Sept. 24, 1929. W. E. WINE 1,729,370

CAR DOOR MECHANISM

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Fig. 3

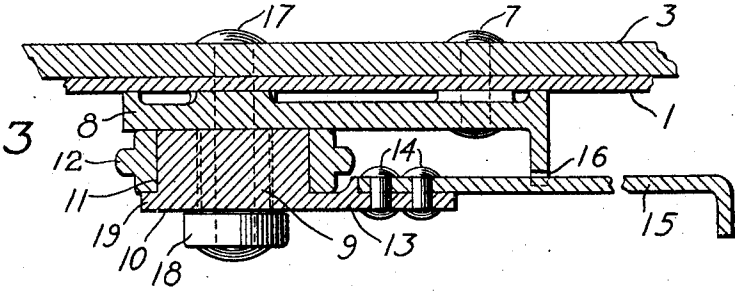


Fig. 1

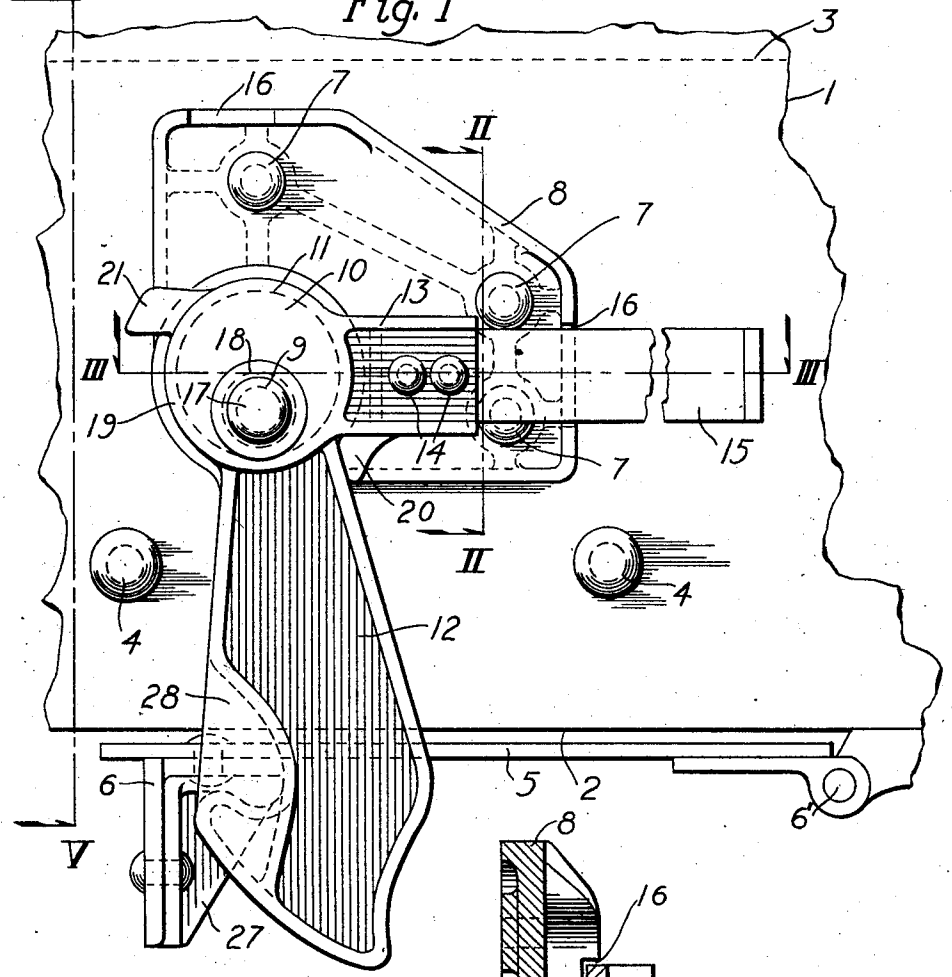


Fig. 2

