UNITED STATES PATENT OFFICE

WILLIAM F. DIETRICHSON, OF ST. LOUIS, MISSOURI, ASSIGNOR TO AMERICAN CAR AND FOUNDRY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY

DOOR-TRIPPING DEVICE FOR CARS

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This invention relates to door tripping devices for cars and more particularly to door tripping devices which are erected alongside the rails at the openings to bins or chutes to operate the door operating mechanism of passing cars so that the car ladings are dumped into the bins or chutes without interruption of the movement of the cars, and it is an object of this invention to provide a device of the kind described which will be of simple construction, readily manufactured and installed, reliable in operating and which will permit of the reverse movement of the cars on the track without operation of the doors.

In the drawings:

Fig. 1 is substantially a vertical sectional view taken on the line 1—1 of Fig. 2 with some parts broken away in order to show other parts more clearly, of a door tripping device constructed in accordance with this invention, a portion of a car of a type suitable for use with the device being shown in broken lines in order to show the relation of the tripping device to the car at the time the door tripping operation is initiated;

Fig. 2 is a side elevation of the tripping device shown in Fig. 1, parts being broken away to show other parts more clearly, the tripping levers being shown in solid lines in normal position and in broken lines in the mid and extreme positions of their movement;

Fig. 3 is a broken view similar to Fig. 2 of a door tripping device of modified construction; and

Fig. 4 is a vertical section taken on the line 4—4 of Fig. 3.

In the drawings a door tripping device 1 constructed in accordance with this invention is shown positioned for use in connection with a drop bottom car 2 of suitable construction. The door tripping device 1 comprises a base or supporting member 4 shown as a channel placed with its web horizontal and its flanges extending downwardly. While no means for supporting the member 4 are shown it is to be understood that the member 4 will be attached to a suitable foundation or to a portion of the bin or chute structure depending upon the conditions at each installation. To the web of the channel 4 is secured a bracket 6 to which pin 8 pivotally connects a lever 10. The lever 10 comprises spaced side members 11 which extend on opposite sides of the bracket 6 and are joined by rivets 12 having filler blocks 14 thereon between the side members 11. The lever 10 extends between spaced channels 16 which are placed with their webs vertical and their flanges projecting outwardly. The channels 16 are connected to the base member 4 by a channel 18 and are joined together by a connecting member 20 and by stop members 22 and 24. The stop members 22 and 24 comprise channel shaped pieces having their flanges secured to the webs of the channels 16 and their webs inclined to serve as stops for the lever 10. To the side members 11 of the lever 10 are attached channel shaped filler members 26 having laterally extending flanges by which the members 26 are attached to the side members 11. Adjacent the upper end of each side member 11 there is attached a plate 28 so shaped and placed that when the lever 10 is in its normal position, as shown in solid lines in Fig. 2, the upper edge of each member 28 is substantially horizontal and projects outwardly on a level with the upper end of its supporting side member 11.

Mounted in the side members 11 adjacent the upper ends thereof is a pin 30 on which there is pivotally mounted between the side members 11 a lever 32 which extends beyond the upper ends of the side members 11 and substantially in line therewith. The lever 32 has a lower portion of greater length than the upper portion extending downwardly between the side members 11 and bent so that its lower end 33 projects outwardly from between the sides members 11. Connecting the side members 11 is a channel shaped piece 34 which is attached to the outer faces of the side members 11 and extends between the lever 10 and the stop member 22. The piece 34 is positioned on the lever 10 below the pin 30 so that it engages the bottom portion of the lever 32 and serves as a stop therefor, thus preventing rotation of the lever 32 in a counterclockwise direction beyond substantial alignment with the lever 10. It will be noted however...
that there is nothing to interfere with the rotation of lever 52 on the pin 50 in a counterclockwise direction.

To the projecting end 53 of the lower portion of the lever 52 there is attached one end of a cable 36 which passes over a pulley 38 mounted on a pin 40 carried by the channels 16. The cable 36 extends through a weight 42 and is provided at its other end with a washer 44 firmly attached thereto. The weight 42 travels within a guide composed of spaced vertically arranged channels 46 and 48 having their flanges projecting outwardly and joined by side plates 50. To the side plates 50 are attached lugs 52 which serve as stops for the weight 42 and keep it from acting upon the cable 36 during the full return movement of the lever 10. The side plates 50 at their upper ends overlap and are secured to the bottom flanges of the channels 16. The flanges of the channel 46 are secured to the flanges of the base member 4 by rivets or bolts which also secure the side plates 50 thereto. To further stiffen the structure the channels 16 are braced by an angle brace member 54.

