LOCKING DEVICES FOR LATERALLY MOVABLE DOORS

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Filed Oct. 20, 1960
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Filed Oct. 20, 1960, Ser. No. 63,823
6 Claims. (Cl. 20—23)

This invention relates to locking devices for laterally movable doors.

It is an object of this invention to provide vertically reciprocating locking devices for laterally movable doors of railway cars and more particularly vertically reciprocating locking devices carried by the laterally movable doors of double door application of railway cars.

A further object is to provide locking devices of the character described above so constructed that proper locking engagement of the locking devices with the cars or keepers carried thereby is insured.

A further object is to provide locking devices of the character described above so constructed that proper locking engagement of the locking devices with the cars or keepers carried thereby is established in situ after the laterally movable doors are hung on the cars and closed.

A further object is to provide locking devices for laterally movable doors of railway cars of such construction that reciprocation of the locking devices is positively limited so as to prevent improper functioning of the locking devices.

Other objects of the invention will become clear as the description thereof proceeds.

In the drawings forming part of this specification:

FIG. 1 is a partial elevation of a railway car having a combination of a main outside sliding door and an auxiliary laterally movable door which carries a locking device embodying the instant invention.

FIG. 2 is a vertical section taken on line 2—2 of FIG. 1 and is shown in three parts so that an enlarged view is obtained. Portions are broken away in order to more clearly illustrate the construction and parts of the locking device are shown in projected and retracted positions.

FIG. 3 is an end elevation looking toward the right in FIG. 2.

FIG. 4 is a horizontal section taken on line 4—4 of FIG. 1.

Referring to the drawings the numeral 10 indicates generally a side wall of a railway car. A portion of which is illustrated. The side wall embodies a side plate 11 of generally Z-shaped section and having a downward extending flange 12. At the bottom of the side wall 10 and forming a part of the underframe of the car is a side sill 13.

If the side plate 11, side sill 13 and door posts 14 and 15 define a door opening 16 in the side wall of the car. The door opening is of extraordinary width and is adapted to be closed by means of a main outside sliding door 17 and an auxiliary laterally movable door 18 which in closed position is seated within the door opening 16 in flush relationship with the side wall 10.

A channel-shaped header 19 is secured to the depending flange 12 of the side plate and extends along the top of that portion of the door opening 16 which is adapted to be closed by the laterally movable door 18. The door 18 is provided with a top reinforcing angle member 20 having an inwardly extending flange 21 which is received within the header 19 when the door is closed. Lateral movement into and out of the door opening is imparted to the auxiliary door 18 by means of a mechanism designated generally by the reference numerals 22 and 23 and embodying vertical bars 23 and 24 rotatably mounted on the door and provided at their upper ends with cranks 25 and 26 and at their lower ends with cranks 27 and 28. For a more detailed description and illustration of the operating mechanism for the laterally movable door, reference is made to applicant's Patent No. 2,658,243, issued November 10, 1953, and incorporated herein.

The front margin of the auxiliary door 18 is reinforced by means of an inwardly extending Z-shaped member 29 having rearwardly extending flanges 30 secured to the main door 17, an inwardly extending web 31 and a forwardly extending flange 32 spaced from the outer face of the door and the attaching flange 33 of a front stop 34 for the main door 17. The flange 33 is secured to the auxiliary door and to the flange 30 of the Z-shaped member 29 as by means of rivets 35. From the attaching flange 33 to the front stop extends outwardly, rearwardly, outwardly, and then forwardly so as to provide rearwardly and forwardly opening channels 36 and 37 in the latter of which the front margin of the main door is received when the doors are closed.

According to the instant invention the auxiliary door 18 carries a locking device for fastening the front margin thereof to the side plate and side sill when it is closed. For this purpose a plate 38 is provided which extends between and is secured by means of welds to the front stop 34 and to the flange 32 of the reinforcing member 29.

A link 39 is pivotally mounted intermediate its ends between the plate 38 and the web 31 of the reinforcing member 29. To permit swinging movement of the link 39 a portion of the flange 32 is copecd as shown at 40. A rod 41 is pivotally secured to one end of the link 39 as shown at 42, and extends upwardly therefrom within the substantially channel-shaped construction provided by the Z-shaped reinforcing member 29 and the attaching flange 33 of the front stop 34.