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CAR DOOR MECHANISM

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Fig. 4

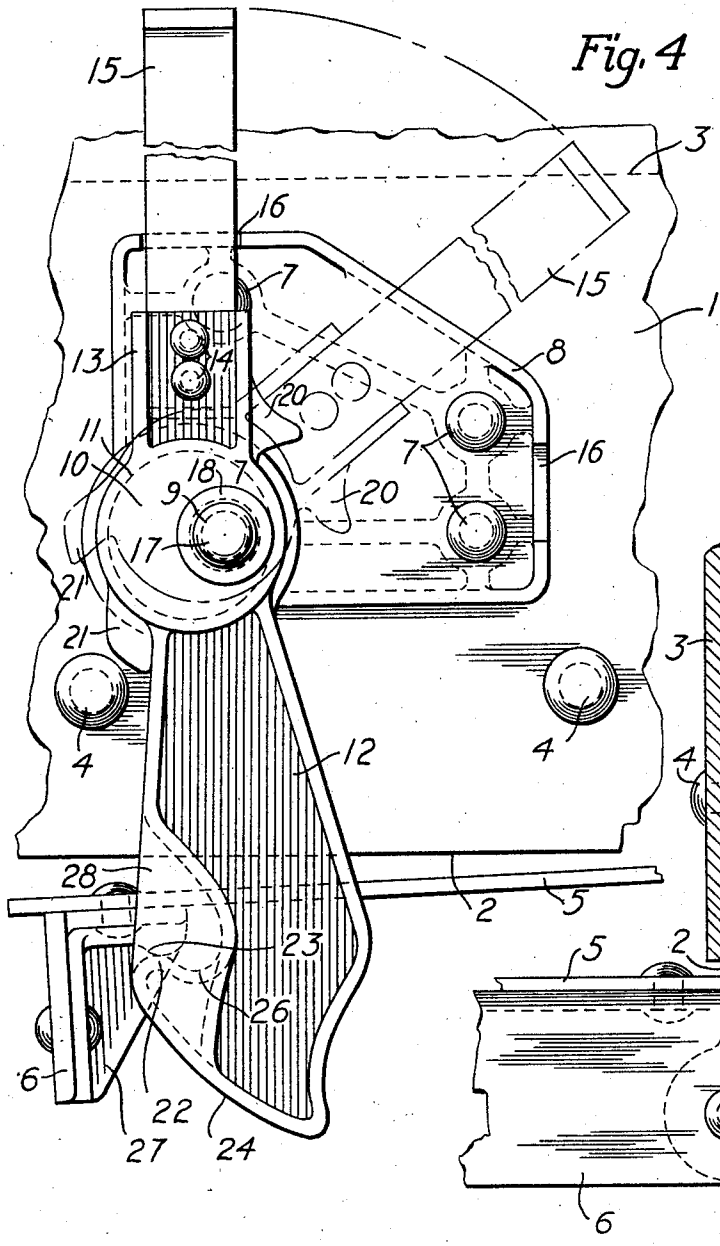
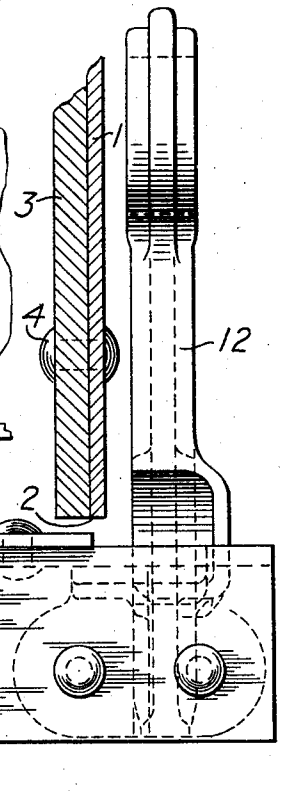