The car 2 shown in connection with the door tripping device 1 is provided with drop doors, not shown, having projecting lugs 58 which in the closed position of the doors will be engaged by latches 60. There are a plurality of latches 60 provided for each door although but one is shown and the latches of each door are joined by a link 62 for simultaneous operation. To one of the latches 60 there is connected one end of a link 64 the opposite end of which is connected to an arm 66 of a bell crank lever 68 which is attached to a shaft 70 suitably journaled in bearings 72 attached to the car. The other arm 74 of the bell crank lever 68 projects outwardly so as to engage with the lever 52 and plates 56 on the lever 10.

As the car approaches from the left in Fig. 2 the arm 74 will engage in the angle between the lever 52 and the plates 56 when the lever 10 is in its normal position as the lever 52 presses against the lever 32 which owing to its engagement with the stop 34 and the cylinders 50 and will carry the lever 10 with it to the right in Fig. 2. As the lever 10 moves to the right the plates 56 engage the end of the arm 74 will raise the arm 74 retracting the latches 60 from the lugs 58 on the doors and permitting the doors to drop. As the car continues its motion to the right the lever 10 will come into engagement with the stop 34 and the arm 74 will pass over the end of the lever 52 disengaging the arm 74 from the lever 32 and permitting the weight 42 to initiate the return of the lever 52 and 10. Before the weight 42 has brought the lever 10 to its normal position, however, the movement of the weight 42 will be arrested by the stops or lugs 32 but the movement of the lever 10 to its normal position will continue due to its momentum and to the effect of gravity upon the lever inasmuch as the weight 42 will have carried the lever past its mid or vertical position. When the cars are moved in the reverse direction on the track and the arm 74 engages with the lever 32 the lever 32 will pivot about the pin 30 to the position shown in broken lines in Fig. 2, raising the lower portion of the lever 52 and drawing up the cable 36. This operation, however, will bring the stop 44 towards the weight 42 but will not raise the weight 42 so that the arm 74 will not be operated by the lever 32. After the arm 32 has passed beyond the lever 32 the weight of the cable 36 and the force of gravity will return the lever 32 to its normal position.

In the modified construction shown in Figs. 3 and 4 the lever 10, constructed of spaced side members 11 as in the other construction, is shown carried upon a pin 50 mounted in spaced channels 32 and extending between the spaced channels 34. The channels 34 are carried upon I-beams 36 one of which is shown as joining the channels 32 and 34 and to the channels 34 are attached the side members 50 of the guide for the weight 42 as in the other construction. The upper ends of the side members 11 are bent to form outwardly projecting portions 88 and in the upper ends of the side members 11 is mounted a pin 50 on which is pivotally mounted a lever 90 between the side members 11.

Fig. 3 shows the lever 10 having a similar arrangement to the lever 10 in position with its lower end projecting outwardly therefrom and bent to one side to form stop 92 which engages with one of the side members 11 and prevents rotation of the lever 90 about the pin 30 in a clockwise direction. The lever 90 is, however, free to rotate in a counterclockwise direction in the same manner as the lever 52. In this construction the arm 74 of the door operating mechanism will engage in the angle between the projecting portions 88 of the side members 11 and the lever 90, operating the levers 90 and 10 in the same manner as the levers 32 and 10 are operated in the other construction. In this construction, however, the cable 36 instead of being connected to the lower end of the lever 90 is connected to the side members 11 and gravity alone is relied upon to return the lever 90 to its normal position when it is operated by a car moving in the reverse direction. Where it is desired to maintain the lever 90 out of operative position a pin 94 is engaged.
in the openings 96 in the side members 11 and an opening 98 in the lever 90 and serves to hold the lever 90 in the position indicated by the broken lines in Fig. 2. While the preferred forms of the invention have been shown and described, it is to be understood that the invention is not limited to the exact details of the construction shown and described as it is obvious that various modifications thereof within the scope of the claims will occur to persons skilled in the art.

What is claimed is:

1. In a car door tripping device, a support, a lever pivotally mounted on said support, a second lever pivoted on said first lever, means limiting the rotation of said second lever with respect to said first lever, means fixed on said first lever for engaging a car door latch operating arm, means to bias said levers to normal position and a stop to prevent movement of said levers past normal position in one direction.

2. In a car door tripping device, a support, a lever pivotally mounted on said support, a second lever pivoted on said first lever and adapted to be engaged by a door latch operating arm carried by a car, means biasing said second lever to a normal position and means on said first named lever preventing pivotal movement of said second lever in one direction with respect to said first lever.

