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B. W. KADEL

CAR DOOR MECHANISM

Filed June 1, 1925

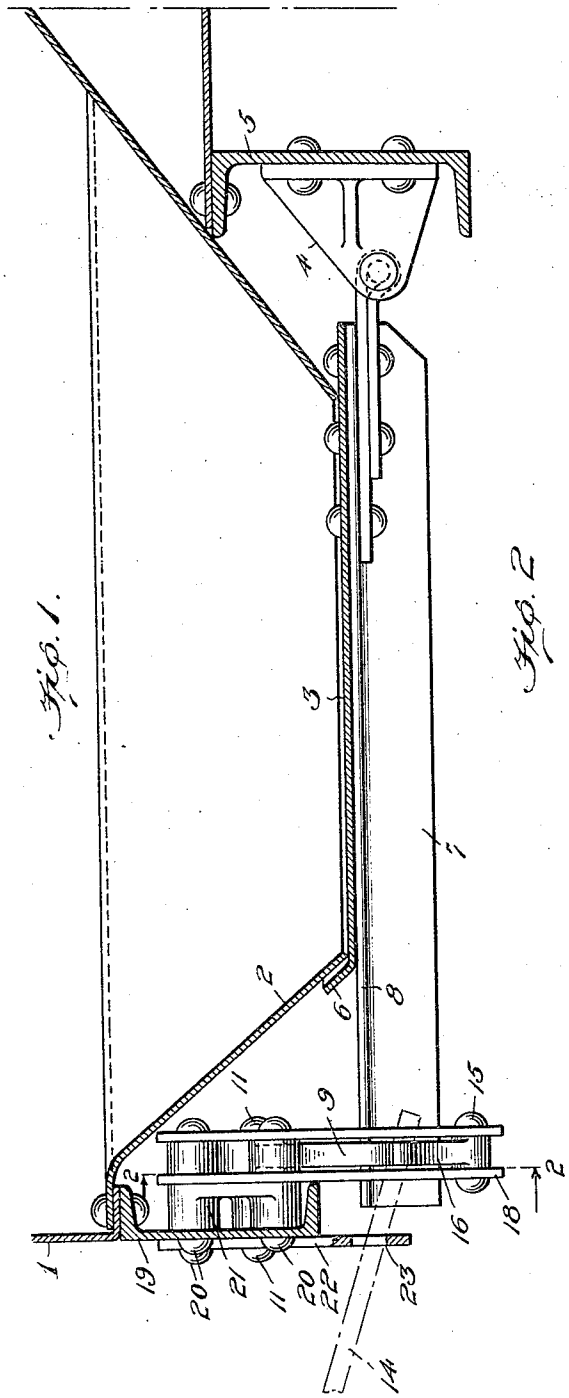


Fig. 1.

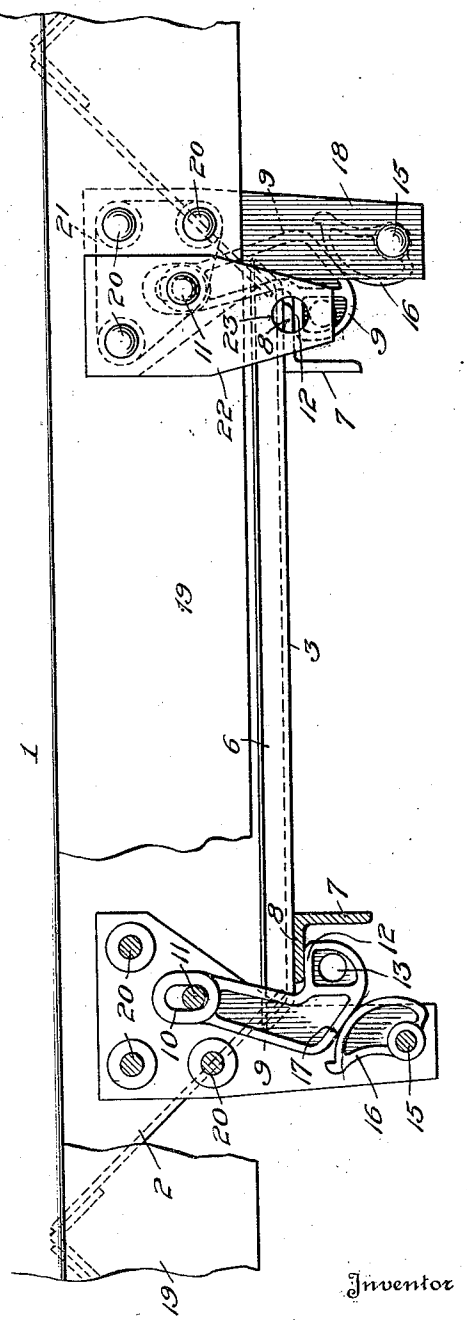


Fig. 2.