Fig. 5



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CAR DOOR MECHANISM

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Fig. 8

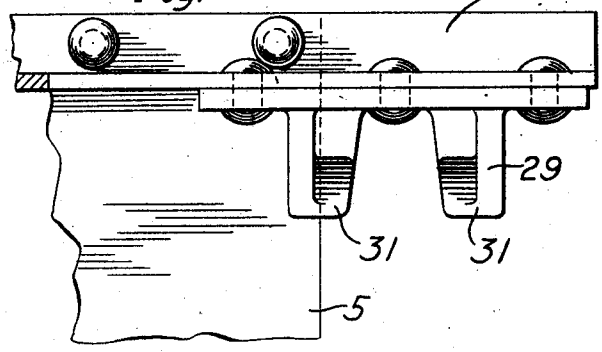


Fig. 6

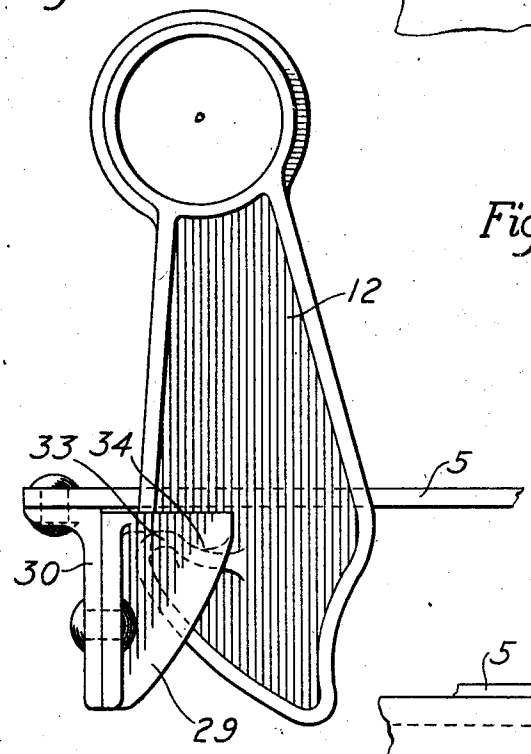
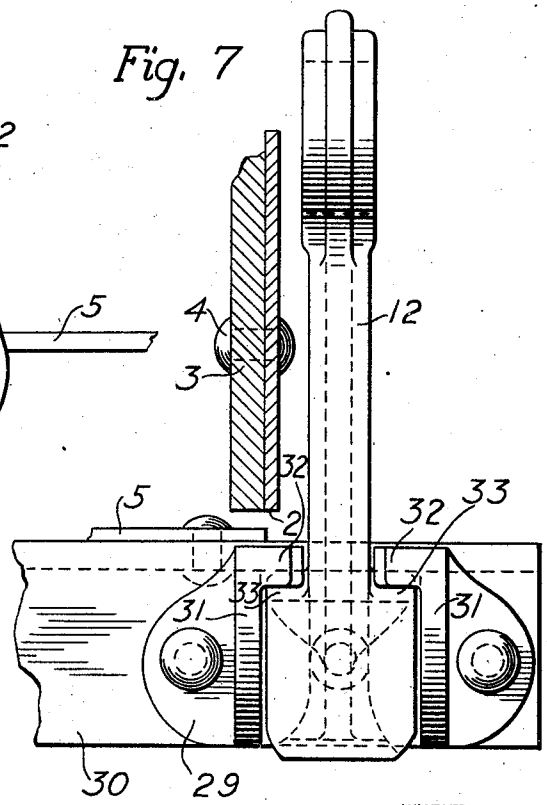


Fig. 7



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Patented Sept. 24, 1929 1,729,370

UNITED STATES PATENT OFFICE

WILLIAM E. WINE, OF TOLEDO, OHIO

CAR-DOOR MECHANISM

Application filed March 28, 1922. Serial No. 547,415.

