is connected to a link member 12 mounted on a downward depending portion of the door 6. The other end of the member 10 moves transversely of the underframe and in engagement therewith to control the movement of the side door during the dumping and righting of a car body. Pivotally mounted on the member 10 and extending transversely of the body is a locking member 13 which engages with the stop member 16 to lock the door in closed position when the body is in load carrying position and to maintain the inactive door closed when in an elevated position as the body is tilted.

A transversely extending portion 14 of the underframe has mounted thereon adjacent its ends, stop portions 15 which are adapted to engage with the locking member 13 and about which the locking member rotates in controlling the movements of the inactive door. The body portion of the member 14 also provides a track on which the member 10 moves, as the body is tilting, to control the movement of the discharging door. The members 15 are in line longitudinally of the car underframe with the bearings 4 so that the rotation of the members 13 about those members will be simultaneous and in the same plane of rotation as that of the body rotating on its trunnions in the bearings 4.

Dump cars of the type illustrated and described usually have a mechanism mounted on the underframe and operated by fluid pressure or other convenient means for tilting the car body. Those body tilting mechanisms form no

part of my invention and have not been illustrated in the drawings but may be of any form adapted to the particular car under construction and known in the art.

Referring now to Figs. 1 and 4 of the drawings in which the car body is shown in load carrying position and in fully tilted position respectively, I will now describe the action of the door mechanism as it moves to control the discharging door as the body moves from load carrying position to fully tilted position. With the body as shown in Fig. 1 and the doors in closed position, the member 10 is held in position by the weight of the body and lading and maintains the member 12 in position to form a compression lock between the member 10 and the downward depending portion of the car door 6. The locking members 13 are also held in engagement with the members 15 of the underframe by the weight of the body and lading and in this position prevent any rotation of the member 10 on the member 11 to permit the accidental opening of the doors 6.

When the body is tilting about the right side of the underframe, by whatever means employed, the first part of the tilting movement carries the door mechanism on the left side of the body upwards away from the underframe until the member 16 moves clear of the member 13 which still remains in engagement with the member 15 on the left side of the underframe. At such time the member 13 is engaged by a projection of the pin 23 of the member 11, or any other convenient support mounted on the body, and with the continued tilting of the body the member 13 moves out of engagement with the member 15 to permit the rotation of the member 10 on the right side of the body. The locking member 13 secured to the member 10 mounted on the left side of the car body rotates about the member 15 mounted on the right side of the underframe and is prevented from moving transversely of the underframe by means of a stop member 16 mounted on the car body. Since the member 15 and the bearing 4 for the body are in the same line longitudinally of the underframe, the member 13 secured to the inactive or rising door on the left side of the body and the door mechanism maintain the same relation to the car body as they did when the body was horizontal and thus prevents the inactive door from opening. On the right side of the body the discharging door moves downward with the body and in closed position, to break the compression lock between member 10 and the depending portion of the door 6, and the door opens by gravity and the weight thereon of the lading being discharged. This opening movement of the discharging door causes the portion of the member 10 adjacent the door to move upwardly and to move and hold the downwardly moving portion of the member 10 into engagement with the underframe. This engagement of the member 10 with the underframe controls the opening movement of the discharging door with the tilting movement of the car body, so that when the body has reached its maximum tilting angle the discharging door is prevented from further opening.

When the car body is righted, the downward movement of the member 11 secured to the car body causes the member 10 mounted thereon to rotate in a clock-wise direction with relation to the car body, forcing the door upward into a fully closed position as the body comes to rest on the underframe. With the body coming to rest on the underframe the locking member 13 secured to the active door mechanism engages with the member 15 mounted on the underframe and with the stop 16 mounted on the car body to lock the door mechanism into position and prevent accidental opening of the door.

Referring now to Figs. 5 to 10 inclusive of the drawings in which is shown a car embodying a modification of my invention. Reference character 17 indicates a car body supported directly on the underframe and having trunnions 18 mounted on the body but free of the underframe when the body is horizontal. Bearings 19 mounted on the underframe are engaged by the trunnions 18 after the body has rotated about the underframe to bring the trunnions into contact with the bearings and from such time until the final dumping position is reached the body pivots about the underframe in the bearings 19 as previously described. This method of mounting the body is described in my copending application, Serial No. 357,567, filed April 23, 1929 issued as Patent No. 2,083,136. In this modification of my invention, the individual members of the door mechanism are the same as those for a trunnion supported car with slight modifications to adapt them to a rolling trunnion dumping car and the door locking mechanism maintains the door in closed position until the trunnions 18 engage with their respective bearings at the sides of the underframes. From this point until the car has reached fully tilted position and during the return of the body to a horizontal position with the underframe, the action of the individual members of the door mechanism is the same as previously described. The members 20 correspond to the members 12 previously described and the pivotally mounted members 21 correspond to the pivotally mounted members 10 in the preferred embodiment of the invention. The locking members 22 correspond to the locking member 13 and control the members 21 in the same manner as the members 13 previously described control the members 10.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

