Dec. 17, 1940. E. J. ROSE 2,225,463

MINE CAR DOOR OPERATING MECHANISM

Original Filed May 21, 1938 4 Sheets-Sheet 1

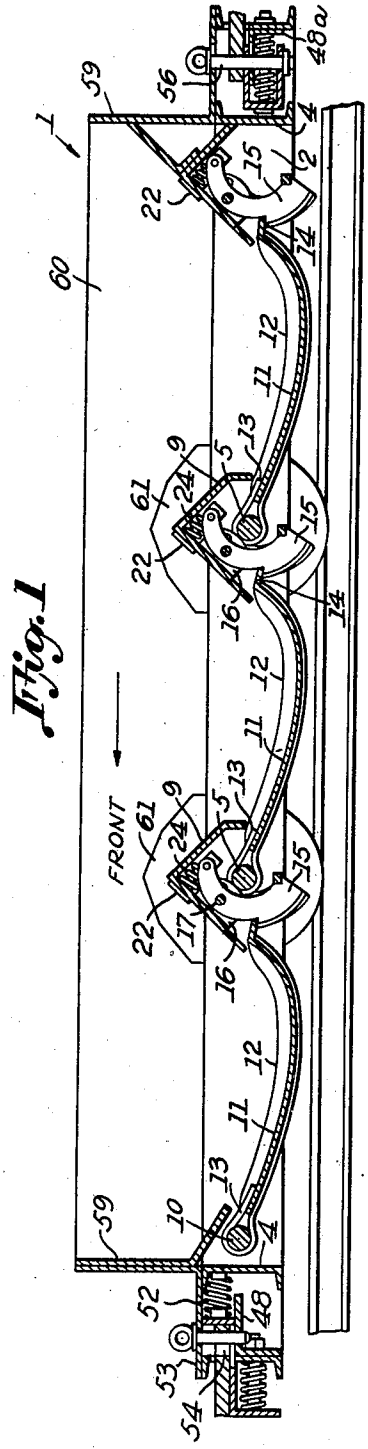


Fig. 1

