Oct. 7, 1930. W. E. WINE 1,777,596

CAR DOOR MECHANISM

Filed May 14, 1928 3 Sheets-Sheet 1

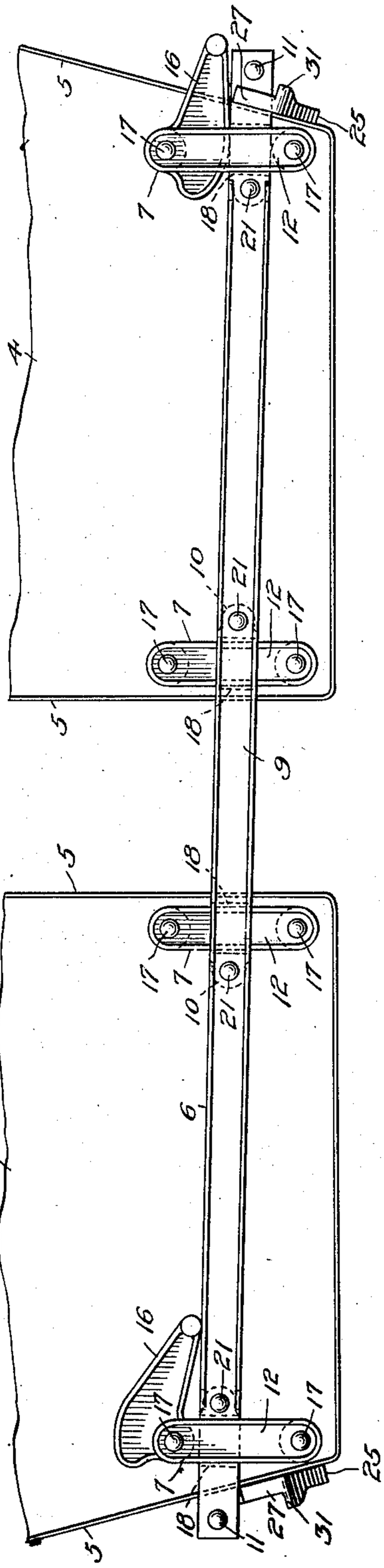

Fig. 1

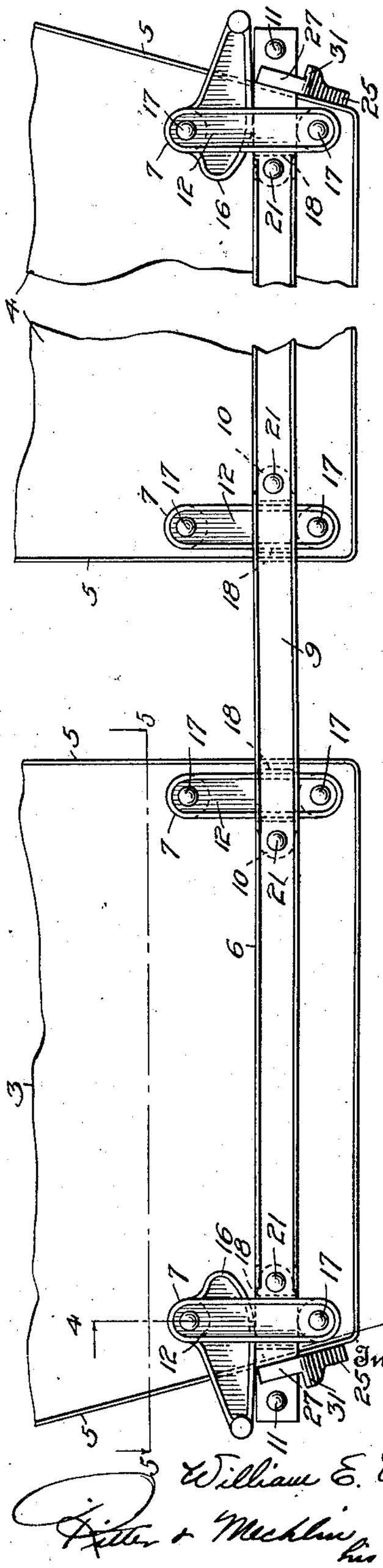

Fig. 2

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CAR DOOR MECHANISM

