Jan. 27, 1931. W. E. WINE 1,790,296

CAR DOOR MECHANISM

Filed April 7, 1928

Fig. 1

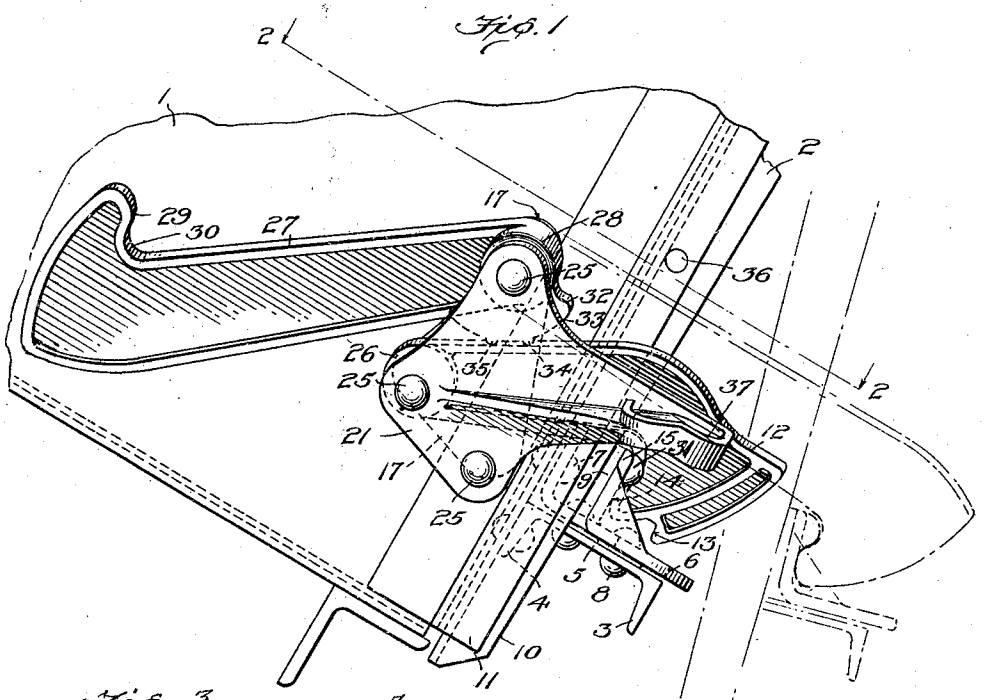


Fig. 3

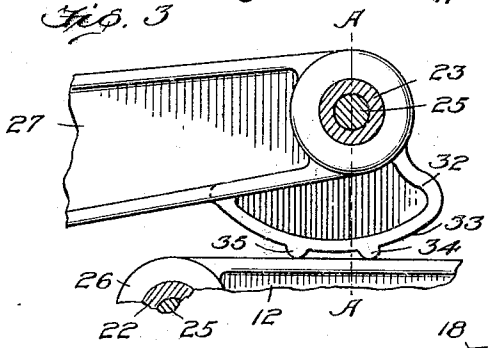


Fig. 2

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Patented Jan. 27, 1931 1,790,296

UNITED STATES PATENT OFFICE

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CAR-DOOR MECHANISM

Application filed April 7, 1928. Serial No. 268,156.

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 simple and reliable means, in addition to the usual door supporting mechanism, which serves to maintain the door in a position for dampening the discharge of lading, such as ballast and the like, from the car.

Another object of the invention is to provide improved means for locking the movable member of the door mechanism in door supporting position.

A primary feature of the invention consists in providing, in combination with mechanism for supporting the door of a railway car in closed position, means operatively interposed between the door and car body for arresting opening movement of the door upon release of the latter from the door supporting mechanism to thereby maintain the door in a position for dampening the discharge of lading from the car.

Another feature of the invention resides in providing the hinged door of a railway car with mechanism for supporting it in closed position, involving a hook pivotally mounted upon the car body and a member rigidly secured to the door, and in associating therewith means pivotally mounted adjacent said hook, the said means upon the release of the door from its supporting mechanism being engageable with the member rigidly secured to the door for arresting opening movement of the latter, so as to maintain the door in a position for dampening the discharge of lading from the car.

A further feature of the invention consists in constructing mechanism for supporting a hinged door of a railway car in closed position with a rotatable locking device, the latter being provided with portions disposed at unequal distances from its axis of rotation to simultaneously engage a portion of the door mechanism to lock the latter in door supporting position.

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

In the drawings illustrating a preferred embodiment of the invention:

Figure 1 is a fragmentary side elevational view of a hopper and its associated door showing the invention applied thereto.

Figure 2 is a fragmentary sectional view taken on line 2—2, Figure 1.

Figure 3 is a fragmentary view, parts being in section, taken on a line corresponding to line 3—3, Figure 2.