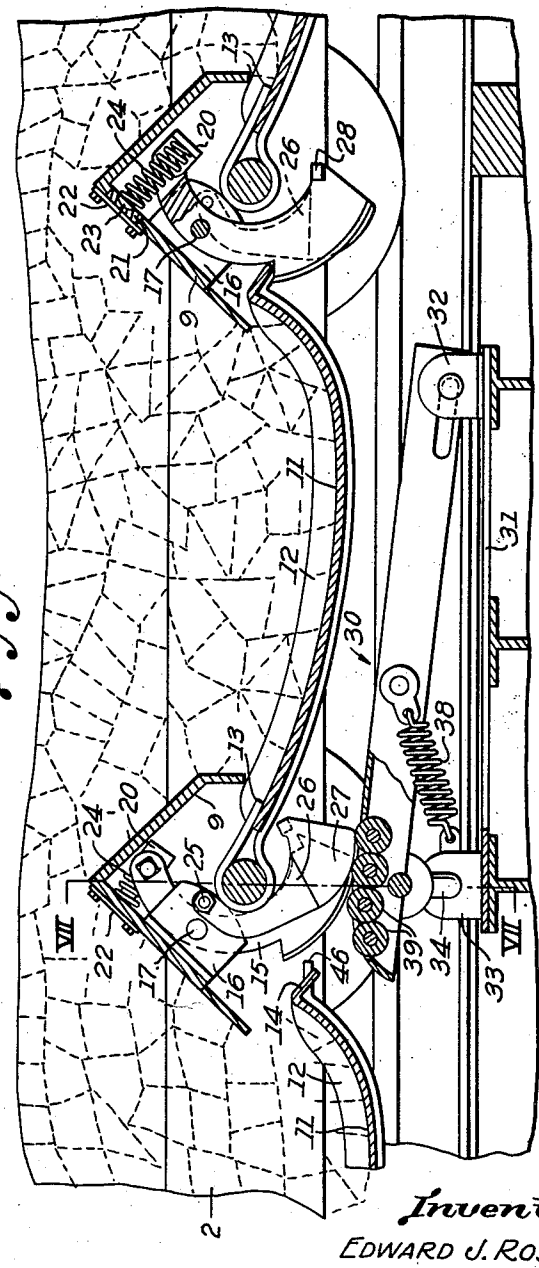


Fig. 2

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Fig. 3

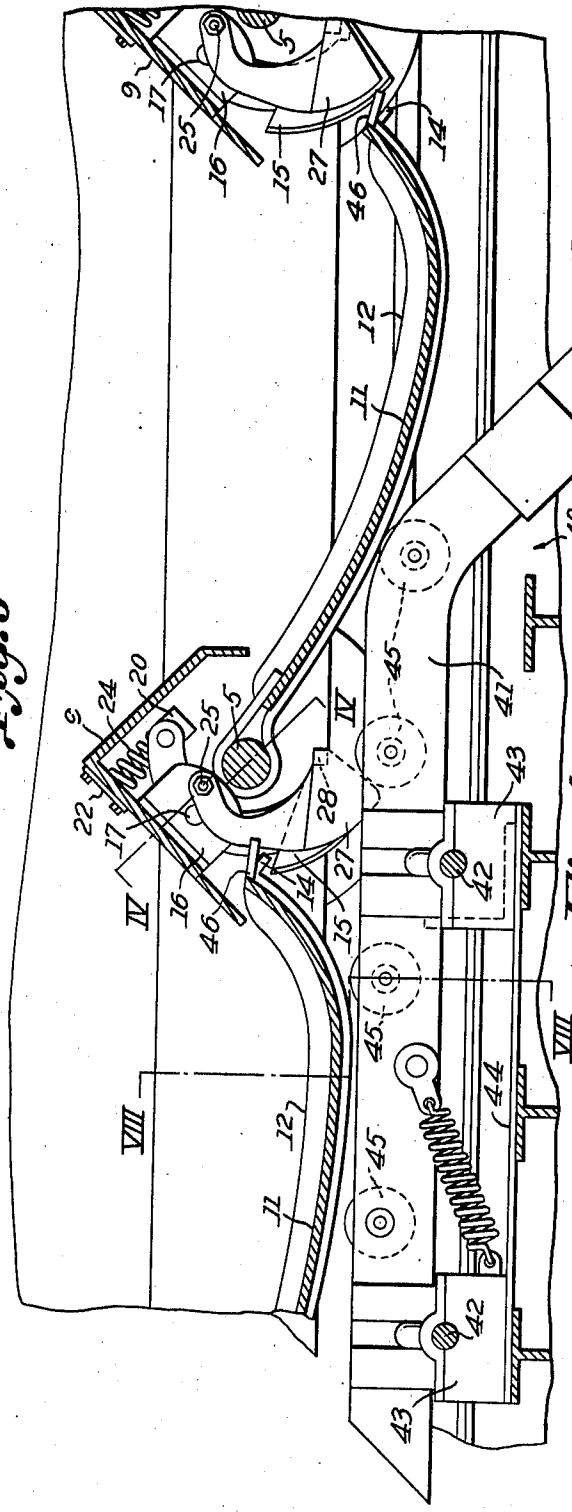
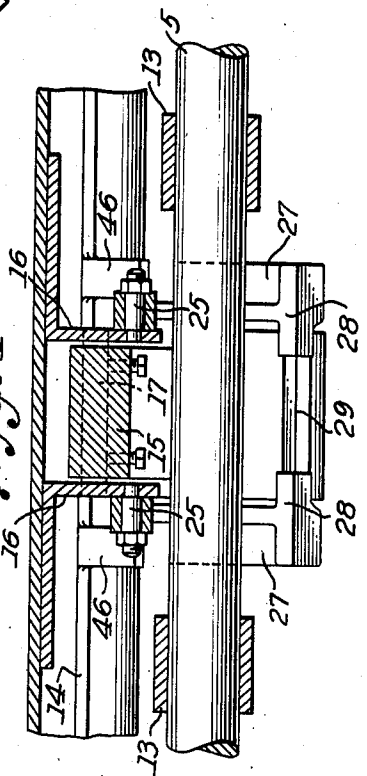


