Oct. 29, 1929. B. W. KADEL 1,733,736

CAR DOOR MECHANISM

Filed Feb. 4, 1926

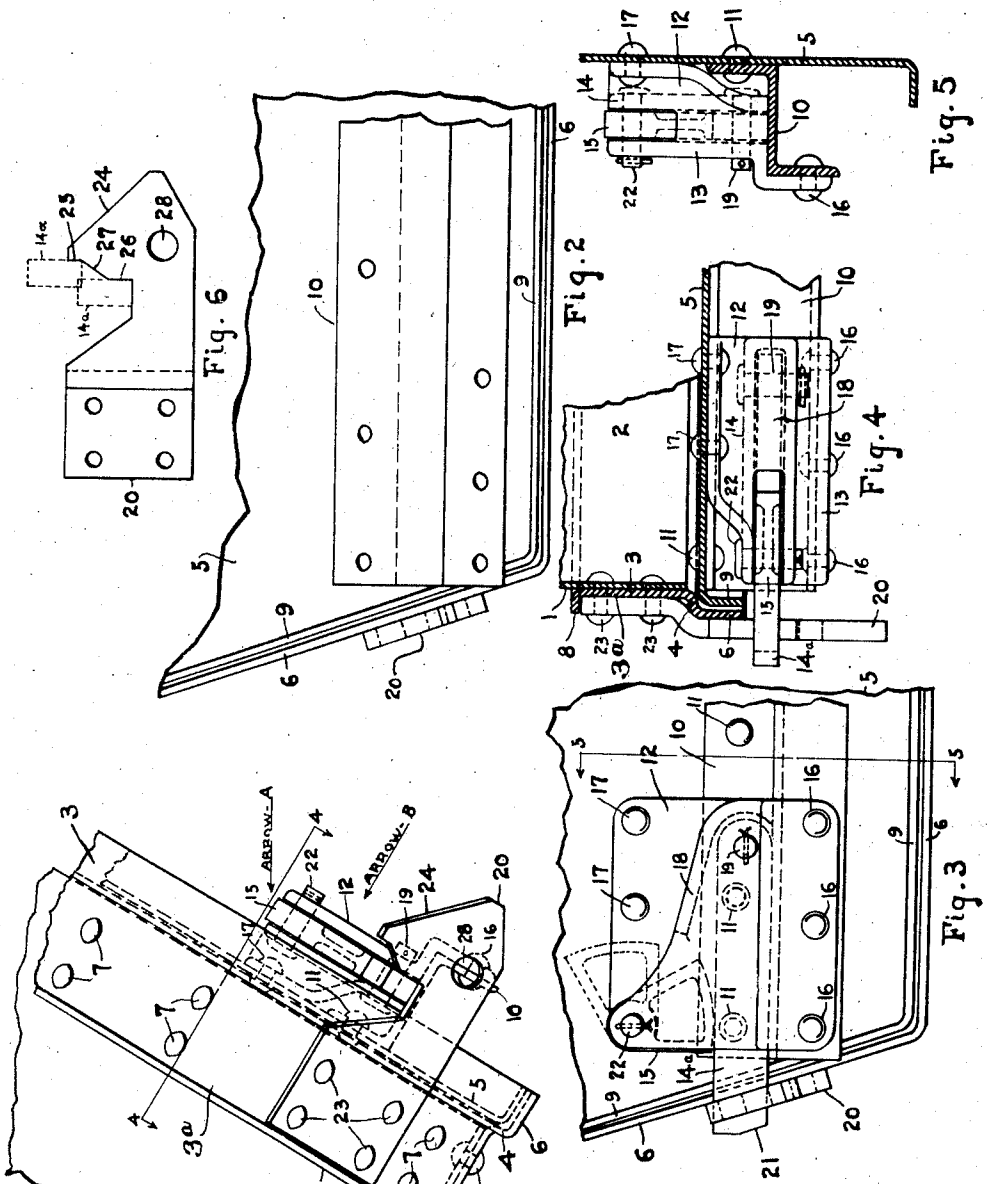



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6

Witness
Cyrus Hawkins

Inventor
Byers W. Kadel

By. Pillar & Mueller
his Attorney

Patented Oct. 29, 1929 1,733,736

# UNITED STATES PATENT OFFICE

BYERS W. KADEL, OF BALTIMORE, MARYLAND

## CAR-DOOR MECHANISM

Application filed February 4, 1926. Serial No. 86,023.

