Jan. 27, 1931. W. E. WINE 1,790,295

HOPPER CAR DOOR SECURING MEANS

Filed April 16, 1925 2 Sheets-Sheet 1

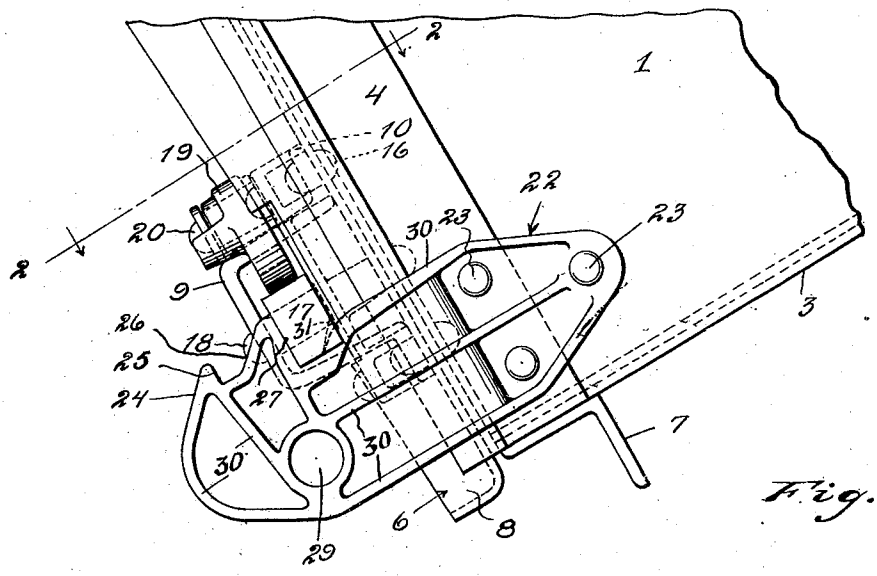


Fig. 1.

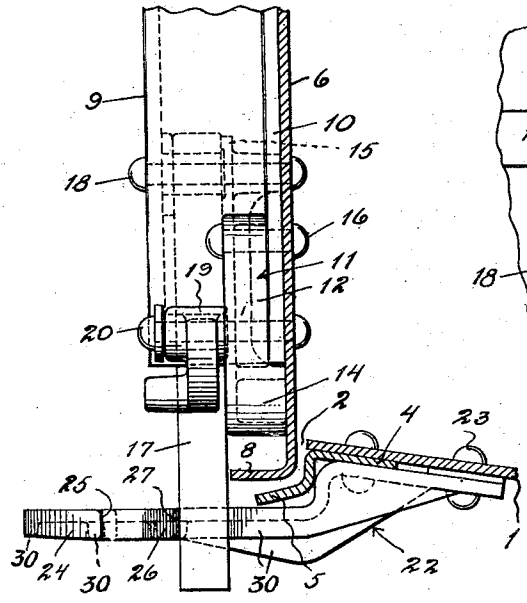


Fig. 2.

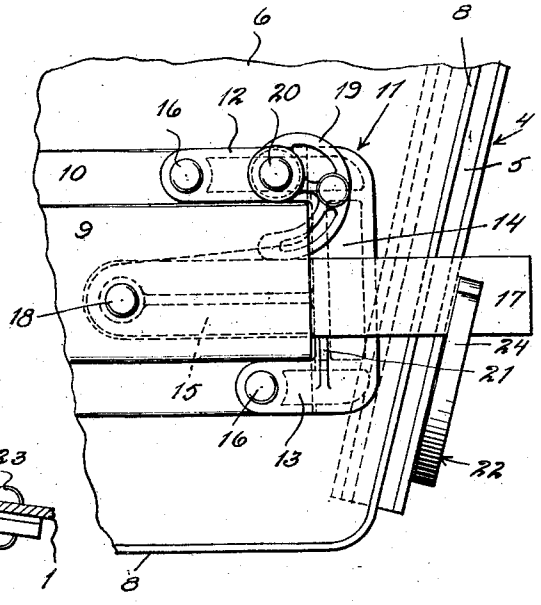


Fig. 3.