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Fig. 3

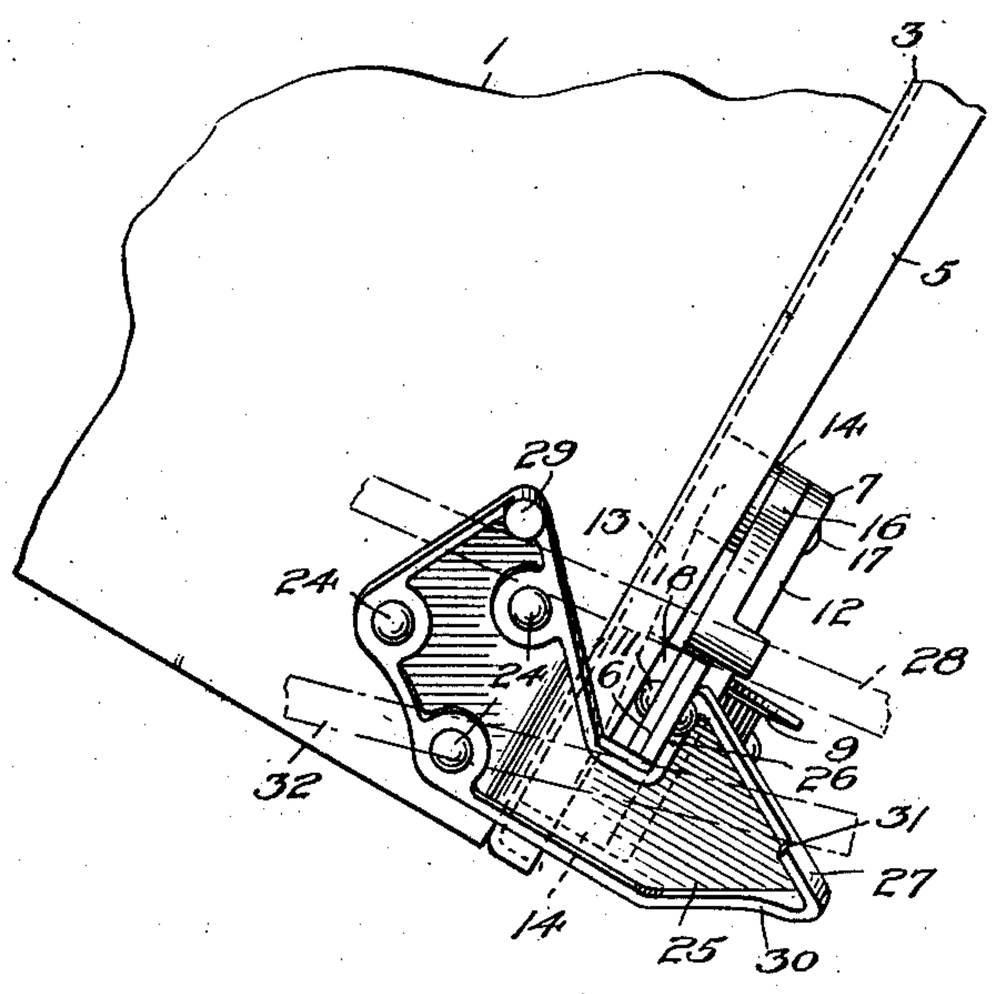


Fig. 4

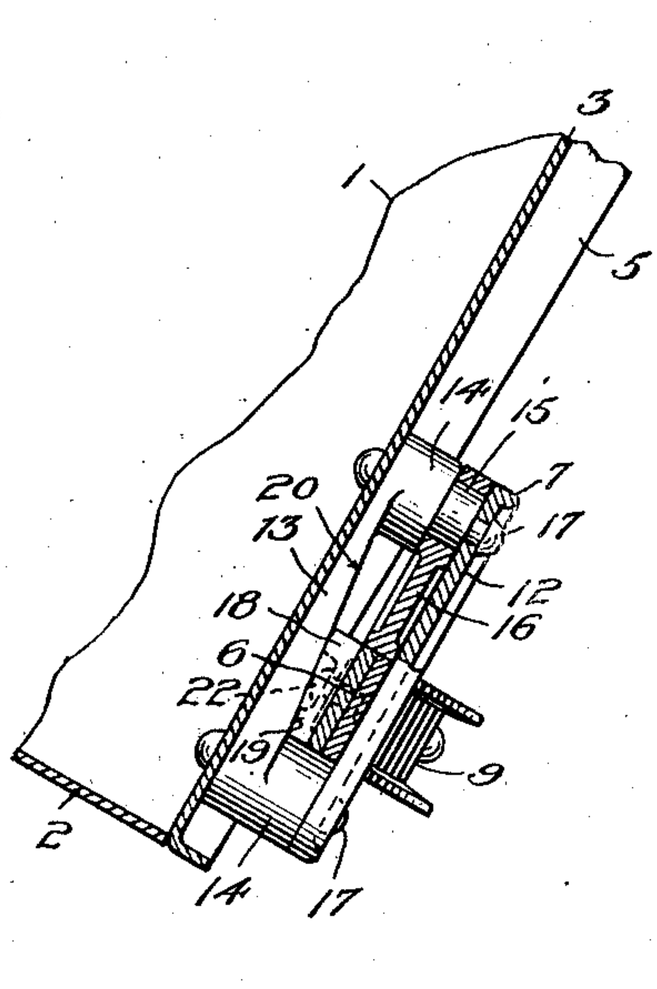


Fig. 5

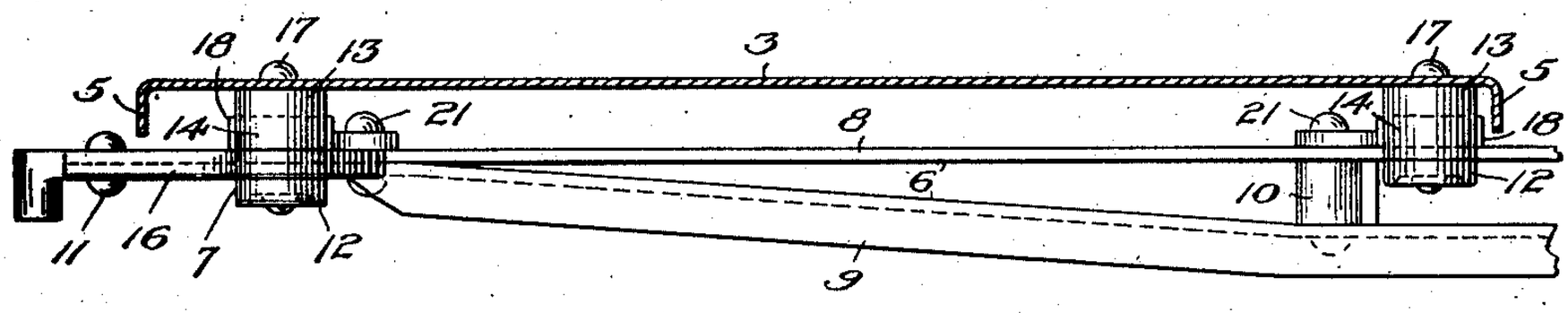


Fig. 6

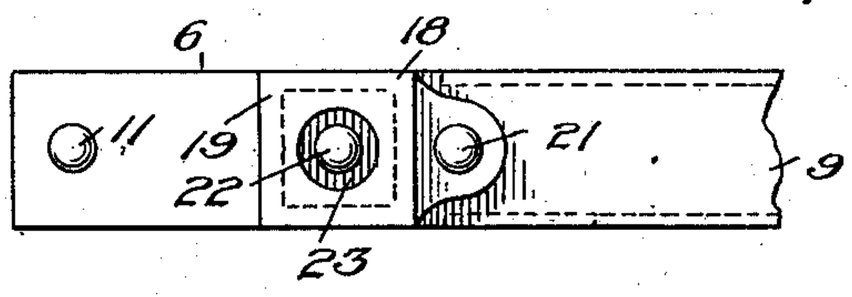


Fig. 8