Fig. 4



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Fig. 5

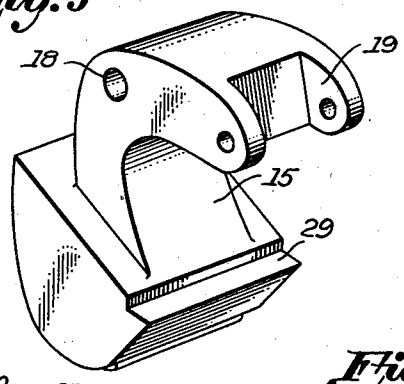


Fig. 6

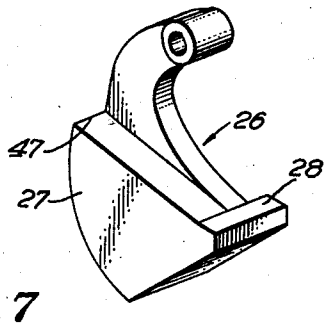


Fig. 7

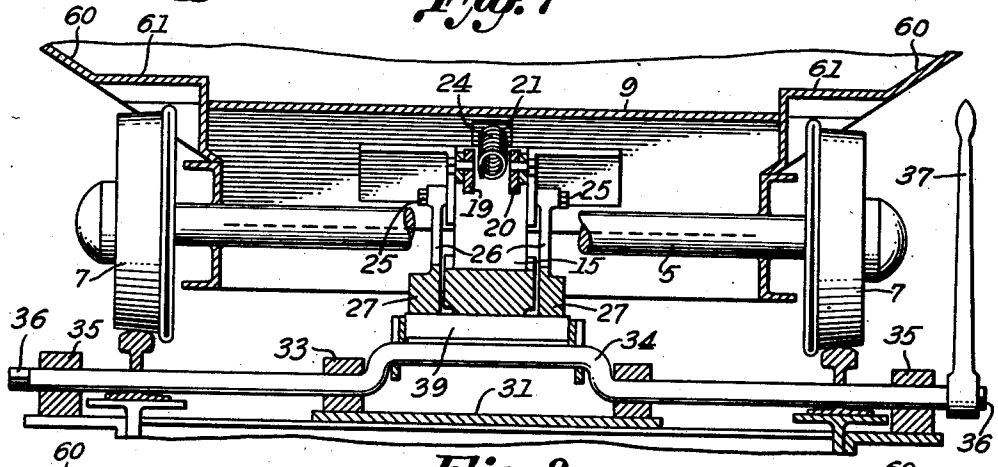
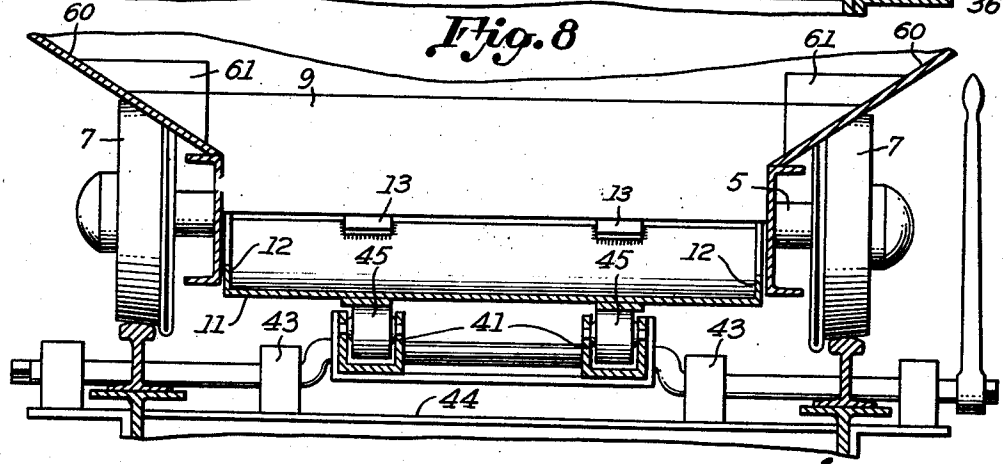