This invention relates to door mechanisms for railway cars or the like, and has among its objects to provide improved means for holding the pivoted doors of such cars in closed position. Another object is to provide means whereby when such doors are pushed shut they may be temporarily supported in partly closed position, and then forced by means of the door-supporting mechanism itself to more completely closed position and locked in such latter position. A still further object is to provide a railway car having a hinged door, with a latching member secured to the door and a shouldered member fixedly secured to the car body for door-supporting engagement by the latching member, the contour of the shoulder of said member being formed with a flat preliminary face and a flat final face whereby the door may be supported in a stable manner in either partly or fully closed position, with a beveled portion connecting the preliminary and final faces whereby movement of the latch from the preliminary face to the final face will force the door toward its seat. A still further object is to provide a door having a stiffening member, preferably of Z section, secured upon its outer face with a housing connecting the stiffener and the door, and with a door-supporting latch pivoted in the housing. Another object is to provide means on the car body adapted to support a prying lever whereby damaged doors may be pried shut or frozen doors pried open by causing the lever to bear respectively against the outer or under face of the door stiffener.

With these and other objects in view, the invention consists of the formation, combination and arrangement of parts as will be herein described and finally claimed.

In the accompanying drawings, which show a preferred form of the invention, Figure 1 is a fragmentary side elevational view of the hopper portion of a car of the well known twin hopper type to which the invention is shown as applied. Figure 2 is an outer face view of a corner of the door, a portion only of the locking mechanism being shown in this view. Figure 3 is a view similar to Figure 2, but showing additional elements of the door mechanism. The directions in which the views of Figures 2 and 3 are taken are indicated in Figure 1 by the arrows A and B respectively. Figure 4 is a transverse, horizontal sectional view through the hopper, this view being taken approximately on the line 4—4 of Figure 1. Figure 5 is a vertical sectional view taken through the door, this view being taken approximately on the line 5—5 of Figure 3. Figure 6 is a detached side elevational view of the fixed hook as used in the mechanism. The preliminary and final positions of the latching member are indicated in this figure by dotted lines.

While the drawings show the device applied to a car of the twin hopper type, it will be understood that the invention is equally adapted for the doors of cars of other types, such as flat bottom gondolas, etc.

Referring to the drawings, the side sheet of the hopper is denoted by the numeral 1 and the chute plate or floor plate thereof by the numeral 2. Twin hopper cars of this type are often arranged with the side sheets 1 inclined and with the door opening also arranged in an inclined plane so that the doors will tend to fall open by gravity when unlatched. The hopper discharge opening or door opening, may be defined by a marginal wrapper sheet 3 which comprises a continuous stiffener or reinforcing member. It is shown in the present embodiment as formed of a flanged strip of steel overlying the discharge edges of the side sheet 1 and the floor sheet 2. The outer margin of the member 3 is fashioned with a continuous offset or flange 4 forming a seat for the flanged door 5, the latter serving to close the discharge opening. The bottom and side flanges 6 of the member 3 are spaced respectively from the sheets 2 and 1, while the main or web portion $3^a$ of the member 3 lies directly against the outer faces of the sheets 2 and 1 and may be secured thereto by means of rivets 7. The back edge of the member 3 may be formed as a continuous outstanding stiffening flange 8. It will thus be seen that the web $3^a$ of the member 3 and its spaced flanges 4 and 8 which project outwardly therefrom substantially

normal thereto form, in effect, a channel which serves most efficiently to strengthen and stiffen the hopper. The door 5 preferably has a continuous marginal flange 9 which is arranged to lie just inside of and parallel with the continuous flange 6 of the member 3, while the door itself is arranged for circumferential seating against the flange 4 of the member 3. Some clearance is indicated in the drawings between the door and its seat in order to allow for inaccuracies of manufacture but it is contemplated that no more clearance will be provided than is absolutely necessary to permit the door to be latched.

It is the practice to pivotally connect doors of this character to the car body along the upper edges of the doors. The door hinges are not shown in the drawings but are well known in the art. It will also be understood that a locking mechanism of the character about to be described will usually be applied to each side of the door and to each side of the car body and the door stiffening member may also comprise the usual door spreader in cases where it is desired to employ separate door plates for each of the aligned hopper openings of cars of this type.