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HOPPER CAR DOOR SECURING MEANS

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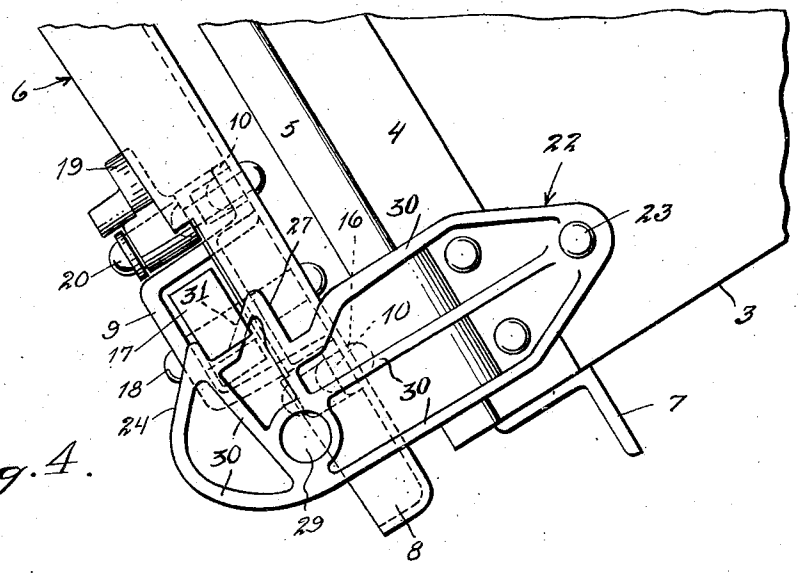


Fig. 4.

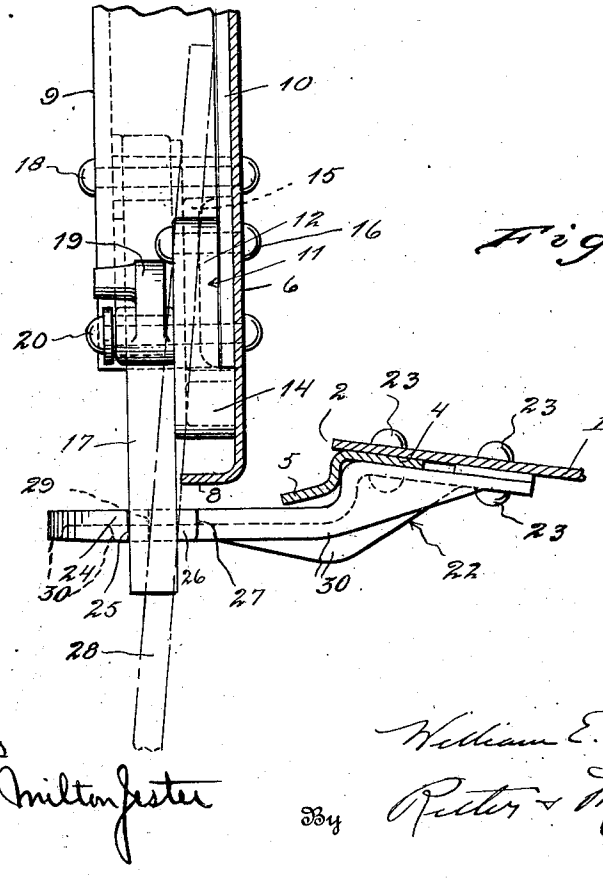


Fig. 5

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UNITED STATES PATENT OFFICE

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HOPPER-CAR-DOOR-SECURING MEANS

Application filed April 16, 1925. Serial No. 23,729.

The invention relates to railway car construction and more particularly to means for holding the doors of a hopper car in closed position.

The primary object of the invention, generally stated, is to provide, in combination with a movably mounted door, securing means, the latter being adapted to hold the door in either closed or partly closed position and being provided with means whereby the door may be forced from partly closed to fully closed position.

Another object of the invention is to provide a door securing means embodying a fixed retainer and a pivoted latch, one of said members being mounted on a fixed portion of the car and the other carried by the door, the pivoted latch being arranged and adapted to coact with successive edges on the fixed retainer.