1. In a dump car, an underframe, a body tiltably mounted on said underframe, side doors for said body hinged adjacent the floor thereof, a door controlling mechanism mounted on the body adjacent each side door for holding the door in closed position when the body is horizontal and positively closing the door when the body is returned to an upright position after dumping, and a locking member extending transversely of the underframe having one end in engagement with the opposite side of the underframe, and the other end secured to its respective door operating mechanism, said locking member maintaining the door operating mechanism in position, as the body tilts towards the opposite side of the underframe, to hold the inactive door closed.

2. In a dump car, an underframe, a dump body tiltably mounted on said underframe in stable equilibrium, side doors for said body hinged adjacent the floor thereof, downward depending members on said doors, a member pivotally mounted intermediate its ends to the body, a link member connecting one end of said pivotally mounted member and the adjacent downward depending door member, the other end of said pivotally mounted member being in engagement with the underframe and moving transversely

thereof when its respective door opens by gravity with the tilting of the car body, and a locking member having one end in engagement with said pivotally mounted member and extending transversely of the underframe to engage with the underframe and body to maintain its respective door operating mechanism in locked position as the body tilts towards the opposite side of the underframe.

3. In a dump car, an underframe, a dump body mounted directly on the underframe in stable equilibrium, trunnions at each side of the body and free of the underframe when the body is horizontal, said trunnions engaging with the underframe after the body begins to tilt and forming pivots about which the body turns in completing the dumping movement, side doors for said body hinged adjacent the floor thereof, independent door operating mechanisms for each side door pivotally mounted on the body adjacent its respective door, said door mechanism being forced into engagement with the underframe when the body is horizontal and when its respective door is opening and closing with the tilting and righting movements of the body and moving out of engagement with the underframe when the body is dumping towards the opposite side of the underframe, and a member pivotally mounted on each door operating mechanism and extending across the underframe to engage with the underframe and hold the door operating mechanism in locked position when the door is inactive during the tilting of the body about the opposite side of the underframe.

4. In a dump car, an underframe, a dump body tiltably mounted on said underframe, doors on said body hinged adjacent the floor thereof and forming walls thereof when in closed position, downward depending members on said doors, an operating mechanism for each side door pivotally mounted on the body adjacent its respective door, said door operating mechanism holding its respective door in closed position when the body is horizontal and releasing the door for opening by gravity as the body tilts towards the adjacent side of the underframe in dumping and positively closing said door as the body is righted, and a member mounted on each said door operating mechanism and extending across the underframe to engage with the underframe and body to maintain its respective door locked in closed position as the body tilts about the underframe at the side opposite the respective door.

5. In a dump car, an underframe, a body supported on said underframe and tilting to either side in dumping, side doors for said body hinged adjacent the floor thereof, a door controlling member mounted on the body adjacent each side door, one end of said member being connected to the adjacent door, the other end of said member resting on an adjacent portion of the underframe, said body acting through said members to lock the respective doors in closed position when the body is horizontal to limit the opening of the descending door as the body is tilted, and to return said door to a closed position when the body is righted, and a member mounted on said door controlling member and engaging with the underframe to maintain said door controlling member in door locking position as the adjacent side of the body moves away from the underframe in dumping.

6. In a dump car, an underframe, a body tiltably mounted on said underframe and tilting to either side in dumping, side doors for said body hinged adjacent the floor thereof and a door operating mechanism mounted on the body independent of the underframe, said mechanism comprising a member mounted on the body so as to permit its partial rotation on an axis intermediate its ends, a connection between one end of said member and the adjacent side door, said mechanism being controlled by the tilting movements of the car body moving said member into engagement with portions of the underframe.

7. In a dump car, an underframe, a tilting body, doors forming the sides of said body and opening outwardly and downwardly as the body is tilted, a member mounted on said body adjacent each side door for controlling its respective door as the body tilts about the adjacent side of the underframe in dumping, a member mounted on said door member and extending across the underframe to detachably engage therewith adjacent the side thereof, said transverse member when in engagement with the underframe controlling its respective door member.

8. In a dump car in combination, an underframe, a body tiltably mounted thereon, side doors for said body hinged adjacent the floor thereof, a door operating mechanism mounted on the body below the floor thereof and adjacent each side door and normally engaging the underframe, said mechanism comprising a member pivotally mounted, intermediate its ends, on said body and link connected at one end to the door to form a compression lock between said door and said body controlled by engagement of the free end of the member with the adjacent side of the underframe, and a member mounted on said pivotally mounted member and extending across the underframe to engage with the opposite side of said body and underframe, said member holding the attached door mechanism in door locking position when said mechanism is out of engagement with said underframe.