This invention relates to a door arrangement for railway cars and has particularly to do with the door supporting mechanism. The principal object of the invention is to provide a door supporting device wherein the door may be lifted and temporarily supported upon a door-retaining member, which latter may then be forcibly moved to complete the closing of the door and be thereafter locked in position to positively hold the door closed. Another object is to provide a door supporting mechanism wherein the supporting member may be moved bodily in one direction to effect closing of the door, and be then moved in another direction into final engagement with the door. Another object is to provide a door supporting mechanism wherein the door-supporting member is so interlocked with portions of the door as to prevent accidental displacement of the supporting member in any direction, the mechanism at the same time being constructed for ready disengagement of the supporting member when desired. Another object is to provide a door supporting hook mounted upon an eccentric member, the latter being capable of rotating through a limited arc for imparting a raising or lowering motion to the hook and the door supported thereby, and being also capable of thereafter rotating through a further arc to cause the supporting hook to forcibly engage with or disengage from the door. A still further object is to so interlock the eccentric member and the door-supporting lock that after a predetermined lifting movement of the lock has been effected through the eccentric motion, a continuation of the rotation of the eccentric member will cause a rotation of the lock and thereby force it into positive engagement with the door. Another object is to incorporate positive door releasing means with the door supporting mechanism. A still further object of the invention is to provide a specially constructed door-supporting hook, also in combination therewith, specially arranged means on the door for cooperation with the same.

With such general and other more detailed objects in view, the invention consists of the construction, combination and arrangement of parts as herein described and particularly claimed.

In the accompanying drawings, which show a preferred embodiment of the invention, Figure 1 is a fragmentary side elevational view of a portion of a car having a swinging door applied thereto, and in conjunction therewith a door supporting mechanism constructed in accordance with the principles of the present invention.

Figure 2 is a cross sectional view taken through a portion of the door supporting mechanism on the line 2—2 of Figure 1.

Figure 3 is a horizontal cross sectional view taken through a portion of the car and the door supporting mechanism on the line 3—3 of Figure 1.

Figure 4 is a fragmentary side elevational view similar to Figure 1, but showing the door in a position not fully closed, the door supporting mechanism being in the position it occupies when the door is temporarily supported upon the door lock preparatory to actuation of the latter to effect complete closing of the door.

Figure 5 is a vertical cross sectional view through a portion of the car adjacent the door supporting mechanism, showing the door supporting lock in a position corresponding to that of Figure 1. The plane of this section is indicated by the line 5—5 of Figure 1.

Figures 6, 7 and 8 show a modified form of the locking faces that are formed upon the door, with corresponding modifications in the lower end of the door supporting hook, Figure 6 being a side elevational view of a portion of the mechanism, Figure 7 an end elevational view thereof, and Figure 8 an inverted plan view of the same.

Referring to these drawings, the side of the car is indicated by the numeral 1, and 2 is the bottom edge of the car. A reinforcing member, such as 3 is frequently used along the lower edge of the car side to stiffen and strengthen the same. Rivets such as 4 are used to secure the stiffening member to the car side.

The car is supplied with a swinging door 5, which is hinged at 6′ to the bottom of the car, and in the present embodiment closes up-

wardly against the lower edge 2 of the car side and the reinforcing member 3. The door is preferably provided near its free edge with a reinforcing member, such as the angle 6, which preferably extends somewhat outside of the plane of the car side so that it may be utilized for securing thereto a seat for the door supporting mechanism to be described.

Secured to the side of the car by means of the rivets 7 is a bracket 8. This bracket has outstanding from it a cylindrical spool 9 which serves as a trunnion or pivot for a rotatable member 10 positioned upon it, the inner face of the latter bearing against the outer face of the bracket 8. This rotatable member 10 is formed in eccentric fashion with respect to the trunnion 9 as a center of rotation, and upon the eccentric outer periphery 11 thereof is journaled a door supporting hook or lock 12. Under certain conditions, this lock may swing freely with respect to the periphery 11 of the rotatable member 10, but under other conditions this swinging motion is arrested. This will be hereafter described.

The rotatable member 10 is provided with an arm 13, which extends substantially radially from the central portion of the rotatable member, and secured to this arm by means of the rivets 14 is a lever extension 15. This lever may be utilized for forcibly rotating the member 10 about the trunnion 9 as an axis of rotation. The bracket 8 is provided with notched portions 16 into which the lever 15 will seat at definite angular positions of the lever, thereby holding the lever and the rotatable member in predetermined positions. In order to move the lever it is necessary to spring it outwardly to clear the notches. When in horizontal position the lever holds the rotatable member and the door lock 12 in position such that the door lock is in positive or final engagement with the locking face of the door. The lever is shown as occupying this position in Figure 1. The other notch 16 is arranged to hold the lever 15 in a vertical position, such as indicated in Figure 4, and when in this position, the door lock 12 is ready for temporary engagement with the locking face of the door when the door has been lifted to partially closed position.