While the drawings illustrate a single hopper and the adjacent edge of the coacting door, it is to be understood that the construction is preferably duplicated on the opposite side of the car and that the door illustrated is but one of a pair of doors connected by a spreader or stiffening member so as to swing as one.

In the drawings, 1 indicates the sloping side sheet of the hopper and 2 is the swinging door for closing the discharge opening thereof. The door 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.

Mounted upon the outer face of the door adjacent the free edge thereof is a door spreader or stiffening member 3 which may conveniently be of channel-shape, one of the legs 4 of the channel being secured to the door and its web 5 projecting outwardly therefrom. Rigid with the door is an arm 6, rivets 7 and 8 being employed for respectively attaching the latter to the door and the outwardly projecting web of the stiffener. To permit the arm 6 to project outwardly beyond the side edge of the door, it may advantageously be offset as at 9 to pass around the marginal outwardly projecting flange 10 of the latter. Adjacent its discharge opening the hopper may advantageously be provided with a flanged reinforcing member 11, the latter constituting a seat for the door and affording means preventing the escape of fine lading and the like from the car. Pivotally connected to the hopper is a hook member 12, the hook being fashioned with a plurality of ledges 13 and 14 re-

spectively adapted to engage the upstanding flange 15 of the door arm to support the door in a position of partial closure and in a position of final closure. A filler casting or member 16 is preferably fashioned with a plate portion 17 and with apertured lugs or bosses 18, 19 and 20, respectively, which project inwardly into engagement with adjacent portions of the hopper.

Overlying the outer face of the hook 12 is a cover plate or bracket 21, the latter being likewise provided with inwardly projecting apertured bosses or lugs 22, 23 and 24 respectively. These bosses engage the outer face of the plate portion 17 of the filler casting 16 to space the cover plate outwardly from the hook 12. The corresponding bosses of the filler casting and cover plate receive rivets 25 which serve to rigidly connect these members to the side sheet 1 of the hopper and to each other. The inwardly projecting boss 22 affords a pivotal support for the hook 12, the pivoted end of the hook being enlarged as at 26 to prevent longitudinal movement thereof on its pivotal support.

Interposed between the cover plate 21 and the filler member 16 is a pivoted auxiliary hook or member 27, the boss 23 serving as a pivotal support therefor. Adjacent its pivoted end the hook may advantageously be fashioned with an enlarged portion 28 which projects therefrom in the opposite direction from which the enlarged end 26 projects from the main door supporting hook 12, thus enabling the two hooks to operate in spaced and preferably parallel planes. The outer end of the auxiliary hook 26 is fashioned with a ledge 29, having a depression 30 for cooperating with the lug or projection 31 formed on the upper portion of the flange 15 of the door arm, the depression and lug respectively functioning to prevent the auxiliary hook from being thrown or kicked suddenly upward by it engaging the door arm when the door is released from its supporting mechanism and permitted to swing toward open position.

A locking device or cam 32 may be employed for maintaining the hook 12 in door supporting position, the device being rotatable about the inwardly projecting boss 23 of the cover plate 21.

Instead of forming the locking device 32 as a separate member it may advantageously be integrally formed upon the pivoted end of the auxiliary hook 27. In this manner it will be perceived that upon the rotation of the auxiliary hook into an inoperative position, as illustrated in Figure 1, the cam 32 is caused to rotate into locking engagement with the door supporting hook 12. The cam is preferably fashioned with an eccentric surface 33 having a plurality of spaced protuberances or projections 34 and 35, respectively; the latter, being formed on the eccentric surface 33, are disposed at unequal distances from the axis of rotation of the cam and they are so arranged that, when in engagement with the hook 12, they are disposed on opposite sides of the line A—A (see Fig. 3) passing through the axis of the cam and normal to the cooperating face of the hook. The protuberance 34 which moves beyond the normal line A—A performs, in effect, the entire locking function of the cam 32; while the protuberance 35 merely serves as a stop, upon engaging the upper surface of the hook 12, to prevent further locking rotation of the cam. The protuberances being disposed in the manner indicated effectively prevent the cam from accidentally rotating out of engagement with the hook, since a further locking rotation of the hook 12 will be necessary before the protuberance 34 may pass from engagement therewith. When the door is supported in a finally closed position, as shown in Figure 1, the cam 32 is rotated in a counter-clockwise direction until both of the protuberances are in engagement with the upper surface of the hook, there being sufficient inherent resiliency and flexibility in the parts to insure that the hook 12 will move upwardly into engagement with the protuberance 34 after the latter passes, in its locking movement, beyond the normal line A—A.

The auxiliary hook 27 is primarily employed for arresting opening movement of the door after the latter has been released from its door supporting mechanism, so as to maintain the door in a position for dampening the discharge of lading, such as ballast and the like.