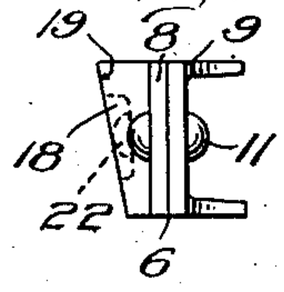
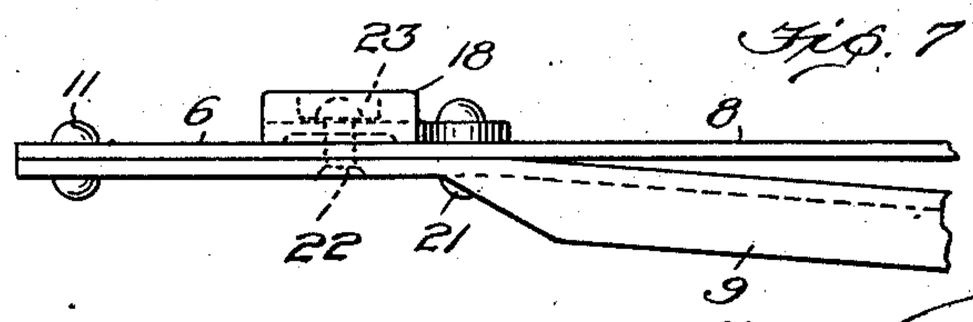


Fig. 7



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CAR DOOR MECHANISM

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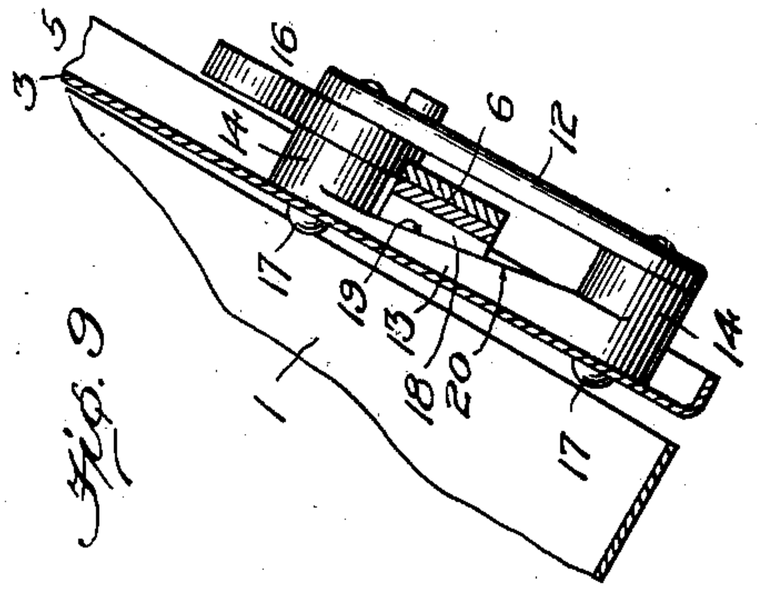