The door supporting lock 12 is placed in position upon the periphery 11 of the rotatable member 10 from the rear face of the latter. A rivet 17 passes through an opening piercing the center of the spool 9, and also through aligned openings in the bracket 8 and in the car side 1, and if desired, in the reinforcing bar 3. This rivet passes through a washer 18 at the outer end of the spool 9, the washer being of sufficient size to slightly overlie the outer face of the rotatable member 10 around the periphery of the opening therein that is utilized for journaling the rotatable member upon the spool 9. The length of the spool 9 is such that when the washer 18 is clamped by the driven 17 against the outer end thereof, the intervening space between the inner face of the washer 18 and the outer face of the bracket 8 will be slightly greater than the thickness of the rotatable member 10. The member 10 will thus be retained in position between the bracket and the washer 18, and will have the necessary freedom of movement for the rotation desired.

It will be noted that the hook 12 being entered as aforesaid upon the periphery 11 of the rotatable member from the rear of the rotatable member, will also be retained in position by the driving of the rivet 17. The arm portion 13 of the rotatable member 10 extends along the outer face of the hook 12, so that this arm, together with an annular flange 19 formed around the outer edge of the periphery 11 of the rotatable member, prevents the hook 12 from moving outwardly with respect to the rotatable member, which latter is in turn restrained from outward movement, or movement away from the car side, by means of the rivet 17 and washer 18. The outer face of the bracket 8 retains the hook and the rotatable member against inward movement, or movement towards the car side.

The hook 12 is accordingly free to swing parallel with or alongside of the car side, around the periphery 11 of the rotatable member as a center of rotation. But this rotary movement is restricted to certain limits which will now be described:

It will be noted that the rotatable member 10 has formed upon it lugs 20 and 21, which are arranged to contact with portions of the hook 12 when the parts are in certain predetermined positions. The device is shown in Figure 1 with the lug 20 bearing against the rear edge of the hook, and with the hook in full engagement with the locking face of the door, and with the lever 15 locked in the horizontal one of the notches 16. It will thus be seen that so long as the lever 15 is seated within the horizontal notch 16, as shown in this figure, the hook 12 cannot swing rearwardly or become disengaged from the door, because of the contact between the back of the hook 12 and the lug 20 of the rotatable member.

In Figure 4 the lever is shown in full lines in an upright position and within the vertical one of the notches 16. When in this position, the lug 21 is in contact with the forward edge of the hook 12. In this view, the door is shown as not fully closed, and in only temporary engagement with the hook 12, the preliminary locking face 23 of the door being shown as resting upon the preliminary supporting ledge 22 of the hook. In this position of the rotatable member, the hook is free to swing to the right, or away from the angle 6 and the locking face on the door, the lug 20 being entirely removed from behind the rear edge of the hook. The freedom of the

hook to swing rearwardly is desirable in order that when the door is lifted, as by hand, the contact of the angle 6 with the approach portion 24 of the hook may cause the latter to swing to the right to permit continued upward movement of the door. Subsequently, when the locking face 23 is clear of the supporting ledge 22 the hook may fall by gravity into the position as shown in Figure 4, where the door will be supported in a position preliminary to final closure.

The lever 15 being in the position illustrated in Fig. 4, is rotated clockwise in order to effect complete closing of the door. During the first portion of this rotation of the lever 15 and of the attached rotatable member 10, the hook 12 will be lifted bodily in a substantially vertical direction, due to the eccentric relationship of the hook and the rotatable member. This rotation of the lever 15 being continued until the parts are almost in the position shown in Figure 1, the lug 20 will come into contact with the back of the hook 12. Thereafter the hook 12 is interlocked with the rotatable member 10 so that these two members rotate in unison or harmony, the lifting motion of the hook being arrested and the lower end of the hook being swung forcibly to the left, into full and complete engagement with the locking face of the door, or into the position as shown in Figure 1.