When it is desired to support the door in a position such that the discharge lading may be dampened or checked, the auxiliary hook 27 is rotated in a clockwise direction from the position indicated in Figure 1 into engagement with the upper marginal edge of the flange 15 of the door arm. The cam being rigid with the auxiliary hook, rotation of the latter causes an unlocking rotation of the cam, thus enabling the hook 12 to be disengaged from the arm 6 permitting the door to swing open. Since the ledge of the auxiliary hook is disposed in the path of movement of the door arm, it will arrest opening movement of the door and thereby maintain the door in a position for dampening the lading as it flows from the discharge opening of the hopper. Should it be desired to permit the door to swing entirely open from a fully closed position, the auxiliary hook 27 is rotated as before described until it engages with a removable pin, bar, stick or the like, (not shown) which is adapted to be inserted in the opening 36 formed in the reinforcing hopper flange 11. The parts are so proportioned that when the auxiliary hook is supported in this elevated position, the

cam assumes a position enabling an unlocking movement of the hook and a subsequent swinging movement of the door into a fully open position. To close the door, the latter is swung into a position permitting the ledge 13 of the hook to engage the flange 15 of the door arm to thereby maintain the door in a partial position of closure. As is usual in door supporting mechanisms of this character, the cover plate 21 is provided with an apertured extension 37 constituting a fulcrum for a removable bar, not shown, the latter, by cooperating with a portion of the door arm, may be operated to force the door to a position enabling the ledge 14 of the hook to engage flange 15 of the door arm and thus support the door in a position of final closure.

I claim:—

1. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to a fully open position under the influence of gravity, of mechanism for supporting the door in closed position involving a pivotally mounted member and a rigidly mounted member, one of said members being carried by the car body and the other by the door, and means adapted to engage the member carried by the door for supporting the door in a partially open position for dampening the discharge of lading from the car, said means being mounted upon the car body and being movable into and out of engagement with said last-named member.

2. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to open position under the influence of gravity, of mechanism for supporting the door in closed position involving a movably mounted member and a rigidly mounted member, one of said members being carried by the car body and the other by the door, and a hook pivotally mounted on the car body, said hook, upon disengagement of the movably mounted member with the rigidly mounted member, being engageable with the member carried by the door for arresting opening movement of the door to thereby maintain it in a position for dampening the discharge of lading from the car.

3. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to a fully open position under the influence of gravity, of mechanism for supporting the door in closed position involving a hook pivotally mounted upon the car body and a member rigidly secured to the door, and means mounted upon the car body adjacent said hook and engageable with said member for arresting opening movement of the door upon release of the latter from said hook so as to maintain the door in a partially open position for dampening the discharge of lading from the car, said means being operable independently of said hook.

4. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to open position under the influence of gravity, of mechanism for supporting the door in closed position involving a hook pivotally mounted upon the car body and a member rigidly secured to the door, and an auxiliary hook pivotally mounted on the car body, the pivotal axis of the latter being spaced from that of the door supporting hook, said auxiliary hook, upon the release of the door from its supporting mechanism, being engageable with the member carried by the door for arresting opening movement of the latter so as to maintain the door in a position for dampening the discharge of lading from the car.

5. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to open position under the influence of gravity, of an arm rigidly secured to the door and a plurality of independently movable hooks, one of said hooks being engageable with the door arm to support the door in a position of partial closure and in a position of final closure, and the other of said hooks, upon the release of said first mentioned hook, being engageable with the said arm for arresting opening movement of the door to thereby maintain the latter in a position for dampening discharge of lading from the car.

6. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to open position under the influence of gravity, of mechanism for supporting the door in partially closed and in fully closed position, involving a hook pivotally mounted upon the car body and an arm rigidly secured to the door, and an auxiliary hook pivotally mounted upon the car body, said auxiliary hook being adapted to swing in a plane parallel with said door supporting hook and being engageable with the door arm for arresting opening movement of the door so as to maintain the latter in a position for dampening the discharge of lading from the car.

7. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to open position under the influence of gravity, of a member secured to the door, a plurality of hooks pivotally mounted on the car body, one of said hooks being engageable with said member to support the door in closed position and the other of said hooks, upon the release of said first mentioned hook, being engageable with the said member to arrest opening movement of the door so as to maintain the latter in a position for dampening the

discharge of lading from the car, and means operatively interposed between the hooks for locking one of them in door supporting position when the other assumes an inoperative position.

8. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to open position under the influence of gravity, of mechanism for supporting the door in closed position involving a hook pivotally mounted upon the car body and an arm rigidly secured to the door, an auxiliary hook pivoted upon the car body, said hook, upon the release of the door from its supporting mechanism, being engageable with the door arm for arresting opening movement of the door so as to maintain the latter in a position for dampening the discharge of lading from the car, and pivoted cam means for locking said first-named hook in door supporting position, the pivotal axis of said cam being substantially coincident with the pivotal axis of the auxiliary hook.

9. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to open position under the influence of gravity, of mechanism for supporting the door in closed position involving a movably mounted member and a rigidly mounted member, one of said members being carried by the car body and the other by the door, and means engageable with one of said members upon the release of the door from its supporting mechanism for arresting opening movement of the door to thereby maintain the latter in a position for dampening the discharge of lading from the car, said means having a portion engageable with the movably mounted member for locking the latter in door supporting position.

10. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to open position under the influence of gravity, of mechanism for supporting the door in closed position involving a movably mounted member and a rigidly mounted member, one of said members being carried by the car body and the other by the door, and a hook pivotally mounted upon the car body, said hook, upon the release of the door from its supporting mechanism, being engageable with the door arm for arresting opening movement of the door so as to maintain the latter in a position for dampening the discharge of lading from the car, said hook having a portion engageable with the said movably mounted means for maintaining the latter in door supporting position when said hook assumes an inoperative position.

11. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to open position under the influence of gravity, of mechanism for supporting the door in closed position involving a hook pivotally mounted upon the car body and an arm rigidly secured to the door, and an auxiliary hook pivoted upon the car body, said auxiliary hook, upon the release of the door from its supporting mechanism, being engageable with the member carried by the door for arresting opening movement of the latter so as to maintain the door in a position for dampening the discharge of lading from the car, said auxiliary hook being fashioned with an eccentric surface for cooperation with the other of said hooks for maintaining the latter in door supporting position. spaced portions of said eccentric surface being simultaneously engageable with the last-named hook.

12. In a railway car having a lading discharge opening, the combination with a hinged door adapted to swing to open position under the influence of gravity, of mechanism for supporting the door in closed position involving a hook pivotally mounted upon the car body and an arm rigidly secured to the door, an auxiliary hook pivotally mounted on the car body, the auxiliary hook, upon the release of the door from its supporting mechanism, being engageable with the door arm for arresting opening movement of the door so as to maintain the latter in a position for dampening the discharge of lading from the car, and rotatable means operatively interposed between the auxiliary hook and the other of said hooks for locking the latter in door supporting position, said means being provided with portions disposed at unequal distances from its axis of rotation for simultaneously cooperating with said last-named hook.

13. A locking cam for railway car door supporting mechanism of the type involving a movable member and a fixed member, one of which is carried by the door and the other by the car body, said cam being provided with an eccentric surface having spaced portions adapted to simultaneously engage the movable member of the car door mechanism to lock the latter in door supporting position.

14. A rotatable locking device for railway car door supporting mechanism of the type involving a movable member, said locking device having portions disposed at unequal distances from its axis of rotation adapted to simultaneously engage the movable member to lock the latter in door supporting position.

15. A rotatable locking device for railway car door supporting mechanism of the type involving a movable member, said locking device being provided with portions adapted to simultaneously engage the movable member to lock the latter in door supporting position, said portion being respectively adapted to be disposed on opposite sides of the line

passing through the axis of rotation of the locking device and normal to the cooperating face of the movable member.

16. A rotatable locking device for railway car door supporting mechanism of the type involving a movable member, said locking device having portions disposed at unequal distances from its axis of rotation adapted to simultaneously engage the movable member to lock the latter in door supporting position, said portions being arranged so that an unlocking rotation of said locking device will tend to induce a further locking movement of said movable member.

17. A rotatable locking device for railway car door supporting mechanism of the type involving a pivoted member, said locking device being provided with an eccentric surface having a plurality of protuberances adapted to simultaneously engage said pivoted member to lock the latter in door supporting position.

18. A rotatable locking device for railway car door supporting mechanism of the type involving a pivoted member, said locking device being provided with an eccentric surface having a plurality of protuberances adapted to simultaneously engage said pivoted member to lock the latter in door supporting position, the portions of the protuberances adapted to engage the movable member being disposed at unequal distances from the axis of rotation of the locking device.

19. In a railway car having a lading discharge opening, the combination with a hinged door adapted to move to open position under the influence of gravity, of mechanism for supporting the door in closed position involving a movably mounted member and a rigidly mounted member, one of said members being carried by the car body and the other by the door, and a rotatable locking device mounted adjacent the movable member, said locking device having portions disposed at unequal distances from its axis of rotation to simultaneously engage said movable member to lock the latter in door supporting position.

20. In a railway car having a lading discharge opening, the combination with a hinged door adapted to move to open position under the influence of gravity, of mechanism for supporting the door in closed position involving a movably mounted member and a rigidly mounted member, and a rotatable locking device mounted adjacent the said movable member, said locking device being provided with an eccentric surface having portions for simultaneously engaging spaced points of the movable member to lock the latter in door supporting position.

In testimony whereof I affix my signature.

WILLIAM E. WINE.