9. In a dump car in combination, an underframe, a body tiltably mounted thereon for lateral dumping movement about each side thereof, doors forming the sides of said body and hinged adjacent the floor thereof, an operating mechanism for each door and mounted on said body adjacent its respective door, said mechanism controlling the opening and closing movements of its respective door through engagement with said underframe and a locking member mounted on said mechanism and extending across the body to engage with the opposite side thereof and the adjacent portion of the underframe, said member controlling the movements of its attached door mechanism when said mechanism is out of engagement with the underframe.

10. In a dump car in combination, an underframe, a body tiltably mounted thereon for lateral dumping movement about either side thereof, side doors for said body hinged adjacent the floor thereof, said body rolling transversely of the underframe during its initial tilting movement then pivoting about a trunnion mounted adjacent the side of said body, a door operating mechanism for each side door mounted on said body below the floor thereof, said mechanism engaging with said underframe to control the movements of its respective door and moving transversely of the underframe during the transverse movement of the body.

11. In a dump car in combination, an underframe, a body tiltably mounted thereon, doors for said body hinged adjacent the floor thereof, a door operating mechanism pivotally mounted

on the ends of said body adjacent each door, said mechanism comprising a member pivotally mounted on said body and having one end resting on said underframe and the opposite end connected with the adjacent door and a connection between said pivotally mounted member and the opposite side of said body and underframe.

12. In a dump car in combination, an underframe, a body tiltably mounted thereon, doors forming the sides of said body and pivotally mounted adjacent the floor thereof, independent mechanisms for each door mounted on said body adjacent their respective doors, said mechanisms controlling the movements of their respective doors through engagement with said underframe, means connected with said door operating mechanism and the opposite side of the body for controlling said doors when the adjacent side of the body is out of engagement with the underframe.

13. In a dump car, an underframe, a body tiltably mounted thereon for dumping movement about the sides of said underframe, said body moving transversely of the underframe during the initial tilting movement and then pivoting about a trunnion mounted on said body and bearing on said underframe, doors for said body hinged adjacent the floor thereof, independent mechanisms for each side door for automatically and selectively controlling the opening and closing movements thereof as the body tilts about the adjacent side of the underframe, said mechanisms including a member extending across the underframe and engaging with the opposite side of said body.

14. In a dump car in combination, an underframe, a dump body, side doors on said body, hinged adjacent the floor thereof, independent mechanisms mounted on the body adjacent each door for automatically and selectively controlling the respective doors as the body moves in dumping about the adjacent side of the underframe and means connected to the mechanisms and extending transversely of the underframe to a selective engagement with the opposite side thereof.

15. In a dump car in combination, an underframe, a dump body, oppositely disposed doors on said body, hinged adjacent the floor thereof, a member pivotally mounted on the body adjacent each door, the inner end of the member having a bearing on the underframe, the outer end of the member being connected to the adjacent door and a member pivotally mounted upon the first mentioned member and selectively engaging the opposite side of the underframe.

16. In a dump car in combination, an underframe, a body supported in stable equilibrium on said underframe, trunnions on said body spaced outwardly of the normal body supports, the body turning on the trunnions in dumping, a side door for the body hinged adjacent the floor thereof and a door controlling mechanism, said mechanism comprising an inner member pivotally mounted on the body, an outer member pivotally mounted on the door and a pivotal connection between the inner and outer members.

17. In a dump car in combination, an underframe, a body supported in stable equilibrium on said underframe, trunnions on said body spaced outwardly of the normal body supports, the body turning on the trunnions in dumping, a side door for the body hinged adjacent the floor thereof and a door controlling mechanism, said mechanism comprising an inner member pivotally mounted on the body, an outer member pivotally mounted on the door and a pivotal connection between the members, the inner end of the inner member selectively engaging with the underframe.

18. In a dump car in combination, an underframe, a body mounted thereon in stable equilibrium, oppositely disposed doors for the body hinged adjacent the floor thereof, trunnions on said body spaced outwardly of the normal body supports, the body turning on the trunnions in dumping, and a door controlling mechanism for each door, said mechanisms comprising a member pivotally mounted on the body adjacent each door, a link connection between each of the members and their adjacent door and a member pivotally mounted on the body member and extending transversely of the underframe to selectively engage with the opposite side thereof.

19. In a dump vehicle, an underframe, a body, laterally spaced supports on the body and underframe for retaining the body in stable equilibrium, trunnions spaced laterally of the supports upon which the body turns in dumping, side doors for the body hinged adjacent the floor thereof, independent mechanism for each door, controlling the opening and closing of the door as the body turns about an adjacent side of the underframe, each mechanism including a member extending across the underframe to releasably engage therewith as the body tilts about the side of the underframe opposite its respective door mechanism to retain its associated door in closed position.