Fig. 8



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MINE CAR DOOR OPERATING MECHANISM

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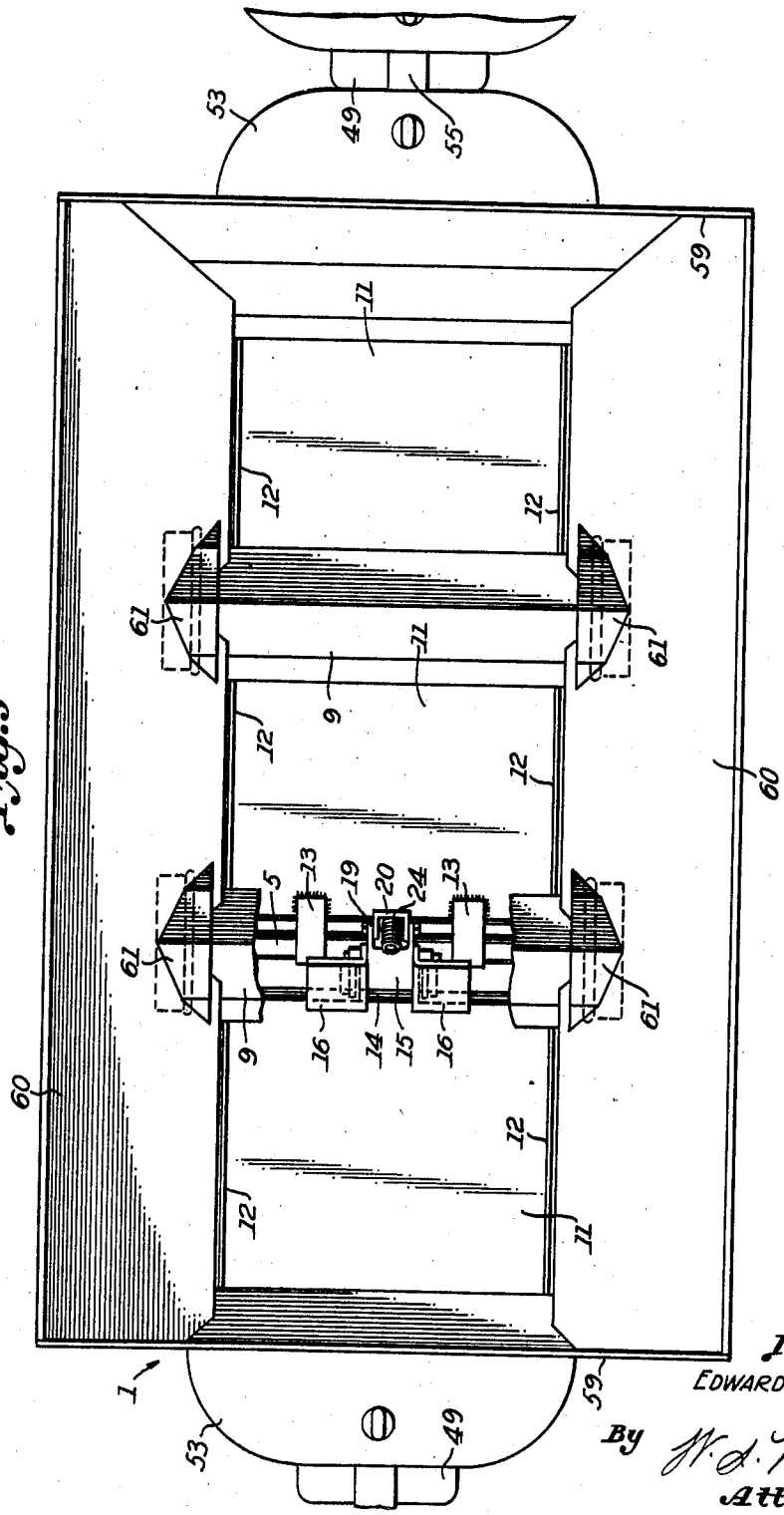