The door in the present embodiment is shown as supplied with an external stiffening member 10 secured to its outer face. This stiffener is preferably formed of a Z bar which has one flange lying against the door plate and secured thereto by means of rivets 11. This door-contacting flange is turned upward, away from the rail, the web of the Z being arranged normal to or outstanding from the door plate, and the outermost flange of the Z lying parallel with the door plate and being turned downward toward the rail. This makes an ideal door stiffener or spreader as it provides accessibility and at the same time does not form a pocket for the accumulation of foreign matter and for the development of rust. The stiffener 10 extends to near the side edge of the door, terminating just inside of the flange 9 thereof. A housing 12 is mounted upon the end of this stiffener, the housing at the same time being connected to the door plate and being thereby adapted to support and brace the stiffener so as to eliminate certain torsional strains which are often induced in such members. This housing has an upright outer wall 13 and an upright inner wall 14, these walls being spaced from each other so as to provide a space between them to accommodate the pivoted door latch $14^a$ and the pivoted locking cam 15. The outer wall 13 overlies and is secured to the outer face of the downstanding flange of the Z by means of rivets 16. This wall is offset around the upper face of the web of the Z and the plane of the upper portion of the wall lies directly above the web of the Z. A portion of the inner wall 12 is arranged parallel with the wall 13 and directly above the web of the Z but another portion of it is warped or offset from the first mentioned portion so as to lie against the door plate above the upper edge of the upstanding flange of the Z, this offset portion being secured directly to the door plate by means of rivets 17. The housing has also a transverse wall 18 which overlies the pivoted end of the latch and may also extend around the end of said latch, this wall serving to tie the spaced walls 13 and 14 together. It will be seen that when this housing is riveted to the door spreader and to the door plate it comprises not only a pivot bracket for the latch and for the pawl but also a sturdy tie and brace for the door plate and particularly for the stiffener.

The latch $14^a$ may be formed of a simple bar of steel, pierced at one end to accommodate the pivot pin 19, which pin also passes through the walls 13 and 14 of the housing, thereby pivoting the latch to the housing. The latch is arranged to lie in substantially a horizontal position when in door supporting engagement with the fixed hook or bracket 20. The lower limit of travel of the latch is defined by the upper surface of the web of the Z, so that when the door is open the latch cannot drop below this position. The outermost end of the latch is preferably cut away on an inclined line 21 corresponding approximately with the incline of the hopper side sheet 1, thereby increasing the third rail clearance. In order to lock the latch $14^a$ in engaged position, the eccentric cam 15 is provided, this can be pivoted in the housing by means of the pivot pin 22.

The fixed hook or shouldered bracket 20 is arranged to lie against and be secured to the web $3^a$ of the stiffening member 3, rivets 23 passing through and uniting the several parts. The inner end of the hook 20 terminates just inside of the flange 8 of the member 3 and midway of its length it is offset to pass around the flange 4. It will be appreciated that since the hook 20 is mounted on the hopper side sheet intermediate the laterally projecting flanges 4 and 8 of the member 3, these flanges, and principally the latter one, will effectively stay the hopper side sheet against outward buckling and bending due to forces transmitted to the hopper from the hook, the outermost end of the hook occupying a plane just outwardly of the side flange 6 of the member 3 and being preferably arranged in a plane corresponding to the incline of the side of the car. The outermost portion of the upper edge of the fixed hook is formed as an inclined approach plane 24 whereby the latch will be caused to ride up over the same when the door is pushed shut.

The contour of the latch-engaging ledge of this fixed hook comprises a plurality of faces,

the upper face 25 being arranged to support the door in a partly closed position. The second or lower face 26, which is nearer the door opening than the face 25, is provided to support the door in fully closed position. An inclined or beveled face 27 connects the faces 25 and 26, so that when the latch 14ª is driven down from the face 25 to the face 26, the bevel 27 will cause the door to be forced shut. At the same time the upright nature of face 25 will positively hold the door in temporary position and the upright face 26 will also hold the door firmly in completely closed position. An upright face or the equivalent is necessary for supporting the door in fully closed position because many railroads require that door mechanism shall be of a character that will not tend to open under load. It will be appreciated that the face 26 of the present device fulfils this requirement. The provision of the flat face 25 at the top of the incline 27 also makes the support of the door in temporary position equally sure. This is important as a temporary support of a positive nature is necessary to catch up a warped door.

If the doors become too badly warped it may not be possible to drive the latch from the face 25 down the incline 27 to the face 26. In order to assist in closing such doors I provide a prying aperture 28 in the fixed hook 20. By inserting a pinch bar or the like through this hole and causing the inner end of the same to bear upon the outer face of the outermost flange of the Z-bar or upon the adjacent portion of the housing 12, a badly warped door may be forced to a position where the latch 14ª will drop down into engagement with the face 26. Usually, however, the door may be forced shut solely by means of the incline 27. The aperture 28 is suitably located so that the pinch bar may also be applied therethrough to seat against the under face of the outermost flange of the Z in order to pry a frozen door shut. This is frequently desirable in extreme weather.