20. In a dump vehicle, an underframe, a body, laterally spaced supports on the body and underframe for retaining the body in stable equilibrium, trunnions spaced laterally of the supports upon which the body turns in dumping, doors forming side walls of the body and hinged adjacent the floor thereof, independent mechanisms for each door mounted on the body for movement relative to the body and underframe to control the opening and closing of the adjacent door as the body moves in dumping about the adjacent side of the underframe, each mechanism including a member extending across the underframe for engagement therewith to control the associated door mechanism when the body tilts about the opposite side of the underframe.

21. In a dump vehicle, an underframe, a body, tiltable about either side of the underframe upon laterally spaced trunnions, doors forming the side walls of the body and hinged adjacent the floor thereof, independent mechanisms for each door being mounted on the body adjacent each door to control the opening and closing movement of the door as the body moves about the adjacent side of the underframe in dumping, each mechanism including a member extending across the underframe to hold its respective door closed as the body moves in dumping about the opposite side of the underframe and a support on the body for said member when out of engagement with the underframe as its respective door opens and closes during dumping.

22. In a dump vehicle, an underframe, a tiltably mounted body, doors forming side walls of the body and hinged adjacent the floor thereof to open outwardly, a mechanism associated with each door mounted on the body to control the opening and closing movements of the door as the body moves in dumping about the adjacent sides of the underframe, said mechanism including a member pivotally mounted on the body for movement relative to the underframe and body when the body moves in dumping about the adjacent

side of the underframe and means engaging the opposite side of the underframe for holding the member in fixed relation to the body when out of engagement with the underframe.

23. In a dump vehicle, an underframe, a body tiltable on laterally spaced trunnions, doors forming side walls of the body and hinged adjacent the floor thereof, a mechanism mounted on the body adjacent each door for controlling the movements thereof as the body moves in dumping, each mechanism including a member mounted on the body inwardly of the adjacent trunnion for movement relative to the body and underframe to release the door for opening movement proportionally to the tilting movement of the body throughout the major portion of the movement of the latter or to remain closed without injury to door or mechanism and means pivotally connected to said member and to the opposite side of the underframe for holding the member fixed relative to the body as the body tilts about the opposite side of the underframe.

24. In a dump vehicle, an underframe, a body tilting to either side of the underframe about laterally spaced trunnions, doors for each side of the body and hinged adjacent the floor thereof, a member pivotally mounted intermediate its ends upon the body and inwardly of the adjacent trunnion, a link connection between the outer end of the member and the adjacent door below the hinge mounting thereof, a bearing for the inner end of the member upon the underframe, said body cooperating with the underframe and acting through the member to control the door associated with the member through movement of the body about the side of the underframe adjacent the door and means associated with the opposite side of the underframe and member for controlling the door when the body is tilting about the opposite side of the underframe.

25. In a dump vehicle, an underframe, a body, laterally spaced supports on the body and underframe maintaining the body in stable equilibrium, said body tilting to either side of the underframe upon trunnions spaced laterally of the body supports and inactive when the body is horizontal, doors forming side walls of the body and hinged adjacent the floor of the latter, a door control mechanism including a member mounted intermediate its ends upon the body and having its outer end associated with the door below its hinged connection, a bearing for the inner end of the member upon the underframe, said member acting to limit the opening movement of the door proportionately to the relative movement of the body when tilting about the adjacent side of the underframe in dumping, to force the closing of the door as the body is righted and by movement relative to the body permit the closing of the door independently of the body movement, and a member associated with said mechanism and the opposite side of the underframe to retain the door in closed position when elevated above the underframe as the body tilts to the opposite side of the underframe.

26. In a dump vehicle, an underframe, a body tilting about either side of the underframe, doors forming walls of the body and opening outward and downward as the body is tilted, a door operating mechanism for each door including a member pivotally mounted on the body with its opposite ends associated with the door and underframe respectively, and a second member having one end mounted on the first member for movement relative thereto and its opposite end selectively engaging the opposite side of the underframe to control its associated door when the body is out of engagement with the side of the underframe adjacent the door.

27. In a dump car, in combination, an underframe, a body supported on the underframe and tilting about opposite sides thereof, doors forming opposite walls of the body and hinged adjacent the floor thereof, an independent mechanism for each door for retaining the associated door in closed position when the body is horizontal, for releasing the door for opening by gravity during tilting of the body about the adjacent side of the underframe, and for imparting a positive closing movement to the door as the body is righted, each mechanism including an arm pivoted intermediate its ends and supported by the body, a link connection between one end of the arm and the adjacent door below its hinged connection to the body, a bearing engagement between the free end of said arm and the underframe, said arm being free to move away from the underframe during all positions of the tilting body, and a member associated with said arm and the opposite side of the underframe to control movement of the arm relative to the body whilst the body is tilting about the side of the underframe opposite from the door controlled by said arm.

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