Fig. 9

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2,225,463

MINE CAR DOOR OPERATING MECHANISM

Edward J. Rose, Wilmington, Ohio, assignor of one-third to Ralph J. Miars and one-third to Cash L. Richardson, Wilmington, Ohio

Original application May 21, 1938, Serial No. 209,281. Divided and this application November 3, 1938, Serial No. 238,633

10 Claims. (Cl. 214—63)

This invention relates to vehicles for transporting loose bulk materials and in its more particular aspect is directed to a mine car of the drop bottom type.

The primary object of the invention resides in the provision of a drop bottom mine car having a plurality of hinged bottom doors with means for holding the doors in a closed position. The construction of the door holding means is such that the doors will drop in consecutive order.

It is also an object of the invention to provide lock means which coacts with the door holding means to prevent the release of the doors except at the desired location.

A further object of the invention resides in the provision of a mine car having a frame formed from a pair of structural channel members. The flanges of the channel members are outwardly directed and the ends of said members are bent toward one another and welded together to form a unitary structure.

It is also an object of the invention to provide the frame of a car with transversely extending angle members to which are pivotally secured the means for holding the bottom doors in a closed position.

Another object of the invention resides in providing the track for the cars with a trip mechanism which will release the lock for the door holding means so that the latter may be moved to a position whereby the bottom door may swing to a discharge position.

The invention also contemplates the provision of novel shock absorbing mechanism at the ends of the car frame so that the shock incident to starting and stopping of the train in which the car is positioned will not injure the car or cause its premature deterioration.

It is also an object of the invention to provide the track with means for closing the doors after they have been permitted to move to a contents discharging position and to provide the trip mechanism and the door closing mechanism with a resilient mounting which will permit the cars to move rearwardly thereover without injuring the doors or the means for holding them in closed positions.

This application is a true division of my copending application, Serial No. 209,281 filed May 21, 1938.

Further objects will be apparent from the following description and the accompanying drawings.

In the drawings:

Fig. 1 is a vertical longitudinal sectional view taken through a car formed in accordance with the present invention;

Fig. 2 is a view on an enlarged scale taken through the car shown in Fig. 1 as it is moving over the trip mechanism to effect the discharge of the materials from the car, the materials being indicated by dotted lines;

Fig. 3 is a similar view of the car as it is moved over the mechanism used to move the doors to a closed position;

Fig. 4 is a detail sectional view taken on the plane indicated by the line IV—IV of Fig. 3;

Fig. 5 is a perspective view of a latch used to hold the bottom doors in a closed position;

Fig. 6 is a similar view of a lock member employed for the purpose of preventing the undesired movement of the latches used to hold the bottom doors closed;

Fig. 7 is a vertical transverse sectional view taken on the plane indicated by the line VII—VII of Fig. 2;

Fig. 8 is a similar view taken on the plane indicated by the line VIII—VIII of Fig. 3;

Fig. 9 is a plan view of the car shown in Fig. 1.

Referring more particularly to the drawings, the numeral 1 designates the car in its entirety. This car is provided with a rectangular frame 2 formed from a pair of channel members arranged with the flanges extending outwardly. Near their ends, the channel members are bent toward one another and the ends are welded as at 3 in abutting relationship. This provides a rigid one-piece structure which possesses great strength. Ordinarily, cars of the type mentioned are provided with frame members secured together by rivets which, in a short time, become loosened due to the rough usage to which the cars of this type are subjected. When the frame is formed as shown, this looseness can not develop since the frame is of one-piece construction. Adjacent each end and slightly spaced therefrom, there is provided a transversely extending channel brace 4, the ends of which are also secured to the sides of the frame member by welding. These braces further strengthen the frame at the places where the jars or shocks caused by starting and stopping of the train occur.