It will be seen that the mechanism as described is simple and strong and it should be particularly noticed that the entire mechanism is arranged so that it can be assembled remote from the car shop and applied to the car as a specially manufactured unit. Variations in the dimensions of adjacent parts of the car body or doors will not affect the device to the extent that occurs with some other mechanisms. Particularly it should be noticed that the latch 14ª is guided and completely supported in the housing and upon the upper face of the web of the Z. It is thereby possible to provide some clearance between the latch and the outer edge of the door flange. As door flanges are subject to considerable variation in manufacture, this is an important feature.

I have thus described a preferred embodiment of my invention. Other embodiments are contemplated within the scope of the appended claims without departing from the spirit thereof.

What is claimed is:

1. A railway car having a door hinged to the car body, a flanged stiffening member affixed to the door, a housing connected between the stiffener and the door and a door-supporting latch pivoted in the housing, the stiffening member being arranged with one flange lying against the door plate and a web outstanding therefrom and with an outer flange turned downward toward the rail, said housing having an outer wall, the lowermost portion of which overlies and is secured to the outer flange of the stiffener and with the upper portion thereof offset toward the door from the lower position thereof and lying in a plane above the web of the stiffener, said housing having also an inner wall spaced from and connected to the outer wall, a portion of the inner wall being inwardly offset toward the door plate and being secured thereto, the said latch being operably mounted between said walls, and a ledge formed on the car body in position to be engaged by said latch to support the door.

2. A railway car having a door, a stiffener member affixed to the door, the same being of Z section, a housing connecting the stiffener, and the door, said housing having spaced walls, one thereof lying against and being secured to the outer face of the door plate and the other lying against and being secured to the outer face of the outermost flange of the Z, a latch pivoted in the housing, a keeper for said latch also pivoted in the housing, and means on the car body adapted to be engaged by the latch to support the door.

3. A railway car having a door, a stiffening member affixed to the door, the same being of Z section and arranged with its web outstanding from the door plate, a latch pivoted to the door, and a ledge member carried by the car body in position to be engaged by the latch to hold the door shut, said ledge member having a lever opening, the same being of such form and arranged in such position that a bar may be inserted therein and caused to bear upon the outer face of the outermost flange of the Z to force the door shut and against the inner face of said flange to force the door open.

4. A railway car having a door stiffening member affixed to the door, the same being of Z section and arranged with its web outstanding from the door plate and a downwardly projecting flange spaced from the door, a housing affixed to the stiffener, having a portion overlappingly secured to the downwardly projecting flange thereof, the same having spaced upright walls, a latch pivoted in the housing between said walls and adapted to swing in a vertical plane, the web of the Z

being arranged to define the lower limit of swing of the latch and comprising a support for the same, and means carried on the car body for engagement by the latch to hold the door in a closed position.

5. In a car door mechanism, the combination with a car having a hopper provided with a lading discharge opening, of a door for closing said opening, a reinforcing member secured to the outer face of the side sheet of the hopper adjacent the discharge opening thereof, the said member being formed with a web and having laterally spaced flanges united thereto, the latter extending outwardly from the web substantially normal to the side sheet and means secured to the car body intermediate the said laterally spaced flanges for cooperating with the floor to retain it in closed position.

6. In a car door mechanism, the combination with a car having a hopper provided with a lading discharge opening, of a door for closing said opening, a reinforcing member secured to the outer face of the side sheet of the hopper adjacent the discharge opening thereof, the said member being formed with a web and having outwardly projecting laterally spaced flanges united thereto, and means for supporting the door in closed position involving a movable member and a fixed member, one of said members being secured to the hopper intermediate the spaced flanges of the reinforcing member.

7. In a car door mechanism, the combination with a car having a hopper provided with a lading discharge opening, of a door for closing said opening, means for supporting the door in closed position involving a pivoted member mounted upon the door and a shouldered member rigidly secured to the car body, and a reinforcing member secured to the outer face of the hopper side sheet adjacent the discharge opening thereof and interposed between said sheet and said shouldered member, said reinforcing member being formed with a web and having laterally spaced flanges projecting outwardly therefrom substantially normal to the side sheet, said shouldered member being secured to the hopper intermediate said laterally spaced flanges.