Still another object of the invention is to provide a door securing mechanism embodying a supporting bracket carried by the door member and adapted to embrace the door stiffener, said bracket being provided with a pivoted latch member, the latter cooperating with a retaining member positioned adjacent a free edge of said door.

Still another object is to provide, in combination with a channel door stiffener a bracket member adapted to embrace the same, a portion of said bracket being adapted to extend within the stiffener and form a support for a pivoted latching member.

Still another object is to provide, in combination with a pivotally mounted door having a channel stiffener member attached thereto, a pivot bracket overlying the end portion of said stiffener, a portion of the bracket extending within the stiffener, and a latch member pivoted to the said portion of the bracket and disposed within the stiffening member, and means carried by the bracket for locking the latch against movement.

A still further object of the invention is to provide a structure of this character in which the movable latch, together with its supporting bracket and locking cam, may be initially assembled and treated as a complete and separate entity adapted for attachment to already existing hopper car doors without involving any material changes in the construction and arrangement thereof.

Still another object of my invention is to provide a door securing bracket including a pivoted latch in which the parts are so placed that the latch is located within the confines of the door stiffener to protect the same against injury, and the rigid bracket being adapted to embrace the end of the door stiffener and serving as a reinforcement thereof.

There are other objects of the invention as will hereinafter more fully appear from the detailed description of the accompanying drawings wherein I have illustrated a single embodiment of the device.

Referring to the drawings wherein like reference characters designate corresponding parts throughout the several views:

Figure 1 is a side elevation of a portion of a hopper car and its door equipped with my securing mechanism, the door being shown in fully closed position.

Figure 2 is a section taken substantially on the line 2—2 of Figure 1, looking in the direction of the arrows and showing a plan of the mechanism.

Figure 3 is a view looking at the outer face of the door.

Figure 4 is a view similar to Figure 1 but showing the door in partly closed position.

Figure 5 is a view similar to Figure 2, showing the door in partly closed position and illustrating the employment of a pry bar.

Referring to the drawings in detail, the numeral 1 designates a portion of a car hopper, only the end sheet being shown, which popper has the usual discharge opening 2 for the car lading, the bottom 3 being inclined as is a common practice. Secured to the end sheet 1 at the discharge opening there may be a Z-bar or the like 4 providing a seat 5 for the door 6. The hopper may be reinforced adjacent the lower edge of the opening by a transversely extending angle bar 7 serving to give it the necessary stiffness and prevent buckling under strain. It is known that doors of the type shown are hinged immediately above the dis-

charge opening of the hopper, the specific hinging means being immaterial and therefore not shown. The door is preferably provided at its free edges with a stiffening flange 8 which extends outwardly with respect to the hopper. Secured to the outer face of the door is a transversely extending stiffener 9 here shown as of channel formation with its open side disposed against the door and its upper and lower or side webs terminating in flanges or attaching portions 10 lying flat against the door and riveted or otherwise suitably secured thereto.

In carrying out the invention I provide a locking mechanism involving a latch supporting bracket designated generally by the numeral 11, which bracket is generally T-shaped in outline. The bracket includes upper and lower arm portions 12 and 13 connected by an outer portion 14 which is provided with an extension 15 preferably of greater length than the arms 12 and 13. This bracket is applied with the extension 15 located within the channel of the stiffener 9 and with the arm portions 12 and 13 arranged in embracing relation to the sides of the channel and engaging against the flanges 10 thereof, the arm connecting portion 14 being disposed against the door 6 immediately outwardly of the end of the stiffener, thereby forming a partial closure therefor. The bracket may be held in place by rivets or the like 16 passing through the arms 12 and 13 and through the stiffener flanges 10 as well as the door itself.