A sleeve 43 is slidable and loosely mounted upon the upper end of the rod 41. The upper end of the sleeve is flattened as shown at 44 and is secured between the jaws 45 and 46 of a slidable locking bolt 47.

A rod 48 is pivotally secured to the other end of the link 39 as shown at 49. The rod 48 extends downwardly and its lower end extends loosely into a sleeve 50. The lower end of the sleeve 50 is flattened as indicated at 51 and is received between jaws, one of which is shown at 52, formed at the upper end of a slidable locking bolt 53.

The upper locking bolt 47 is slidably retained by means of a guide member 54. When projected the locking bolt 47 is received within an opening formed in a keeper 55 secured to the downwardly extending flange 12 of the side plate. The lower locking bolt 53 is slidably retained within a guide member 56 preferably formed as part of a casting 57 secured between the flange 32 of the reinforcing member 29 and the front stop 34. In projected or locking position the locking bolt 53 is received within a keeper 58 mounted upon the side sill 13.

A lever 59 is employed to impart sliding movement to the locking bolts. The lever 59 is pivotally and slidably mounted upon the member 57. To this end the member 57 is formed with a vertically elongated slot 60 through which a pin 61 loosely extends. The lever 59 is also pivotally engaged with the pin 62 that is used to fasten the flattened end of the sleeve 50 between the jaws of the locking bolt 53.

The laterally movable auxiliary door 18 is furnished with the parts of the locking device assembled therewith in the manner noted hereinabove. The auxiliary door is then mounted upon the side wall and is disposed by means of its operating mechanism in the door opening in flush relationship with the side wall. The locking device is then put into operable relationship with the upper and lower keepers 55 and 58. In this accomplished the locking engagement of the locking bolts with their keepers is insured regardless of variations in height of the
To this end the bottom locking bolt 53 is lowered to establish full engagement thereof with the keeper 58. In the establishment of this relationship the lever can be moved vertically within the slot 60 of the member 57. At this time the lever is so disposed that the lug 63 provided thereon is engaged with the member 57 thereby insuring that the lever will be disposed in correct position. Also at this time the extension 64 of the pin 65 of the pivotal connection 42 engages the upper end of a slot 66 formed in the member 57 thereby preventing the link 39 from passing over center when the lower locking bolt 53 is in engagement with keeper 58. Sleeve 50 is then welded to rod 48 and pin 61 is welded to the member 57. The lower locking bolt 53 is now retracted from its keeper 58. This is accomplished by swinging movement of the link 39. The swinging movement of the link is limited by the engagement of the extension 64 with the lower end of the slot 66 formed in plate 38. The upper end of the locking bolt 47 is disposed slightly below the keeper 55 and the sleeve 43 is welded to the rod 41. Thereafter when the lever 59 is actuated to project the locking bolts 47 and 53 into engagement with their keepers proper locking relationship between the bolts and the keepers is insured. This is so regardless of the variations in the distance between the upper and lower keepers, which frequently occurs in car construction, since the relationship between the rods 41, 48 and 50 at the lower end of the link 39 and the member 57 permit proper engagement between the bolts and the keepers. Moreover, should this locking relationship be disturbed after the car has been in service it can readily be restored by breaking away the welds at the lower end of the link 39 and re-welding the rods to the sleeves and the pin 61 to the member 57.

It will be apparent that numerous changes and modifications in the details of the invention will be clear to those skilled in the art. It is intended, therefore, that all such modifications and changes be comprehended within this invention which is to be limited only by the scope of the claims appended hereto.

I claim:

1. In a railway car having a side wall provided with a door opening, a slidable mounted main door and a laterally movable auxiliary door for closing the door opening and means for moving the auxiliary door into and out of the door opening, a vertically reciprocating locking device for locking the auxiliary door in the door opening, said locking device comprising a link pivotally mounted intermediate its ends on said door, a first rod pivotally connected to one end of said link and extending upwardly therefrom, a second rod pivotally connected to the other end of said link and extending downwardly therefrom, a locking bolt, a member connected to said locking bolt, said member being slidably associated with the upper end of said first rod, means selectively securing said member to said first rod, a locking bolt, a member connected to said latter locking bolt, said member being slidably associated with the lower end of said second rod, means selectively securing said latter member to said second rod, upper and lower guide members for said locking bolts carried by said latter member, said locking bolts secured to said car, an actuating lever slidably mounted on said door, means selectively securing said lever on said door, and means operatively connecting said lever to said lower locking bolt.