Near the central portion of the frame, there is provided transversely extending shafts 5, the outer ends of which project through the body of the channel frame and are reduced as at 6 to receive the antifriction bearings of flanged track engaging wheels 7. The shafts are welded to the frame to prevent movement relative thereto and

the outer ends of the shafts are threaded as at 8 to receive the bearing retaining means, not shown. In vertical registration with the shafts, there is provided transversely extending angle members 9 which have their corners directed upwardly to present a minimum surface to be engaged by the material positioned in the car. These angles prevent the coal from engaging the shafts or other mechanism disposed adjacent thereto.

Positioned at the forward end of the frame is a short shaft 10. This shaft and the shafts 5 form the pivotal support for bottom doors 11, the latter include curved sheet metal sections having at their side edges, flanges 12, which help to form the bottom of the car and keep the coal dust from falling between the doors and the frame of the car. One end of the sections 11 has straps 13 welded thereto, the straps being looped around the shafts and extending lengthwise of the doors to reenforce them. The free edge of the door is flanged as at 14 for engagement with a hook extension provided on a pivoted latch 15. One flange of the angle members 9 is provided with spaced angle brackets 16 through which projects a fulcrum pin 17. The latch 15 is formed with an opening 18 to receive the pin 17 on which the latch is pivotally supported. The upper end of the latch is bifurcated as at 19 to provide spaced apertured ears between which is pivotally supported a saddle 20.

In registration with the saddle 20, one flange of the angle member 9 is formed with an opening in which is positioned a block 21. The upper surface of the angle member has a plate 22 secured thereto to hold the block in position in the opening. The under side of the block 21 is provided with an arcuate depression to receive a similarly shaped head on a button 23. The saddle 20 is formed on its inner surface with a lug in alignment with the button 23. A compression type coil spring 24 is disposed between the saddle and the member 23. The rounded shape of the head of the member 23 provides for lateral movement on the part of the spring at the end engaged by the saddle without introducing torsional stress in the spring. The spring 24 exerts a force on the latch to move the hooked end into engagement with the free edge of the door. Since the door engages the latch substantially in vertical registration with the pivot for the latch, the force of the spring is sufficient to maintain the door in a closed position even when the car is loaded to capacity.

To prevent accidental movement of the latch to a door releasing position, the brackets 16 are provided with a second set of openings for the reception of studs 25 which form the pivotal support for lock members 26, the latter being provided at their lower ends with weighted portions 27 to cause the locks to swing to a position whereby laterally projecting lugs 28 will engage a recess 29 formed on the rear side of the latch 15. The pivots for the locks are disposed in spaced relation to the pivot for the latch member.

This spacing causes the recess in the latch member to move on a slightly different arc than the projection on the lock member. When these members are in engagement, a binding action will be produced by this difference and the latch will be positively prevented from moving. When it is desired to release the doors to discharge the contents of the car, the lock must be moved to a position whereby the projections 28 will be out of the path of movement of the latch. This is accomplished through the provision of a trip mechanism best illustrated in Figs. 2 and 7. The lower portion of the lock extends a slight distance below the corresponding portion of the latch and will therefore engage a trip mechanism 30 provided in connection with the track slightly prior to the engagement of the latch therewith. As the car moves forward, the lock will be swung rearwardly, when the latch will engage the trip mechanism and continued movement of the car will move the latch in opposition to the spring 24. When the latch is moved sufficiently, the hook thereon will be moved out of engagement with the flange on the free edge of the door and the latter will move to an open position.