Located within the channel of the stiffener is an elongated latch 17 which has one end projecting beyond the side edge of the door and which has its other end pivoted between the front or outer wall or web of the stiffener and the extension 15, as for instance by means of a rivet 18, which may pass through the stiffener, the extension, and also the door, if desired. This latch is designed to cooperate with a keeper to be described and may be held in its locked position by means of a locking cam 19 pivoted upon the bracket arm 12, as by means of a rivet 20 which passes through the cam, the arm 12, the flange of the stiffener, and the door. This cam is represented as pivoted at one end and its free end is adapted to enter the channel of the stiffener so as to engage and hold the latch in its lowermost position. It is preferable to provide a stop lug 21 on the bracket engageable by the lower edge of the latch for limiting its downward swinging movement when the door is open.

The means on the car cooperating with the latch for supporting the door in its closed position consists of a retainer or keeper 22 secured, as by means of rivets 23, to the inclined side sheet of the hopper and may advantageously be cast as a base plate having outwardly projecting stiffening ribs or flanges 30, the base plate of the retainer 22 carried by the outer inclined side sheet having a portion which projects beyond the discharge opening of the hopper disposed in a plane substantially parallel to the plane of swinging movement of the adjacent edge of the door, thus forming an acute angle with the portion of the base plate overlying the side sheet and also an acute angle with the hinge axis of the door. The part of the retainer projecting beyond the discharge opening of the hopper is preferably formed with two latch cooperating ledges 25 and 27 having inclined approach planes 24 and 26 leading to each of the respective ledges.

That portion of the latch which is adapted to coact or engage with the projecting portion of the retainer is beveled or inclined, as shown at 31, thereby obtaining an extended bearing surface between the latch and retainer and permitting the employment of a stronger and more efficient latch and a shorter retainer member.

Assuming that the door has been opened to permit discharge of the car lading and that it is desired to effect reclosing, it is first necessary to swing the door, by any means or in any suitable manner until the latch 17 will engage and ride up along the incline 24 and drop into engagement with the first ledge 25. When this occurs the door will be held in the partly closed position illustrated in Figures 4 and 5. To effect complete closure, especially when the door has become warped or distorted, use may be made of a pry bar, indicated at 28, which pry bar may be inserted through a hole 29 in the fixed keeper or retainer 22, with its free end engaging against the door or against the stiffener. When the operator pulls the outer end of the pry bar outwardly or away from the hopper door it is evident that the pry bar will fulcrum on the edge of the hole 29 while its inner end will exert the necessary pressure against the door to swing it against its seat, the latch 17 moving out of engagement with the ledge 25, riding up the incline 26 and dropping into engagement with the ledge 27. Subsequent to this final closing, the locking cam 19 may be swung down so that its free end will engage the latch and hold it against displacement or disengagement from the final ledge 27.

A hopper car door securing or locking mechanism constructed in accordance with this invention is simple inasmuch as it embodies only three parts to be applied to the door, the bracket structure having the additional advantage of being a single piece capable of formation as a casting and application to the door without presenting any obstacles or difficulties to be overcome. It is apparent that this latch mechanism may be used to replace other types and to be mounted at the holes provided for or left upon the removal of ordinary types, the device being consequently more or less of a complete and separate entity adapted for attachment to exist-

ing door structures without involving alterations therein. The peculiar shape of the bracket device is of considerable advantage inasmuch as its embracing engagement upon the door stiffener will serve to reinforce the same at the point where greatest strain occurs. The intermediate member or extension of the bracket which extends into the stiffener forms an adequate seat and stop for the pivoted latch so that undue strain on its pivot will be entirely avoided.

While I have shown and described a preferred embodiment of the invention, it should be understood that I reserve the right to make such changes in the form, construction and arrangement of parts as will not depart from the spirit of the invention or the scope of the appended claims.

Having now described my invention, what I claim is:

1. A railway car provided with a hopper having a discharge opening, a hingedly mounted door for closing the opening, a stiffener mounted on the outer face of the door in transverse relation thereto, a bracket structure secured to the stiffener and the door outwardly of the end of the former and having portions embracingly engaging against the opposite sides of the stiffener, a latch pivoted on said bracket structure and projecting beyond the side edge of the door, and a fixed retainer mounted on the side of the hopper for cooperation with said latch.