It will be understood that the lever and lug arrangement just described affords a means for applying impacts to the hook to force it into the fully closed position desired. In this fully closed position, the preliminary locking face 23 seats within the final supporting ledge 26 on the hook, so that in order for the hook to be released it is necessary that a relative vertical displacement take place between the hook and the door, the horizontal plane tangent to the face 26 being lower than the corresponding tangent plane of the face 22.

When it is desired to release the door the lever 15 is sprung outwardly until freed from the notch 16, and is then rotated in counter-clockwise direction. This rotation, through the eccentric action heretofore described, lowers the hook and the door until the lug 21 comes into contact with the forward edge of the hook 12. Further movement of the lever in counter-clockwise direction now produces a positive rotation of the hook 12 in harmony with the rotation of the lever, so that the lower end of the hook may be forcibly swung to the right and thereby disengaged from the locking face of the door. It will be understood that to effect this the lever 15 may be swung in counter-clockwise direction somewhat further to the left than shown in Figure 4, if desired. The lever 15 and lug 21 may be utilized for impact against the front face of the hook for forcible disengagement, if necessary.

The locking face on the door is preferably formed by riveting to the angle iron 6 a bracket 27 which has cast upon it the locking shoulder 23 before referred to. The hook may be formed with a shroud 28, which ties the supporting ledge 26 to the upper portion of the hook in a substantial manner. This shroud overlies the outer end of the bracket 27 and prevents movement of the lower end of the hook towards the car side. The shroud 28 connects the lower shank portion of the hook to the upper shank portion and forms a rigid tension tie between the door supporting ledge 23 and the upper end of the hook, thereby carrying the load of the door directly from the ledge to the pivot eye of the hook without inducing heavy bending movements in the shank portion of the hook. Being arranged outwardly of the end of the angle iron 6 and outwardly of the hook seat, the shroud 28 will not interfere with the free engagement of the hook and the door arm provided for engagement therewith.

In the modification shown in Figures 6, 7 and 8, the bracket 29, which embodies the locking face on the door, is riveted to the rear face of a door reinforcing angle 30. The hook 12 in this construction is arranged to seat between a pair of walls 31 formed on this casting 29, there being a suitable space between the walls to receive and accommodate the lower end of the hook. These walls terminate at the top in inturned shoulders 32, beneath which the laterally extending supporting ledges 33, which are formed upon the opposite sides of the hook 12, may be seated. The ledges formed beneath the shoulders 32 are shaped in a manner similar to the locking face in the previously described arrangement, there being preliminary points 34 which will first rest upon the ledges 33 of the hook for retaining the door in partially closed position.

In this construction when the hook is in position between the walls 31, it cannot be moved longitudinally of the angle iron 30, because of the pocket formed between the walls 31. As before explained, the locking of the lever 15 in the notch 16 effectively prevents swinging movements of the hook. Furthermore, the difference in elevation of the points 22 and 26 with relation to the seat 23, makes it impossible for the door to become disengaged from the hook, except when such disengagement is desired.

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

What is claimed is:

1. A door mechanism for railway cars including a door hinged to a car body, a pivoted door lock engageable with a portion of said door for supporting the latter, said lock be-

ing mounted upon a member rotatably carried upon the car body, and means for rotating the rotatable member, the door lock being so associated with the said rotatable member that a limited rotation of the latter with respect to the car body will produce relative pivotal movement between the door lock and the said rotatable member causing the pivotal axis of said lock to shift with respect to the position it occupies when the door is in closed position, and further rotation of said rotatable member with respect to the car body will cause a rotation of said rotatable member and said lock as a unit.