Fig. 9

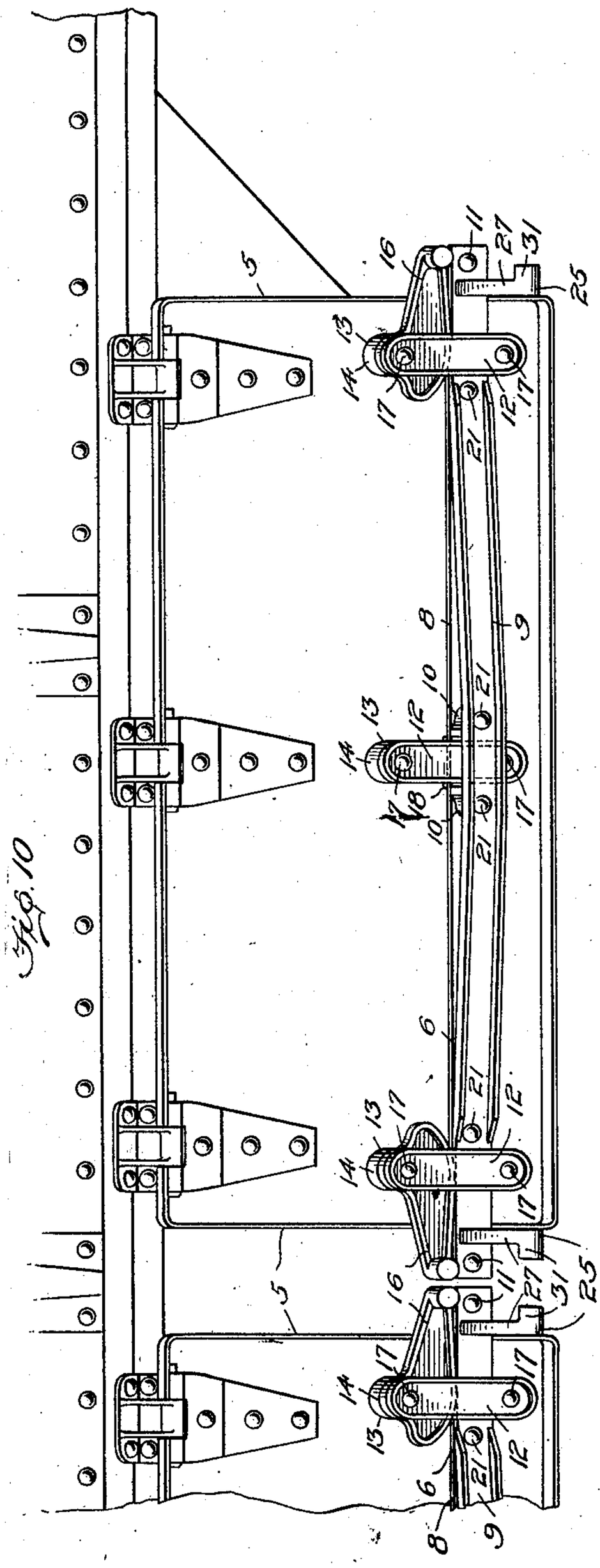

Fig. 10

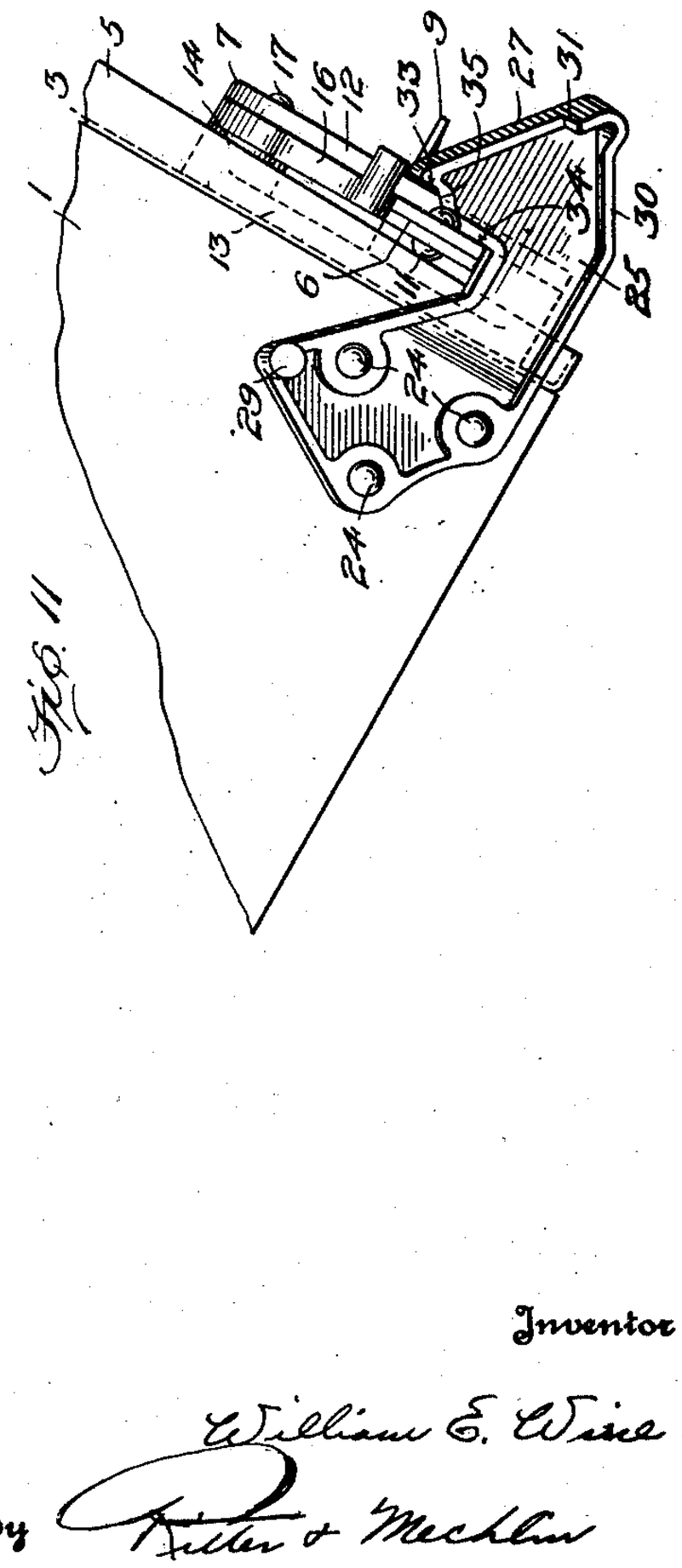

Fig. 11

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UNITED STATES PATENT OFFICE

WILLIAM E. WINE, OF TOLEDO, OHIO

CAR-DOOR MECHANISM

Application filed May 14, 1928. Serial No. 277,465.

My invention relates to door mechanism for railway cars and is especially suitable for application to hopper cars, although it may advantageously be employed on cars of other types.

The principal object of the invention is to provide a hopper car door with means which, in addition to functioning as a door spreader and preventing distortion of the door, serves to support or maintain the door in closed position.

A further object of the invention is to provide a door locking mechanism with means for forcing the door from a partially closed to a fully closed position.

A primary feature of the invention resides in providing a railway car with a hinged door movable to open position under the influence or gravity and, in associating therewith, a latch member slidably mounted on the door and means carried by the car body engageable with the opposite ends of said latch for maintaining the door in closed position, the latch being so formed and arranged as to constitute means for preventing distortion of the door.

A further feature of the invention consists in providing a hopper car door composed of a plurality of sections respectively disposed on opposite sides of the car center sill with rigid means slidably mounted on the door sections and constituting a combined latch and door spreader, the opposite ends thereof being engageable with hooks carried by the car body for maintaining the door in closed position.

A still further feature of the invention resides in providing the door of a railway car with a combined latch and door spreader of truss form.

A still further feature of the invention consists in slidably mounting on a hinged car door a latch member which is adapted to cooperate with means fixedly mounted on the car body to support the door either in partially closed or in fully closed position, the door being provided with brackets having relatively inclined surfaces cooperable with the slidable latch to force the door from partially closed to fully closed position upon movement of the latch in a locking direction.

Other features of the invention pertaining to advantageous forms of construction and combinations of parts will hereinafter appear and be pointed out in the claims.

In the drawings:

Figure 1 is an elevational view showing the invention as applied to door sections employed for closing the lading discharge openings of railway cars having transversely disposed hoppers on opposite sides of the car center sill (not shown), one of the door sections being supported in a partial position of closure and the other in a practically final position of closure.

Figure 2 is a view similar to Figure 1 showing both of the door sections supported in fully closed position.

Figure 3 is a fragmentary side elevational view of a hopper and its swinging door showing the invention applied thereto, the door being supported in fully closed position.

Figure 4 is a fragmentary sectional view taken on line 4—4, Figure 2.

Figure 5 is a fragmentary sectional view taken on line 5—5, Figure 2.