2. A railway car provided with a hopper having a discharge opening, a hingedly mounted door for closing the opening, a stiffener mounted on the outer face of the door in transverse relation thereto, a bracket structure secured to the stiffener and the door outwardly of the end of the former and having portions embracingly engaging against the opposite sides of the stiffener, a latch pivoted on said bracket structure and projecting beyond the side edge of the door, and a fixed retainer mounted on the side of the hopper for cooperation with said latch, the fixed retainer being provided with spaced ledges and having inclined surfaces leading thereto whereby to conduct the latch into engagement with the successive ledges when the door is moved to closed position.

3. A railway car provided with a hopper having a discharge opening, a hingedly mounted door for closing the opening, a stiffener mounted on the outer face of the door in transverse relation thereto, a bracket structure secured to the stiffener and the door outwardly of the end of the former and having portions embracingly engaging against the opposite sides of the stiffener, a latch pivoted on said bracket structure and projecting beyond the side edge of the door, and a fixed retainer mounted on the side of the hopper for cooperation with said latch, the fixed retainer being provided with spaced ledges and having inclined surfaces leading thereto whereby to conduct the latch into engagement with the successive ledges when the door is moved to closed position, and said fixed retainer having a transverse opening therethrough defining a fulcrum for a pry bar disposable therethrough and engageable against the outer side of the stiffener.

4. In a railway car provided with a hopper having a discharge opening, a hinged door for closing the opening, a stiffener secured to the outer face of the door in transverse relation thereto, a bracket structure secured to the stiffener and the door and including arm portions disposed against the sides of the stiffener, further including an arm connecting portion located outwardly of the end of the stiffener and further including an intermediate portion projecting into the stiffener, a latch pivoted on said intermediate portion within the stiffener and projecting beyond the side of the door, and a fixed ledged retainer on the hopper coacting with the latch.

5. In a railway car provided with a hopper having a discharge opening, a hinged door for closing the opening, a stiffener secured to the outer face of the door in transverse relation thereto, a bracket structure secured to the stiffener and the door and including arm portions disposed against the sides of the stiffener, further including an arm connecting portion located outwardly of the end of the stiffener and further including an intermediate portion projecting into the stiffener, a latch pivoted on said intermediate portion within the stiffener and projecting beyond the side of the door, a fixed ledged retainer on the hopper coacting with the latch, and a locking cam pivoted on the bracket structure exteriorly of the stiffener and adapted to enter thereinto when in engagement with the latch.

6. In a railway car provided with a hopper having a discharge opening, a hinged door for closing the opening, a channel-shaped stiffener secured to the outer face of the door in transverse relation thereto and having its sides provided with outstanding flanges bearing against the door, a bracket structure formed as a single integral body including spaced arm portions engaged against the opposite sides of the stiffener and against said outstanding flanges and secured thereto and to the door, the bracket structure further including an arm connecting portion located outwardly of the end of the stiffener flat against the outer face of the door, the bracket structure further including an intermediate member projecting from said arm connecting portion and located within the channel in flat engagement with the outer face of the door, a latch located within the stiffener and pivoted upon said intermediate member, the latch projecting beyond the side edge of the door, and a ledged retainer secured on the

hopper side and cooperating with the latch.

7. In a railway car provided with a hopper having a discharge opening, a hinged door for closing the opening, a channel-shaped stiffener secured to the outer face of the door in transverse relation thereto and having its sides provided with outstanding flanges bearing against the door, a bracket structure formed as a single integral body including spaced arm portions engaged against the opposite sides of the stiffener and against said outstanding flanges and secured thereto and to the door, the bracket structure further including an arm connecting portion located outwardly of the end of the stiffener flat against the outer face of the door, the bracket structure further including an intermediate member projecting from said arm connecting portion and located within the channel in flat engagement with the outer face of the door, a latch located within the stiffener and pivoted upon said intermediate member, the latch projecting beyond the side edge of the door, a ledged retainer secured on the hopper side and cooperating with the latch, and a locking cam pivoted upon said upper arm member and engageable with the latch for maintaining the same in engagement with the retainer member.