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UNITED STATES PATENT OFFICE.

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CAR-DOOR MECHANISM.

Application filed June 1, 1925. Serial No. 34,040.

My invention relates to car door mechanism for retaining in closed position a hinged door which is adapted to swing to open position under the influence of gravity to permit the lading of the car to be discharged.

The principal object of the invention is to provide simple and efficient means for temporarily supporting the door of the car in a partially closed position as well as for securely locking it in fully closed position.

A principal feature of the invention consists in associating with a door hinged to the car body, a hook for supporting said door against opening movement, said hook being slidably and swingingly mounted on the car body and being adapted to occupy a plurality of positions so as to support said door at will either in a partially closed position or in a position of complete closure, and in combining therewith a cam which is pivoted below said hook and is adapted to engage the latter so as to sustain the load imposed on said hook by the door.

A further feature of the invention consists in combining with a door hinged to the car body, a hook having a ledge for engaging the door to support the latter, said hook being slidably and swingingly mounted upon the car body and having a seat which is engagable by a removable door-prying lever adapted to force the hook to a position corresponding to closed position of said door and means forming a fulcrum for said removable lever.

Another feature of the invention resides in providing the car with side sills having inwardly directed flanges, and in securing the door supporting mechanisms thereto in such manner that the latter are spaced inwardly from the webs of the sills and extend downwardly below the same.

Other features of the invention residing in particular details of construction and advantageous combination of parts will hereinafter appear and be pointed out in the claims.

In the drawings illustrating the invention:

Figure 1 is a transverse vertical section of a portion of a railway car equipped with door mechanism embodying the invention;

Figure 2 is a view of the construction, partly in side elevation and partly in vertical section on the line 2—2, Figure 1.

The car illustrated in the drawings is of the well known type embodying hoppers having sloping walls, but it is to be understood that the invention claimed is not limited to cars of the particular type shown.

In the drawings 1 indicates the side wall of the car and 2 the hopper. The discharge opening of the hopper is adapted to be closed by a door 3 which is hinged to a suitable bracket 4 rigidly secured to the adjacent center sill 5. The door is preferably fashioned of sheet metal and may advantageously be provided with marginal flanges 6 which not only stiffen the door but also form sealing means which overlap the lower portions of the hopper sheets so as to prevent the escape of fine lading. Secured to the underside of the door and extending outwardly beyond the free edge of the latter are door arms 7 which stiffen the door structure and also afford means for cooperating with the movable hooks by which the door is supported. Each of these door arms may advantageously be in the form of a flanged member, preferably an angle iron, having one flange thereof disposed so as to constitute a seat 8 beneath which the supporting hook 9 may extend to support the door against opening movement.

Each of the swinging doors, several of which are customarily arranged on opposite sides of the car, is preferably supported by a plurality of hooks or latches 9. These hooks are mounted upon the car so as to be capable of both sliding and pivotal movements. This may be advantageously accomplished by forming each hook 9 at its upper end with a vertically elongated slot 10 for receiving a rivet 11 affording a pivotal support for the hook.

Towards its lower end the hook 9 is provided with a ledge or shoulder 12 adapted to extend under and engage the flange 8 of the neighboring door arm; and the hook is also preferably fashioned with an opening 13 adapted to receive a removable door-prying lever 14 so as to permit the latter to seat firmly against the hook in the operation of forcing the door from partially closed to fully closed position.

Pivotally mounted below the hook, preferably upon a rivet 15 is a cam 16 which is adapted to engage the lower face 17 of the adjacent hook for the purpose of maintaining the latter in a position corresponding to fully closed position of the door. When the hooks 9 are locked in their upper positions by means of their respective cooperating cams 16 the pivots of the hooks are relieved from strain incident to load upon the door and all the load is transmitted through the lower portions of the hooks and thence to the cams 16. By this

means the cast metal of the hooks and cams is placed under compression and the tension load from the door is carried by the hanger plates 18 between which the hooks and cams are positioned and through which the pivot rivets 11 and 15 pass. When the door is supported in closed position by the hooks and cams the load of the door imparts to the cams a force tending to rotate them in a locking direction. This is accomplished by so constructing each cam that the force applied thereto by the cooperating hook passes to the inside (the door side) of the pivotal point of the cam.

Where the car is provided with side sills 19 having inwardly extending flanges the plates 18 upon which the hooks 9 and cams 16 are movably mounted may advantageously be secured to said sills by means of rivets 20, a suitable filler casting 21 through which said rivets pass being interposed between each outermost plate 18 and the web of the neighboring side sill 19. The rivets 20 may also serve as a means for rigidly securing a fulcrum plate 22 to the car body, there being preferably one fulcrum plate adjacent each of the hooks 9. Each fulcrum member preferably extends downwardly below the adjacent side sill 19 and may conveniently be formed at its lower end with an opening 23 for receiving the removable door-prying lever 14. This manner of mounting the hooks 9, the hanger plates 18 and the fulcrum members 22 is not only simple and compact but it also results in affording excellent protection against accidental injury to the door supporting mechanism.