Figure 6 is an elevational view of the inner face of the combined latch and door spreader.

Figure 7 is a top elevational view of the construction illustrated in Figure 6.

Figure 8 is an end elevational view of the construction shown in Figure 6.

Figure 9 is a view similar to Figure 4, the door being supported in partially closed position.

Figure 10 is a side elevational view of a hopper car of the side dump type showing the invention applied to the doors employed on this type of car.

Figure 11 is a view similar to Figure 3 illustrating a slightly modified arrangement for forcing the door from one position of closure to another position of closure.

As is well understood hopper cars, having lading discharge openings disposed transversely of the car on opposite sides of the car center sill, are provided with doors formed in a plurality of sections and connected by a spreader or stiffening member so as to swing

together. Heretofore the door sections have been connected by spreaders which are rigidly and immovably secured to each section, the opposite ends of the spreader being provided with either an immovable or movable part of the door locking mechanism to cooperate with a portion of the locking mechanism carried by the outer side sheets of the hoppers. I have found, however, that the door spreader, by being suitably formed, may be arranged to function as the latch portion of the locking mechanism without detracting from its function as a door spreader or stiffening element.

In the drawings, 1 indicates the side sheets of the hoppers and 2 the slope or bottom sheets thereof, the outer edges of these sheets respectively defining the lading discharge openings which are adapted to be closed by the corresponding door sections 3 and 4. Each of the doors may be secured to the car body by the usual hinges (not shown) so as to swing to open position under the influence of gravity. To reinforce the door sections their marginal edges may be flanged outwardly as at 5. The door sections 3 and 4 are connected so as to swing together by a member 6 which is slidably mounted upon each of the sections by a plurality of brackets 7. This member in addition to serving as a door spreader serves as the latch of the door locking mechanism. In order that the spreader may be of sufficient strength to effectively withstand the forces tending to warp and distort the door sections it may be formed of a plurality of members 8 and 9 constituting the compression and tension members, respectively, of a truss. Adjacent the points of maximum divergence of the tension and compression members filler blocks or castings 10 may be employed for retaining them in spaced relation. So that the member 6 may be of maximum rigidity, the tension member 9 thereof is formed as a flanged beam, preferably a channel, the flanges of which are cut away at its opposite ends where it is connected to the compression member by rivets 11. The ends of the combined spreader and latch project outwardly beyond adjacent portions of the hoppers to cooperate with other portions of the door locking mechanism to be hereinafter described.

The brackets 7 are respectively secured to the door sections adjacent their inner and outer edges and each of the brackets consists of an outer member 12 and an inner member 13, the latter being fashioned with upper and lower outwardly projecting lugs or bosses 14 for maintaining the outer member in spaced relation thereto, thus affording a portion for receiving the slidable door spreader 6. The upper lug of the brackets secured adjacent the outer edges of the door sections is provided with a reduced portion 15 serving as a pivotal support for a cam 16 employed for making the spreader rigid with the door sections and to thereby maintain it in locked position to prevent accidental opening movement of the door sections. Any suitable means such as rivets 17 may be used for securing the brackets to the outer faces of the door sections, the rivets preferably passing through the central portions of the upper and lower lugs 14 of the inner members 13. While the outer members 12 of the brackets secured to the door sections adjacent their outer edges overlie the outer face of the door stiffener, the outer members 12 of the brackets which are secured to the doors adjacent their inner edges are interposed between the compression member 8 and the tension member 9 thereof. It will thus be seen that the filler members 10 may be of any desired size, thereby permitting the divergence between the tension and compression members to be varied in order to obtain a spreader of the most effective strength.

The fillers 10, in addition to serving as spacers for the compression and tension members of the spreader, limit longitudinal movement of the latter by cooperating with the opposite edges of the outer plates 12 of the adjacent brackets. Secured to the compression member 8 adjacent each of the brackets 7 is a wedge block or member 18 fashioned with an inclined surface 19 to cooperatively engage the correspondingly inclined surface 20 formed on the inner members 13 of the brackets. The wedge blocks 18 are secured to the spreader by rivets 21 and 22 which pass through both of the members comprising the spreader, the inclined surface 19 of each of the wedge blocks being provided with a depressed portion 23 to receive the inner head of the rivets 22.

Suitably secured as by rivets 24 to each of the outer side sheets of the hoppers is a hook member 25 having a ledge 26, the ledges of the hooks being respectively adapted to cooperate with the outwardly projecting opposite ends of the door spreader 6. The ledge of each of the hooks and the portions of the brackets for receiving the spreader are so arranged and proportioned that, by moving both ends of the spreader upwardly into the position illustrated in Figure 9, the door sections will be permitted to swing to open position.