8. In a railway car provided with a hopper having a discharge opening, a hinged door for closing the opening, a channeled stiffener secured to the outer face of the door in transverse relation thereto with its open side disposed toward the door, a combined bearing and reinforcing bracket structure secured upon the stiffener, a latch pivoted on said bracket structure and partly enclosed within the stiffener with its end projecting beyond the side of the car, a fixed retainer on the side of the hopper provided with ledges for cooperation with the latch, the ledges being located in relatively different positions whereby to require two dropping movements of the latch when the door is moved to closed position, the retaining member having inclined surfaces leading to the successive ledges.

9. In a railway car provided with a hopper having a discharge opening, a hinged door for closing the opening, a channeled stiffener secured to the outer face of the door in transverse relation thereto with its open side disposed toward the door, a combined bearing and reinforcing bracket structure secured upon the stiffener, a latch pivoted on said bracket structure and partly enclosed within the stiffener with its end projecting beyond the side of the car, a fixed retainer on the side of the hopper provided with ledges for cooperation with the latch, the ledges being located in relatively different positions whereby to require two dropping movements of the latch when the door is moved to closed position, the retaining member having inclined surfaces leading to the successive ledges, the retainer member having a portion projecting beyond the door when the latter is in closed position and said projecting portion being provided with a transverse hole for the reception of a pry bar disposable against the stiffener and out of contact with the latch whereby the door may be forced to closed position.

10. A railway car provided with a hopper having a discharge opening, a hingedly mounted door for closing the opening, a stiffener mounted adjacent the free edge of the door and terminating short of a side edge thereof, a bracket secured to the door and having a portion disposed between the end of the stiffener and side edge of the door, a latch pivoted to the bracket and projecting beyond the side edge of the door, and a fixed retainer mounted on the side of the hopper for cooperating with the latch.

11. A railway car provided with a hopper having a discharge opening, a hingedly mounted door for closing the opening, a channel shaped stiffener mounted on the door, a bracket having a plurality of arms, one of said arms being located within the channel-shaped stiffener, a latch pivoted to the bracket, and a fixed retainer mounted on the hopper for cooperation with the latch.

12. A railway car provided with a hopper having a discharge opening, a hingedly mounted door for closing said opening, a channel-shaped stiffener secured to the door, a bracket having parallel arms, one of which is adapted to extend within the channel, a latch pivotally mounted upon one of said arms, and a fixed retainer mounted on the hopper for cooperation with the latch.

13. A railway car provided with a hopper having an inclined side sheet, a hingedly mounted door for closing the discharge opening of th hopper, and means for securing said door in closed position, said means involving a latch, and a retainer secured to the hopper side sheet for cooperating with said latch, said retainer being formed with a base plate having portions disposed in planes at acute angles to each other, the plane of one of said portions being substantially parallel to the inclined side sheet of the hopper and the plane of the other of said portions being substantially parallel to the plane of swinging movement of the adjacent edge of the door.

14. A railway car provided with a hopper having a sloping side sheet, a hingedly mounted door for closing the discharge opening of the hopper, a latch pivotally mounted on the door, and a retainer secured to the sloping side sheet of the hopper in the plane thereof, said retainer having a portion projecting outwardly beyond the said discharge opening of the hopper for cooperating with the latch to support the door in closed posi-

tion, said outwardly projecting portion being disposed in a plane forming an acute angle with the hinge axis of the door and the sloping side sheet of the hopper.

15. A railway car provided with a hopper having a discharge opening, a door hingedly secured to the hopper for closing the discharge opening, and means for supporting said door in closed position involving a latch pivotally mounted on the door to swing in a plane substantially parallel with that of the door, and a retainer fixedly secured to the hopper, said retainer having an inclined portion and a ledge, said latch being adapted to be operatively interposed between said inclined portion and said ledge to support the door in closed position and being provided with a beveled portion adapted to overlap the inclined portion of the retainer when in door supporting position.

16. A railway car provided with a hopper having a discharge opening, a door for closing the discharge opening, and means for supporting said door in closed position involving a retainer member fixedly mounted on the hopper and projecting beyond the discharge opening thereof and a bar latch member pivotally mounted on the door, the retainer being provided with a supporting ledge and having an inclined portion spaced from the latter in the direction of the closed door, said latch being adapted to be operatively interposed between the ledge and the inclined portion of the retainer to maintain the door inclosed position, a portion of one edge of said latch being beveled to overlap the inclined portion of the retainer when the latch is in door supporting position.