2. In a railway car having a side wall provided with a door opening, a slidable mounted main door and a laterally movable auxiliary door for closing the door opening and means for moving the auxiliary door into and out of the door opening, a vertically reciprocating locking device for locking the auxiliary door in the door opening, said locking device comprising a link pivotally mounted intermediate its ends on said door, a first rod pivotally connected to one end of said link and extending upwardly therefrom, a second rod pivotally connected to the other end of said link and extending downwardly therefrom, a locking bolt, a member connected to said locking bolt, said member being slidably associated with the upper end of said first rod, means selectively securing said member to said first rod, a locking bolt, a member connected to said latter locking bolt, said member being slidably associated with the lower end of said second rod, means selectively securing said latter member to said second rod, upper and lower guide members for said locking bolts carried by said latter member, said locking bolts secured to said car, an actuating lever, a pin extending through said lever and the slot in said lower guide member, means selectively securing said pin to said lower guide member, and means operatively connecting said lever to said latter locking bolt.

3. In a railway car having a side wall provided with a door opening, a slidable mounted main door and a laterally movable auxiliary door for closing the door opening and means for moving the auxiliary door into and out of the door opening, a vertically reciprocating locking device for locking the auxiliary door in the door opening, said locking device comprising a link pivotally mounted intermediate its ends on said door, a first rod pivotally connected to one end of said link and extending upwardly therefrom, a second rod pivotally connected to the other end of said link and extending downwardly therefrom, a locking bolt, a member connected to said locking bolt, said member being slidably associated with the upper end of said first rod, means selectively securing said member to said first rod, a locking bolt, a member connected to said latter locking bolt, said member being slidably associated with the lower end of said second rod, means selectively securing said latter member to said second rod, upper and lower guide members for said locking bolts carried by said latter member, said locking bolts secured to said car, an actuating lever, a pin extending through said lever and the slot in said lower guide member, means selectively securing said pin to said lower guide member, and means operatively connecting said lever to said latter locking bolt.

4. In a railway car having a side wall provided with a door opening, a slidable mounted main door and a laterally movable auxiliary door for closing the door opening and means for moving the auxiliary door into and out of the door opening, a vertically reciprocating locking device for locking the auxiliary door in the door opening, said locking device comprising a link pivotally mounted intermediate its ends on said door, a first rod pivotally connected to one end of said link and extending upwardly therefrom, a second rod pivotally connected to the other end of said link and extending downwardly therefrom, a locking bolt, a member connected to said locking bolt, said member being slidably associated with the upper end of said first rod, means selectively securing said member to said first rod, a locking bolt, a member connected to said latter locking bolt, said member being slidably associated with the lower end of said second rod, means selectively securing said latter member to said second rod, upper and lower guide members for said locking bolts carried by said latter member, said locking bolts secured to said car, an actuating lever, a pin extending through said lever and the slot in said lower guide member, means selectively securing said pin to said lower guide member, and means operatively connecting said lever to said latter locking bolt.

5. The car defined in claim 4 wherein said lever carries a projection which engages said lower member in a predetermined position of said lever.

6. As an article of manufacture a door having a vertical recess therein, means on said door for imparting lateral movement thereto into and out of a door opening in a railway car upon which said door is mounted, a
link pivotally mounted between its ends in the recess, a first rod pivotally connected to one end of said link and extending upwardly therefrom, a second rod pivotally connected to the other end of said link and extending downwardly therefrom, a locking bolt, means on said locking bolt slidably and loosely mounted on the upper end of said first rod, a locking bolt, means on said latter locking bolt slidably and loosely mounted on the lower end of said second rod, upper and lower members secured to said door having guides confining said locking bolts for sliding movement in the recess, an actuating lever, means pivotally connecting said lever to said latter locking bolt and means slidably mounting said lever on said lower member.

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