The trip mechanism 30 includes a base 31 having spaced upstanding bearing members 32 and 33. The trip member is pivoted at one end between the bearings 32 and at the other end, the trip member is formed with openings for the reception of a crank 34. This member is rotatably supported by the bearings 33 and the ends thereof project through the track and auxiliary bearings 35. The outer extremities of the crank are squared as at 36 for the reception of an operating handle 37. When the handle 37 is moved, the crank 34 will raise or lower the body of the trip member into and out of active position. The opening for the pivot in the member 30 adjacent the bearings 32 is slotted to permit the trip member to be moved by the crank. A tension type coil spring 38 is arranged at either side of the trip member to resiliently hold the same in an active position.

At the upper end, the trip member carries a plurality of rolls 39 to decrease the frictional engagement between the latch and lock members therewith. When the cars move rearwardly after being discharged, the locks and latches will engage the end of the trip member and move it to an inactive position. After the car moves to a position where the latches and locks are free from engagement with the trip member, the spring 38 will again move it to its active position. The rear edges of the latches and locks are inclined to produce a wedge-like cam surface to enable them to more easily depress the trip mechanism. When the car has moved beyond the dumping location, the open doors will engage a door closing mechanism 40 as illustrated in Figs. 3 and 8.

The door closing mechanism 40 comprises a pair of laterally spaced angle members 41 supported between the tracks on a pair of crank members 42, the latter being pivotally carried by bearing brackets 43 formed at the ends of a base member 44. The angle members 41 support a plurality of spaced roller members 45 which register with the reenforcing straps 13 provided on the under side of the doors 11. The angle members 41 are bent downward where the doors first engage them and the inclination of the angles cause the doors to move upwardly as the cars move forward. When the doors have moved far enough, a pair of projections 46 secured to the free edge of the door will engage the locks and move them to a position whereby the latch members may also be moved to an inactive position.

After the latch members have been moved by the door, the projections 46 will move beyond a shoulder 47, formed on the locks and these members will then be free to swing into engagement with the latches. After the door has been fully elevated, the latch will be moved by its spring to a position whereby the door will be retained against downward movement. Since the locks

are in engagement with the latches, the latter will be prevented from moving to a position to again release the door. The trip mechanism and the door closing device are usually positioned at the top of a coal bin or other storage device. The cars are run over the storage bin where they move over the trip. This releases the door and permits the contents to be discharged from the car into the bin. The car continues to move and will then engage the door closing mechanism which will move the doors to a closed position. If desired, the cars may move in one direction only or they may be moved rearwardly over the bin without effecting the release of the doors.

What is claimed is:

1. In mechanism for handling loose bulk materials, a trackway, a plurality of cars movable over said trackway, said cars each comprising a frame, side and end walls secured to said frame to form a body, track engaging wheels provided at the sides of said frame, transversely extending shafts secured to said frame, a bottom door pivoted at one edge to each of said shafts, a spring pressed latch engaging the opposite edge of each of said doors to maintain them in positions of closure, lock means provided adjacent each of said latches to resist movement thereof to effect the release of said doors, and door release means provided in connection with said trackway to directly engage each latch and lock to move the locks to latch releasing positions and the latches in opposition to said springs.

2. In mechanism for handling loose bulk materials, a trackway, a plurality of cars movable over said trackway, said cars each comprising a frame, side and end walls secured to said frame to form a body, track engaging wheels provided at the sides of said frame, transversely extending shafts secured to said frame, a bottom door pivoted at one edge to each of said shafts, a spring pressed latch engaging the opposite edge of each of said doors to maintain them in positions of closure, lock means provided adjacent each of said latches to resist movement thereof to effect the release of said doors, means provided in connection with said trackway to directly engage each latch and lock to move the latter to latch releasing positions and the former in opposition to said spring, and means provided adjacent said track for moving said doors to a closed position.