When it is desired to close the door the operator may grasp any convenient portion thereof or one of the outwardly projecting ends of the movable spreader to move the door toward closed position. The approach planes 27 of the respective hooks cause the spreader to move upwardly with respect to the door sections thus permitting it to assume a position enabling it to drop behind the ledges 26 of the hooks to support the door in a partial position of closure as shown

in Figure 9. If the door sections are warped or distorted to an extent such that the door may not be easily caused to assume fully closed position, suitable force may be applied to the outwardly projecting ends of the spreader by employing a removable lever 28 adapted to fulcrum about the outwardly projecting lug or boss 29 of the hook. When force is applied to the removable lever 28 to cause the spreader to move downwardly, the door is forced to fully closed position due to the coaction between the inclined surface 20 of the inner members of the respective brackets and the inclined surface 19 of the wedge blocks of the spreader. If the door sections are being manipulated by only one operator it will, of course, be understood that both of the sections cannot be simultaneously locked but, as shown in Figure 1, the door section 4 may be caused to assume a fully closed position and the operator by passing around to the other side of the car may thereafter secure the door section 3 in fully closed position. Likewise, when only one operator is available to unlock the door sections, the opposite ends of the spreader may be caused to successively assume a position permitting the door to swing open. As considerable force is required to move the spreader to unlocked position a mechanical advantage is preferably employed to obtain the desired force. To accomplish this result a portion of the marginal flange 30 of the hook is cut away as at 31 to provide a ledge or shoulder for accommodating a removable lever 32. By moving the lever in a clockwise direction about the ledge 31 as a fulcrum, it will readily be perceived that the spreader is caused to move upwardly, thereby permitting the door to swing open.

All parts of the door mechanism as applied to the side dump hopper car illustrated in Figure 10 are identical with those illustrated in the main figures of the drawings, the only difference being that the door is formed as a unit instead of in sections as illustrated in Figures 1 and 2.

In the modification illustrated in Figure 11 which may be applied either to the type of hopper illustrated in Figure 1 or to that illustrated in Figure 10, the hooks are formed with a plurality of ledges, the ledge 33 serving to maintain the door in partially closed position while the ledge 34 functions to sustain the door in fully closed position. Instead of providing the brackets 7 and the spreader 6 with inclined surfaces to wedge the door to fully closed position by a downward movement of the spreader, these surfaces in the modification illustrated in Figure 11 are made parallel to the direction of movement of the spreader, the wedging action being obtained by connecting the ledges 33 and 34 of the hooks by an inclined surface 35. It will thus be appreciated that when the spreader is moved downwardly along the inclined surface 35, the door will be forced from partially closed to fully closed position.

By constructing the door mechanism in the manner herein disclosed, one of the parts efficiently performs the dual function of a latch and a door-spreader which prevents distortion and warping of the door.

I claim:

1. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of a latch member slidably mounted on the door, and means carried by the car body engageable with the opposite ends of said member for maintaining the door in closed position, said slidable latch involving a flanged beam constituting means serving to stiffen the door.

2. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of a trussed latch slidably mounted on the door and constituting means preventing distortion of the latter, means carried by the car body engageable with the opposite ends of said latch for maintaining the door in closed position, and means secured to the door adjacent each end of the latch for engaging the upper edge of the latter to lock it in door supporting position.

3. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of a latch bar slidably mounted on the door, and means carried by the car body engageable with the opposite ends of said latch for maintaining the door in closed position, said latch being of greatest depth intermediate its ends and involving a flanged beam constituting means preventing distortion of the door.

4. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of fixed means carried by the car body, and slidable means carried by the door involving a plurality of rigidly connected members provided with means for maintaining them in spaced relation intermediate their ends, one of said members being provided with a plurality of flanges said slidable means serving to prevent distortion of the door and being cooperable with said fixed means to support the door in closed position.

5. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of fixed means carried by the car body, and a latch bar slidably mounted on the door having rigid portions projecting beyond opposite edges of the latter for cooperating with said fixed means to maintain the door in closed position, said latch bar constituting

means preventing distortion of the door and involving a plurality of rigidly connected members arranged in spaced relation intermediate their ends, one of said members being substantially of channel shape.

6. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of a latch bar slidably mounted on the door and constituting means preventing distortion thereof, said latch bar involving a plurality of members rigidly connected adjacent their opposite ends and a filler for maintaining said members in spaced relation intermediate their ends, one of said members being provided with a rigidifying flange, and means fixedly mounted on the car body for engagement with the opposite ends of said latch bar to maintain the door in closed position.

7. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of a slidable latch bar mounted on the door, means mounted on the car body engageable with the opposite ends of said latch bar for supporting the door in closed position, and brackets on the door for guiding said latch bar, one of said brackets overlying the outer face of said latch bar and another of said brackets having a part interposed between portions of the latch bar.

8. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of fixed means carried by the car body, a latch bar slidably mounted on the door having portions projecting beyond opposite edges of the latter for cooperating with said fixed means to maintain the door in closed position, said latch bar constituting means preventing distortion of the door and involving a plurality of rigidly connected members arranged in spaced relation intermediate their ends, and brackets for guiding said latch bar, one of said brackets having a portion interposed between the spaced members of the latch bar.

9. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of a combined door-stiffening and latch member slidably mounted on the door, means carried by the car body engageable with the opposite ends of said latch for maintaining the door in partially closed and in fully closed position, means operatively interposed between the latch member and the car body for causing said door to move from partially closed to fully closed position upon movement of said latch member in a locking direction, and means carried by the door for making the latch rigid therewith after the door has been moved to fully closed position.

10. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of a latch member slidably mounted on the door, means carried by the car body engageable with the opposite ends of said latch for maintaining the door in partially closed and in fully closed position, and means carried by the door and cooperable with portions of said latch member to cause the door to move from partially closed to fully closed position upon movement of said latch member in a locking direction.

11. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of a latch member slidably mounted on the door, means carried by the car body engageable with the opposite ends of said latch for maintaining the door in partially closed and in fully closed position, the door and slidable latch being provided with cooperating inclined surfaces for forcing said door from partially closed to fully closed position upon movement of said latch in a locking direction.

12. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of means fixedly mounted on the car body adjacent opposite sides of the door, a combined door stiffening and latch member carried by the door and engageable with the said fixed means to maintain the door in partially closed and in fully closed position, and a bracket member mounted on the door, said bracket having a relatively inclined surface for cooperating with said latch member to cause said door to move from partially closed to fully closed position upon movement of said latch member from a position corresponding to partially closed position of the door to a position corresponding to fully closed position thereof.

13. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, of means fixedly mounted on the car body, a slidable latch member carried by the door and engageable with the said fixed means to maintain the door in partially closed and fully closed position, and a bracket for guiding said slidable latch, said bracket involving spaced members for receiving said latch and one of said members being fashioned with a relatively inclined surface for cooperating with the latter to cause said door to move from partially closed to fully closed position upon movement of said latch from a position corresponding to partially closed position of the door to a position corresponding to fully closed position thereof.

14. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, said door comprising a plurality of

sections respectively disposed on opposite sides of the car center sill, of means carried by the car body adjacent the outer edges of said door sections, and rigid means slidably mounted on the door and constituting a combined latch and door-spreader, the opposite ends of said rigid means being engageable with the means carried by the car body for maintaining the door in closed position.

15. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, said door comprising a plurality of sections respectively disposed on opposite sides of the car center sill, of means carried by the car body adjacent the outer edges of said door sections, and a trussed member slidably mounted on said door sections and constituting a combined latch and door-spreader, the opposite ends of said member being engageable with said means to maintain the door in closed position.

16. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, said door comprising a plurality of sections respectively disposed on opposite sides of the car center sill, of means carried by the car body adjacent the outer edges of said door sections, and combined latch and door-spreader means slidably mounted on the door sections and having portions projecting beyond the outer edges of the latter for cooperating with the means carried by the car body for maintaining the door in closed position, said latch means involving a plurality of rigidly connected members diverging from points adjacent their opposite ends toward points adjacent the inner edges of the respective door sections.

17. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, said door comprising a plurality of sections respectively disposed on opposite sides of the car center sill, of means carried by the car body adjacent the outer edges of said door sections, rigid means slidably mounted on the door sections and constituting a combined latch and door-spreader, the opposite ends of said rigid means being engageable with the means carried by the car body for maintaining the door in partially closed and in fully closed position, and means operatively interposed between the latch member and car body for causing said door to move from partially closed to fully closed position upon movement of said latch member in a locking direction.

18. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, said door comprising a plurality of sections respectively disposed on opposite sides of the car center sill, of means carried by the car body adjacent the outer edges of said door sections, rigid means slidably mounted on the door sections and constituting a combined latch and door-spreader, the opposite ends of said rigid means being engageable with the means carried by the car body for maintaining the door in partially closed and in fully closed position, and brackets secured to each of said door sections adjacent their inner and outer edges for guiding said slidable means, the brackets adjacent the respective inner edges of the door sections having parts interposed between portions of the slidable means and the brackets adjacent the respective outer edges of the door sections having portions overlying the outer face of said slidable means.

19. In a door mechanism for railway cars, the combination with a hinged door movable to open position under the influence of gravity, said door comprising a plurality of sections respectively disposed on opposite sides of the car center sill, of means carried by the car body adjacent the outer edges of said door sections, rigid means slidably mounted on the door sections and constituting a combined latch and door-spreader, the opposite ends of said rigid means being engageable with the means carried by the car body for maintaining the door in partially closed and in fully closed position, and brackets secured to said door sections for guiding said slidable means, one of the brackets on each of said door sections being fashioned with a relatively inclined surface for respectively cooperating with portions of said slidable means to cause said door to move from partially closed to fully closed position upon movement of said slidable means in a locking direction.

In testimony whereof I affix my signature.

WILLIAM E. WINE.