2. A door mechanism for railway cars, including a door hinged to the car body, a rotatable member pivoted upon the car body near an edge of the door, a door securing lock engageable with a portion of the door, said lock being pivotally associated with the rotatable member so as to permit a limited relative pivotal movement between said lock and rotatable member upon rotation of the latter, and means for thereafter causing said lock and said rotatable member to be rotated together as a unit about an axis coincident with the axis of rotation of said rotatable member, said relative pivotal movement serving to shift the position of the pivotal axis of said lock.

3. A door mechanism for railway cars, including a door hinged to the car body, a rotatable member eccentrically pivoted upon the car body near an edge of the door, a door securing lock journalled upon the eccentric periphery of the rotatable member in such manner that the said parts are capable of relative rotative movement with respect to each other for a limited distance to an interlocked position, interlocking means cooperatively associated between the said parts, and means for rotating one of said parts.

4. A door mechanism for railway cars, including a door hinged to the car body, a rotatable member eccentrically pivoted upon the car body near an edge of the door, a door securing lock mounted upon the said rotatable member, and means carried by the rotatable member for forcing the lock into or out of engagement with the door.

5. A door mechanism for railway cars, including a door hinged to the car body, a pivoted door lock engageable with a portion of said door, for supporting the same, the same being mounted in eccentric fashion upon a member, said member being rotatably carried upon the car body, means for rotating the rotatable member, the door lock being so associated with the rotatable member that a limited rotation of the latter with respect to the car body will effect a vertical displacement of the door lock through the eccentric mounting of the same thereupon, and so that further rotation of the rotatable member will produce a harmonious rotation therewith of the door lock as a unit.

6. A door mechanism for railway cars, including a door hinged to the car body, a pivoted door lock engageable with a portion of the door for supporting the same, a member rotatably mounted upon the car body, the said door lock being mounted in eccentric fashion upon the said rotatable member and the eccentric movement being arranged to raise or lower the door lock upon rotation of the rotatable member, depending upon the direction of rotation thereof, and interlocking means operable between the said two members for arresting said rotation and for producing harmonious rotative movement of the said lock about the axis of rotation of the rotating member by further rotation thereof, to force the said lock into or out of engagement with the door.

7. In a door mechanism for railway cars, the combination with the door, of a door-supporting hook, a movable member having a face adapted to contact said hook to hold the same against release movement in one direction and having another portion thereof arranged to overlie the hook to prevent movement thereof in another direction.

8. In a door mechanism for railway cars, the combination with a door hinged to the car body, of pivoted means operatively interposed between said door and the car body for releasably supporting said door in closed position, and means movable with respect to said pivoted means for preventing rotation of the latter in one direction to door releasing position and for restraining movement of said pivoted means in a direction transverse to the plane of its normal pivotal movement.

9. A door fastener for railway cars, comprising a base plate, a latch member movably mounted on said plate, a lever movably mounted on said plate, and movable relatively to said latch member, and means on said lever for engaging said latch member for releasing the same when in latched position.

10. A door fastener for car doors, comprising an attaching plate, a latch movably mounted on said plate, and means for holding said latch in position to be automatically latched, said means being also adapted to hold said latch in latched position.

11. In a car provided with a hopper, a hinged door for said hopper, a pivoted latch carried by said hopper for engaging said door, a pivoted lever associated with said latch, and means carried by said lever for engaging said latch for striking the same a sharp blow for releasing said latch.

12. In a railway car provided with a hopper, a hinged door for said hopper, a pivoted latch for engaging said door, a pivoted lever, means carried by said lever for engaging said latch for holding said latch in locked

position or for striking said latch a sharp blow for releasing the same.

13. In combination with a car body provided with a hopper, a door for said hopper, a keeper on said door, a pivoted latch on the side wall of said hopper and adapted to engage said keeper, an eccentric lever associated with said latch and adapted to clamp said door against said hopper, said lever having its free end distorted whereby the same may be struck by the foot of the operator for releasing said latch, and a lug for limiting the upward movement of said latch.

14. A door mechanism for railway cars, including a door hinged to the car body, a pivoted door lock adapted to cooperate with a portion of said door to support the latter, said lock being arranged eccentrically upon a member rotatably carried on the car body, and means for rotating the rotatable member, the door lock being adapted to execute a vertical displacement upon a limited rotation of the rotatable member and further rotation of the latter serving to cause said lock and rotatable member to rotate as a unit.