3. In mechanism for handling loose bulk materials, a trackway, a plurality of cars movable over said trackway, said cars each comprising a frame, side and end walls secured to said frame to form a body, track engaging wheels provided at the sides of said frame, transversely extending shafts secured to said frame, a bottom door pivoted at one edge to each of said shafts, a spring pressed latch engaging the opposite edge of each of said dors to maintain them in positions of closure, lock means provided adjacent each of said latches to resist movement thereof to effect the release of said doors, means provided in connection with said trackway and engaging said latches and locks to move the latter to latch releasing positions and the former in opposition to said spring, means provided adjacent said trackway for moving said doors into engagement with said latches to secure said doors in a closed position, and means provided on the free edge of said doors to engage said lock means to move them to a latch releasing position prior to the engagement of the doors with said latches.

4. In a trackway for mine cars of the type having hinged bottom doors, latch means for holding the doors in closed positions and means for securing said latch means against undesired movement to door releasing positions, means carried by said track to effect the release of said doors, means provided in spaced relation to said door releasing means to engage said doors to effect their closure, said means including a pair of transversely spaced members having downwardly inclined portions, means for supporting said members in an active raised position, and means provided in connection with said track to move said members to a lowered inactive position.

5. In a trackway for mine cars of the type having bottom doors hinged at their forward ends, latch means engaging the rear ends of the doors to retain them in closed positions and lock means for maintaining the latch means in operative position, means for releasing said doors comprising an inclined trip plate disposed between the tracks, rollers provided on said trip plate to engage and move both latch and lock means to inactive positions, and crank means adjustably supporting said trip plate for movement from active to inactive positions.

6. In a trackway for mine cars of the type having bottom doors hinged at their forward ends, centrally disposed latch means engaging the rear ends of the doors to retain said doors in closed positions and independent lock means on each side of said latch means to prevent undesired movement thereof, means for releasing said doors comprising a trip member disposed between the tracks in registration with the latch and lock means, said trip means engaging and simultaneously moving said lock means to inactive positions immediately prior to the movement of said latch means to a door releasing position.

7. In a trackway for mine cars of the type having bottom doors hinged at their forward ends and latch means engaging the rear ends of the doors to retain them in closed positions, means for automatically actuating said doors comprising latch releasing and door closing members provided in spaced relation adjacent the track, each member having a body, a crank element movably supporting one end of each body, and spring means for yieldably holding each body in an elevated active position, rotation of said crank elements serving to move said bodies in opposition to said springs to inactive positions.

8. In a trackway for mine cars of the type having bottom doors hinged at their forward ends and latch means engaging the rear ends of the doors to retain them in closed positions, means for automatically actuating said doors comprising latch releasing and door closing members provided in spaced relation adjacent the track, each member having a body, horizontally disposed rollers carried by each of said bodies, a crank element movably supporting one end of each body, and spring means for yieldably holding each body in an elevated active position, rotation of said crank elements serving to move said bodies in opposition to said springs to inactive positions.

9. In a mine car of the type having bottom doors hinged at their forward ends and pivoted latch members engaging the rear ends of said doors to hold them in closed positions, said latch members projecting downwardly from said car, lock members for preventing undesired move-

ment of said latch members, said lock members also projecting downwardly from said car to a greater degree than said latch members, and means for releasing the doors including a trip member carried by the trackway for the car, said trip member engaging said lock members to move them to inactive positions prior to moving said latch members to door releasing positions.

10. In a mine car of the type having bottom doors hinged at their forward ends and pivoted latch members engaging the rear ends of said doors to hold them in closed positions, said latch members projecting downwardly from the transverse center of said car, lock members disposed adjacent either side of said latch members for preventing undesired movement of said latch members, said lock members also projecting downwardly from said car to a greater degree than said latch members, means for releasing the doors including a trip member carried by the trackway for the car, said trip member engaging said lock members to move them to inactive positions prior to moving said latch members to door releasing positions, and means provided adjacent the trackway for returning said doors to closed positions, said means having transversely spaced inclined body members disposed to engage the doors at either side of said latch and lock members to move the doors to closed positions.

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