17. A railway car provided with a hopper having a discharge opening, a door hingedly secured to the hopper for closing said discharge opening, a pivoted latch mounted on the door adapted to swing in a plane substantially parallel to the plane of the latter, and a retainer fixedly secured to the hopper having a plurality of ledges for cooperating with the latch to support the door in different positions of closure, said retainer being fashioned with inclined approach planes leading to each of said ledges and said latch being provided with a beveled portion engageable with said inclined approach planes.

18. In a railway car having a lading discharge opening, the combination with a hinged door for closing said opening, the door being movable to open position under the influence of gravity, a stiffening member secured to the door adjacent its free edge remote from the hinge axis thereof and extending substantially parallel thereto, the outer end of said stiffener terminating inwardly of the adjacent side edge of the door, a latch movably mounted on the door and operable in a plane substantially parallel to the main body portion thereof, a bracket rigidly secured to the car body and having a ledge for cooperating with the latch to retain the door in closed position, and a member positioned between the side edge of the door and the adjacent outer end of the stiffener and having a portion directly connected to the latter, said member affording a supporting abutment for the latch.

19. In a railway car having a lading discharge opening, the combination with a hinged door for closing said opening, the door being movable to open position under the influence of gravity, a stiffening member secured to the door adjacent its free edge remote from the hinge axis thereof and extending substantially parallel thereto, a latch pivotally mounted on the door and operable in a plane substantially parallel to the main body portion thereof, a bracket rigidly secured to the car body and having a ledge for cooperating with the latch to retain the door in closed position, and a member overlapping and riveted to said stiffener affording a supporting abutment for the latch, said member having portions disposed on opposite sides of the latch when the latter is in engagement with said bracket.

20. In a railway car having a lading discharge opening, the combination with a hinged door for closing said opening, the door being movable to open position under the influence of gravity, a stiffening member secured to the door adjacent its free edge remote from the hinge axis thereof and extending substantially parallel thereto, the outer end of said stiffener terminating inwardly of the adjacent side edge of the door, a latch movably mounted on the door and operable in a plane substantially parallel to the main body portion thereof, a bracket rigidly secured to the car body and having a ledge for cooperating with the latch to retain the door in closed position, and a member carried by the door having a portion interposed between the outer end of the stiffener and the adjacent side edge of the door and a portion overlapping the stiffener in a direction normal to the plane of the door, the said interposed portion of the member serving as a supporting abutment for the latch and the said overlapping portion thereof being rigidly connected to the stiffener whereby the load transmitted to the latch when the door is in closed position is communicated through the said member directly to the door stiffener.

21. In a railway car having a lading discharge opening, the combination with a hinged door for closing said opening, the door being movable to open position under the influence of gravity, a stiffening member secured to the door adjacent its free edge remote from the hinge axis thereof and extending substantially parallel thereto, a latch pivotally mounted on the door and operable

in a plane substantially parallel to the main body portion thereof, a bracket rigidly secured to the car body having a ledge for cooperating with the latch to retain the door in closed position, and a member having a portion extending at an angle to the hinge axis of the door constituting a supporting abutment for the latch, said member being riveted to the stiffener adjacent its outer end in overlapping relation thereto.

22. In a railway car having a lading discharge opening, the combination with a hinged door for closing said opening, the door being movable to open position under the influence of gravity, of a stiffening member secured to the door adjacent its free edge and extending substantially parallel with the latter, a latch pivotally mounted on the door and operable in a plane substantially parallel with the main body portion thereof, a bracket rigidly secured to the car body having a ledge for cooperating with the latch to maintain the door in closed position, and a member having a portion extending at an angle to the stiffening member and interposed between one end of the latter and the adjacent side edge of the door, said member being rigidly secured to the stiffening member and constituting a supporting abutment for the latch when the latter is in door supporting position.

In testimony whereof I affix my signature.

WILLIAM E. WINE.