8. In a car door mechanism, the combination with a car having a hopper provided with a lading discharge opening, of a door for closing said opening, a reinforcing member secured to the outer face of the hopper side sheet adjacent the discharge opening thereof, said member having a web and laterally spaced flanges projecting outwardly therefrom, one of said flanges forming an abutment for the door and the latter flange having an auxiliary portion disposed substantially parallel with the side edge of the door, and means for supporting the door in closed position involving a shouldered member rigidly secured to the hopper side sheet intermediate the laterally spaced flanges of the reinforcing member and a latch member pivotally secured to the door for cooperating with the shouldered member.

9. In a car door mechanism, the combination with a car having a hopper provided with a lading discharge opening, of a door for closing said opening, a reinforcing member having a portion contacting with and secured to the outer face of the hopper side sheet adjacent the discharge opening thereof, one edge of said member having a flange portion projecting outwardly from the side sheet, a shouldered member rigidly secured to said sheet intermediate the flanged portion of said member and the edge of said sheet defining the hopper discharge opening, and a latch pivotally mounted on the door for cooperating with said shouldered member to retain the door in closed position.

In testimony whereof I affix my signature.

BYERS W. KADEL.

## CERTIFICATE OF CORRECTION.

Patent No. 1,733,736. Granted October 29, 1929, to

BYERS W. KADEL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, line 18, claim 5, for the word "floor" read "door"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 31st day of December, A. D. 1929.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.

## DISCLAIMER

1,733,736.—*Byers W. Kadel*, Baltimore, Md. CAR-DOOR MECHANISM. Patent dated October 29, 1929. Disclaimer filed September 18, 1934, by the assignee, *Wine Railway Appliance Company*.

Hereby enters this disclaimer to that part of the thing patented which is claimed in said patent in the following words, to wit:

"5. In a car door mechanism, the combination with a car having a hopper provided with a lading discharge opening, of a door for closing said opening, a reinforcing member secured to the outer face of the side sheet of the hopper adjacent the discharge opening thereof, the said member being formed with a web and having laterally spaced flanges united thereto, the latter extending outwardly from the web substantially normal to the side sheet and means secured to the car body intermediate the said laterally spaced flanges for cooperating with the door to retain it in closed position.

"6. In a car door mechanism, the combination with a car having a hopper provided with a lading discharge opening, of a door for closing said opening, a reinforcing member secured to the outer face of the side sheet of the hopper adjacent the discharge opening thereof, said member being formed with a web and having outwardly projecting laterally spaced flanges united thereto, and means for supporting the door in closed position involving a movable member and a fixed member, one of said members being secured to the hopper intermediate the spaced flanges of the reinforcing member.

"7. In a car door mechanism, the combination with a car having a hopper provided with a lading discharge opening, of a door for closing said opening, means for supporting the door in closed position involving a pivoted member mounted upon the door and a shouldered member rigidly secured to the car body, and a reinforcing member secured to the outer face of the hopper side sheet adjacent the discharge opening thereof and interposed between said sheet and said shouldered member, said reinforcing member being formed with a web and having laterally spaced flanges projecting outwardly therefrom substantially normal to the side sheet, said shouldered member being secured to the hopper intermediate said laterally spaced flanges.

"8. In a car door mechanism, the combination with a car having a hopper provided with a lading discharge opening, of a door for closing said opening, a reinforcing member secured to the outer face of the hopper side sheet adjacent the discharge opening thereof, said member having a web and laterally spaced flanges projecting outwardly therefrom, one of said flanges forming an abutment for the door and the latter flange having an auxiliary portion disposed substantially parallel with the side edge of the door, and means for supporting the door in closed position involving a shouldered member rigidly secured to the hopper side sheet intermediate the laterally spaced flanges of the reinforcing member and a latch member pivotally secured to the door for cooperating with the shouldered member.

"9. In a car door mechanism, the combination with a car having a hopper provided with a lading discharge opening, of a door for closing said opening, a reinforcing member having a portion contacting with and secured to the outer face of the hopper side sheet adjacent the discharge opening thereof, one edge of said member having a flange portion projecting outwardly from the side sheet, a shouldered member rigidly secured to said sheet intermediate the flanged portion of said member and the edge of said sheet defining the hopper discharge opening, and a latch pivotally mounted on the door for cooperating with said shouldered member to retain the door in closed position."

[*Official Gazette October 16, 1934.*]