When the door is open the hooks 9 occupy their lowermost positions being then adapted to support the door in a position of partial closure. As is well understood, drop bottom doors frequently become warped and distorted because of the service to which they are subjected and therefore, while capable of being readily moved to an approximately closed position, can be moved to fully closed position only by the application of considerable force. With the mechanism embodying the present invention the door may be easily forced from a partly closed to a fully closed position by use of a removable prying lever 14 which may successively be inserted through the openings 23 of the respective fulcrum members 22 and through the openings 13 in the corresponding hooks 9 so as to apply sufficient leverage to the doors to close them completely. Since the lever engages the hook during this operation, the hook and door will be pried up together to a position where they may be locked by means of a cooperating cam. If however the prying lever is caused to operate upon the door without engaging the hook, as may be done by bringing it into engagement with the adjacent door arm 7, the hook must be lifted or forced up by other means to bring it to a position where it may be locked by the cam. In some cases it is practical to force the door and the hook upward without employing a removable lever by simply driving the cam into engagement with the hook; but where the door is warped to any substantial extent the use of the prying lever is most advantageous.

I claim:—

1. A car door mechanism including, in combination with a door hinged to the car body, a hook for supporting said door against opening movement, and a cam adapted to engage said hook for supporting the latter in an elevated position when the door is closed, said hook being slidably and swingingly mounted and being adapted to have supporting engagement with said door in a plurality of positions of the latter, and said cam being pivoted below said hook and being adapted to engage the latter so as to sustain the load imposed thereon by the door.

2. A car door mechanism including, in combination with a door hinged to the car body, a hook having a ledge for supporting said door against opening movement, said hook being slidably and swingingly mounted, and movably mounted means for transmitting the load of the door from said hook to the car body, said means when the door is in closed position being adapted to have supporting engagement with said hook at a point spaced downwardly from the door supporting ledge of said hook.

3. A car door mechanism including, in combination with a door hinged to the car body, movably mounted means for engaging said door to support the latter in partially closed and in fully closed position, and movable means for engaging said movably mounted means to maintain the latter in supporting relation to said door when the latter is in fully closed position, said movably mounted means being adapted to support the door in partially closed position independent of said movable means and being adapted when supporting the door in fully closed position to transmit to said movable means substantially the entire load imposed by said door, and said movably mounted means and said movable means being so related that when the door is supported thereby in closed position the load of the door opposes accidental movement of said movable means to door releasing position.

4. A car door mechanism including, in combination with a door hinged to the car body, a plurality of pivotally movable members constituting means for supporting said door against opening movement, said members being relatively movable and serving to transmit to the car body the load of the door, and said members being adapted when the door is in closed position to cooperate in a manner such that the force imparted by the load of

the door to one of said members passes to the inside of the pivotal point of the latter, whereby the load of the door tends to maintain said members in door supporting relation.

5. A car door mechanism including, in combination with a door hinged to the car body, a hook having a ledge for supporting said door against opening movement, said hook being slidably and swingingly mounted and being provided with a seat capable of being engaged by a removable door-prying lever adapted to force said hook to a position corresponding to closed position of the said door, and means forming a fulcrum for said removable lever.

6. A car door mechanism including, in combination with a car having a hinged door and a side sill having a web and inwardly directed flanges, means for supporting said door against opening movement, said means being secured to said sill and extending downwardly below the latter and spaced inwardly from the web thereof.

7. A car door mechanism including, in combination with a door hinged to the car body, movably mounted means for engaging said door to support the latter in partially closed and in fully closed position, and movable means for engaging said movably mounted means to maintain the latter in supporting relation to said door only when the latter is in fully closed position, said movably mounted means and said movable means being associated in a manner such that when the door is in fully closed position both of said means are under compression.

8. A car door mechanism including, in combination with a door hinged to the car body, a pivoted member carried by the car body and engageable with the door for supporting the latter in preliminary and final positions of closure, a pivotal support for said member, the latter having a shank portion and a ledge portion, the said member being formed so that the forces, incident to supporting the door in a position of preliminary closure, will be transmitted from the door and the coacting ledge portion of the member through the shank thereof to the said pivotal support, and means cooperating with the member so as to relieve the shank portion thereof from strain when supporting the door in a position of final closure.

9. A car door mechanism including, in combination with a door hinged to the car body, a pivoted hook for cooperating with the door to support the latter in partially closed position and in fully closed position, a pivotal support for said hook, means cooperating with a removable lever for simultaneously forcing the hook and door from a position corresponding to the partially closed position of the door to fully closed position thereof, and means for supporting the hook and door in fully closed position independent of the pivotal support of the hook.

In testimony whereof I affix my signature.

BYERS W. KADEL.