3. In a car door tripping device, a support, a lever pivotally mounted on said support, a second lever pivoted on said first lever and positioned for engagement with a car door latch operating arm, said levers pivoting about the pivotal support of said first lever when said second lever is engaged by a latch operating arm on a car going in one direction and said second lever pivoting about its support on said first lever when engaged by a latch operating arm on a car going in the opposite direction.

4. In a car door tripping device, a support, a lever pivotally mounted on said support and having a projection thereon, a second lever pivoted on said first lever and positioned for engagement with a car door latch operating arm, said levers pivoting about the pivotal support of said first lever and said projection raising the latch operating arm when said second lever is engaged by a latch operating arm on a car going in one direction and said second lever pivoting about its support on said first lever to lie substantially level with said projection when engaged by a latch operating arm on a car going in the opposite direction.

5. In a car door tripping device, a support, a lever pivotally mounted on said support, a second lever pivoted on said first lever and positioned for engagement with a car door latch operating arm, said second lever pivoting on its support on said first lever when engaged by a latch operating arm on a car going in one direction and means preventing pivoting of said second lever on its support on said first lever when engaged by a latch operating arm on a car going in the opposite direction.

6. In a car door tripping device, a support, a lever pivotally mounted on said support, a second lever pivoted on said first lever and positioned for engagement with a car door latch operating arm, means causing pivotal movement of said levers about the support of said first lever when said second lever is engaged by a latch operating arm of a car going in one direction and means for returning said levers to their normal positions.

7. In a car door tripping device, a support, a lever pivotally mounted on said support, a second lever pivoted on said first lever and positioned for engagement with a car door latch operating arm, means on the said first named lever for restraining the levers against relative movement when said second named lever is engaged by a latch operating arm of a car moving in one direction, wherein said first named lever is moved on its pivot, means for returning said levers to their normal positions, and means on said first named lever for raising the latch operating arm as the latch operating arm operates said levers.

8. In a car door tripping device, a support, a lever pivotally mounted on said support, a second lever pivoted on said first lever and positioned for engagement with a car door latch arm, means on the said first named lever for restraining the levers against relative movement when said second named lever is engaged by a latch operating arm of a car going in one direction whereby said first named lever is moved on its pivot, means for returning said levers to their normal positions, and means fixedly secured to and moving with said first named lever for raising the latch operating arm as the latch operating arm operates said levers.

9. In a car door tripping device, a support, a lever pivotally mounted on said support, a second lever pivoted on said first lever and positioned for engagement with a car door latch operating arm, means causing pivotal movement of said levers about the support of said first lever when said second lever is engaged by a latch operating arm of a car going in one direction, means for returning said levers to their normal positions and a projection on said first lever for raising the latch operating arm as the latch operating arm operates said lever.

10. In a car door tripping device, a support, a lever pivotally mounted on said support, a second lever pivoted on said first lever, means causing pivotal movement of said levers about the support of said first lever when said second lever is engaged by
a latch operating arm of a car going in one direction, said means permitting pivotal movement of said second lever on said first lever when said second lever is engaged by a latch operating arm of a car going in the opposite direction, a projection on said first lever for raising the latch operating arm as the latch operating arm operates both of said levers and means for returning said levers to their normal positions.

11. In a car door tripping device, a fixed support, a lever pivoted to the support for swinging movement about a horizontal axis, a second lever pivotally secured to said first named lever and projecting beyond the end of the latter to define a contacting element for a car door latch operating arm, said second named lever being capable of movement from its normal position in one direction only, and means fixed to said first named lever for lifting the door latch operating arm during pivotal movement of said first named lever.

12. In a car door tripping device, a support arranged adjacent the path of movement of a car, a lever pivoted to the support for swinging movement parallel to the path of movement of the car, a second lever pivoted to the first named lever and projecting beyond the upper end thereof to define a contacting element for engagement by a car door latch operating element, means on the first named lever for restraining the second named lever against rotation on its pivot in one direction, means fixed to the first named lever for lifting the car door latch operating element during pivotal movement of said lever, and abutments for limiting the pivotal movement of said first named lever.

13. In a car door tripping device, a support arranged adjacent the path of movement of a car, a lever pivoted to the support for swinging movement parallel to the path of movement of the car, a second lever pivoted to the first named lever and projecting beyond the upper end thereof to define a contacting element for engagement by a car door latch operating element, means on the first named lever for restraining the second named lever against rotation on its pivot in one direction whereby the before mentioned latch operating element during movement of the car in one direction will swing said first named lever on its pivot, means fixed to the first named lever for lifting the car door latch operating element during pivotal movement of said lever, and abutments for limiting the pivotal movement of said first named lever.

In witness whereof I have hereunto set my hand.

WILLIAM F. DIETRICHSON.