OPERATING MECHANISM FOR COVERS OF A HOPPER RAILCAR

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ABSTRACT

An apparatus for automatically opening and closing the covers of a covered hopper railroad car. After the covers are unlatched, the car is driven through the apparatus. The covers of the car are contacted by the bars of the apparatus, which lifts the covers to the open position. The car can then be filled. Continued advancement of the car causes the apparatus to close the hopper doors.
OPERATING MECHANISM FOR COVERS OF A HOPPER RAILCAR

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention is directed in general to covered hopper railroad cars, and, in particular, to a mechanism for automatically opening and closing the covers of a hopper railroad car.

2. Description of the Related Art

Often, it is necessary that the hopper cars use covers to protect the contents of the car from the elements. Some examples of covered hopper cars are taught in U.S. Pat. Nos. 4,004,542; 4,299,174; 4,368,674; 4,821,648; and 5,263,421. However, the opening and closing of these hatches is very labor-intensive.

In addition, there are inherent dangers to operating these hopper covers, as a person often has to climb atop the railroad car to open and close the hatches, providing an opportunity for injury. In addition, if it is necessary to bring the car to a complete stop to open and close the hatch covers, valuable time is wasted.

As the hatches must be secured when the train is in route, the workers usually must climb atop the railcar to unlatch the covers for loading the car, and to latch them after the contents have been loaded.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a mechanism for automatically opening and closing the hatch covers of a covered hopper railroad car.

It is a further object of the present invention to provide a mechanism for filling a hopper car while in motion without the need of a person to physically open and close the hopper covers.

It is a still further object of the present invention to provide a mechanism for latching and unlatching the hopper covers of a railcar which can be operated safely from the side of the car while standing on the ground.

These and other objects of the present invention will be more readily apparent from the description and drawings which follow.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view of the locking mechanism for a covered hopper railcar;

FIGS. 2A-H, taken sequentially, show a top view of the front end of a covered hopper railcar moving through the mechanism of the present invention;

FIGS. 3A-H, taken sequentially, show an elevational view of the railcar shown in FIGS. 2A-H; and

FIG. 4 is an end view, partly in cross-section, of a covered hopper railcar for use with the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENT

Before the railcar, designated at 8, is moved through the operating mechanism, it is necessary to unlatch the hopper covers 10a and 10b. The latching mechanism, generally indicated at 20, consists of a pair of latches 22a, b which each engage a protrusion 24a, b extending from the upper part of each of covers 10a, 10b. Latches 22a, b each consist of L-shaped levers, which pivot about a pin 26 extending from the end of a railcar 8. The opposite end of each latch 22 is rotatably coupled to a lever 30a, b. The opposite ends of levers 30a, b are connected for rotation to opposite ends of a coupling arm 32, which is rotatably mounted on railcar 8 to a pivot pin 34. Another extension of arm 32 is coupled to a lever 36. Lever 36 is connected to an operating handle 40 which is coupled for rotation to railcar 8 by a pivot pin 42.

To operate latching mechanism 20, handle 40 is rotated in the clockwise direction about pivot 42 such that lever 36 is shifted in the direction of arrow A. This action causes arm 32 to rotate about pivot 34 in the direction of arrow B, causing lever 30b to shift upwardly in the direction of arrow C, while lever 30a travels downwardly in the direction of arrow D. As lever 30a moves upwardly, latch 22a rotates about pin 26 in the direction of arrow E. Simultaneously, lever 30b moves downwardly, causing latch 22b to rotate about pin 26 in the direction of arrow F. This action unlatches hopper covers 10a and 10b.

A second latching mechanism is preferably located on the opposite end of railcar 8 such that covers 10a and 10b are secured at both ends. This latching mechanism is a mirror image of mechanism 20.

Once the covers are unlatched, the railcar can be moved through the operating mechanism. Referring now to FIGS. 2A and 3A, the forward end of railcar 8 approaches the framework of the operating mechanism, designated at 50. As the leading edge 50a of mechanism 50 contacts railcar 8, it is positioned beneath covers 10a and 10b as shown in FIG. 4. Note that mechanism 50 is constructed such that cover 10a, which overlaps cover 10b, is contacted first.

As railcar 8 moves along to the position shown in FIGS. 2B and 3B, covers 10a and 10b begin to open, as they are lifted by the rising and diverging slopes of mechanism 50. As railcar 8 continues in the forward direction to the position shown in FIGS. 2C and 3C, covers 10a and 10b continue to open. When railcar 8 reaches the position shown in FIGS. 2D and 3D, covers 10a and 10b are at their fully open position. The hoppers of railcar 8 can now be loaded with the desired material, as the entire top of the car is open.

After the car has been loaded, railcar 8 is advanced to the position shown in FIGS. 2E and 3E. At this point, the rails of mechanism 50 are located on the outside of hopper covers 10a and 10b. As railcar 8 proceeds to the position shown in FIGS. 2F and 3F, the rails of mechanism 50 begin to converge and slope downwardly. As railcar 8 continues to move forward to the position shown in FIGS. 2G and 3G, the rails of mechanism 50 force covers 10a and 10b to the closed position. Note that mechanism 50 is configured such that cover 10b closes first, and then followed by overlapping cover 10a. As railcar 8 reaches the position shown in FIGS. 2H and 3H, covers 10a and 10b are completely closed. Latching mechanisms 20 can then be locked.

Latching mechanism 20 can be operated from ground level, such that it is not necessary to climb on top of
the cars to unlatch and latch the covers, eliminating possible injuries. In addition, the cover operating mechanism requires no internal power source for operation.

[0022] In the above description, and in the claims which follow, the use of such words as "clockwise", "counterclockwise", "distal", "proximal", "forward", "rearward", "vertical", "horizontal", and the like is in conjunction with the drawings for purposes of clarity. As will be understood by one skilled in the art, the mechanisms will operate on hopper doors which open in opposite directions, and thus will use opposite terminology.

[0023] While the invention has been shown and described in terms of preferred embodiment, it will be understood that this invention is not limited to this particular embodiment, and that many changes and modifications may be made without departing from the true spirit and scope of the invention as defined in the appended claims.

What is claimed is:
1. An apparatus for automatically opening the covers of a covered hopper railroad car, comprising:
   a railroad car;
a left hand cover and a right hand cover;
a single member for fitting under the forward edges of said covers;
two divergent numbers attached to said single member;
two parallel members each attached to one of said divergent members;
two additional parallel members for contacting said doors when said doors in the open position;
and two convergent members for allowing said doors to close.

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