15. A door mechanism for railway cars, including a door hinged to the car body, a pivoted door lock adapted to engage a portion of the door to support the latter, a member rotatably mounted upon the car body, the said door lock being eccentrically mounted on the said rotatable member so as to raise or lower the door lock upon rotation of the rotatable member in the correspondingly appropriate direction, and means cooperating with said lock and said rotatable member for arresting the rotation of said lock with respect to the rotatable member and for causing rotation of the said lock about the axis of rotation of said rotatably mounted member, said means being adapted by rotation in the appropriate direction to force the said lock into or out of engagement with the door.

16. A door mechanism for railway cars, including a door hinged to the car body, a pivoted door lock engageable with a portion of the door for supporting the same, a member rotatably mounted upon the car body, the said door lock being mounted in eccentric fashion upon the said rotatable member and the eccentric movement being arranged to raise or lower the door lock upon rotation of the rotatable member, depending upon the direction of rotation thereof, and interlocking means operable between the said two members for arresting the said eccentric motion and for producing harmonious rotative movement of the said lock about the axis of rotation of the rotating member by further rotation of the rotatable member, to force the said lock into or out of engagement with the door.

17. In a door mechanism for railway cars, the combination with a door hinged to the car body, of pivoted means operatively interposed between said door and the car body for releasably supporting said door in closed position, and rotatable means movable with respect to said pivoted means for preventing rotation of the latter in one direction to door releasing position and for restraining movement of said pivoted means in a direction transverse to the plane of its normal pivotal movement, said pivoted means being movable independently of said rotatable means to automatically support the door in a position of closure when the latter is raised from open position.

18. In a door mechanism for railway cars, the combination with a door hinged to the car body and adapted to swing to open position under the influence of gravity, of means operatively interposed between said door and the car body for releasably supporting said door against opening movement, said means involving a swinging latch, and a rotatable eccentric for cooperating with said latch to move said door from partially closed to fully closed position, said eccentric being provided with means for causing said latch to assume a position permitting said door to swing open.

19. In a door mechanism for railway cars, the combination with a door hinged to the car body and adapted to swing to open position under the influence of gravity, of means operatively interposed between said door and the car body for releasably supporting said door against opening movement, said means being adapted to force said door from a partially closed to a fully closed position and involving a swinging latch carried by the car body, and rotatable eccentric means for cooperating with said latch to move said door toward closed position, said last named means being adapted to move said latch to a position permitting said door to swing open.

20. In a door mechanism for railway cars, the combination with a door hinged to the car body and adapted to swing to open position under the influence of gravity, of means for releasably supporting the door in closed position, said means involving a latch pivotally mounted upon the car body, a member secured to the door for cooperating with the latch, and a lever adapted to engage said latch to force it toward door supporting position, said lever being pivotally mounted upon the car body so as to swing in a plane substantially parallel to the plane of operation of the latch and being provided between its ends with a lug adapted to engage the latch and stand in its path of unlocking movement when the latch is in a position corresponding to the closed position of the door.

21. In a door mechanism for railway cars, the combination with a door hinged to the car body, of means operatively interposed between said door and car body for releasably supporting the door in closed position, said

means involving a swinging latch, and a pivoted lever for forcing the latch to door supporting position, the lever being provided between its ends with a lug adapted to engage the rear side of the latch so as to stand in the path of unlocking movement of the latter when the door is in closed position.

22. A door mechanism for railway cars, including a door hinged to the car body, a rotatable member eccentrically pivoted upon the car body near an edge of the door, a door securing lock journaled upon the eccentric periphery of the rotatable member in such manner that the said parts are capable of relative rotative movement with respect to each other for limited distance to an interlocked position, interlocking means cooperating with said lock and rotatable member for causing the parts to rotate simultaneously, and means for rotating one of said parts.

In testimony whereof I affix my signature.

WILLIAM E. WINE.