June 9, 1936. C. HANKINS 2,043,616

RAILWAY CAR

Filed Dec. 23, 1933 3 Sheets-Sheet 1

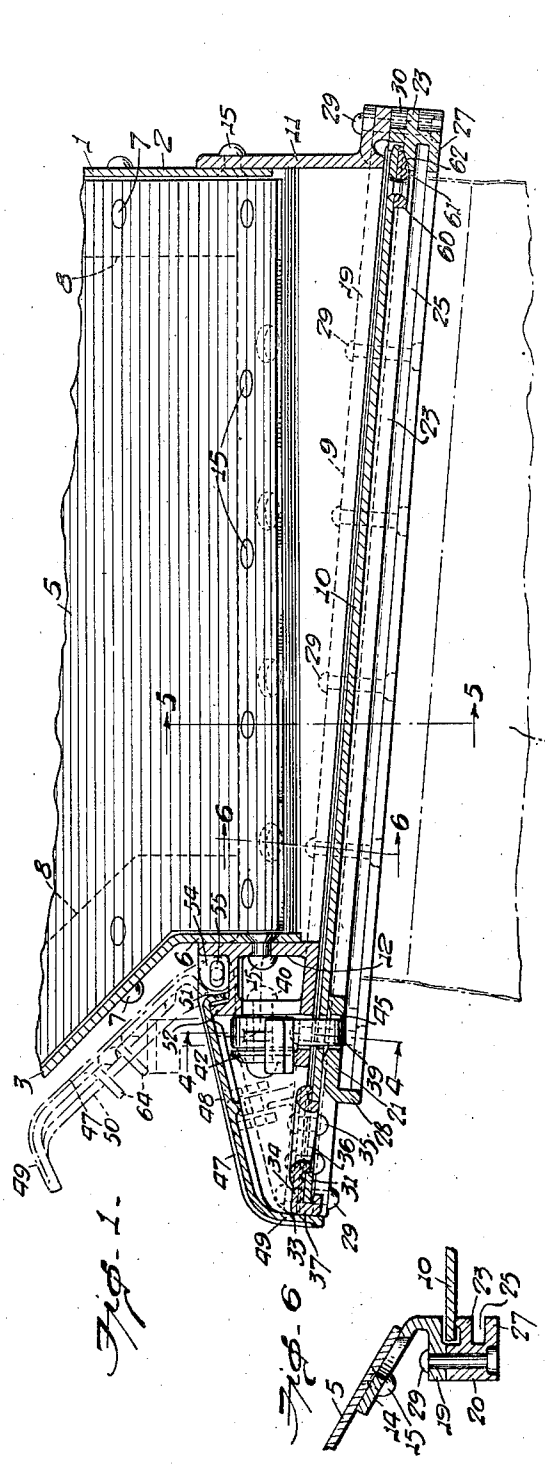

Fig. 1.

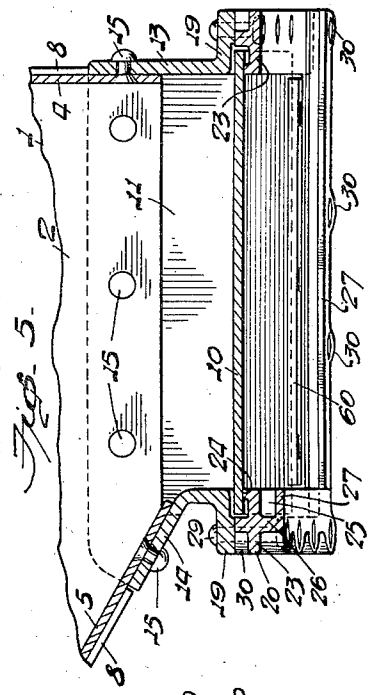

Fig. 5.

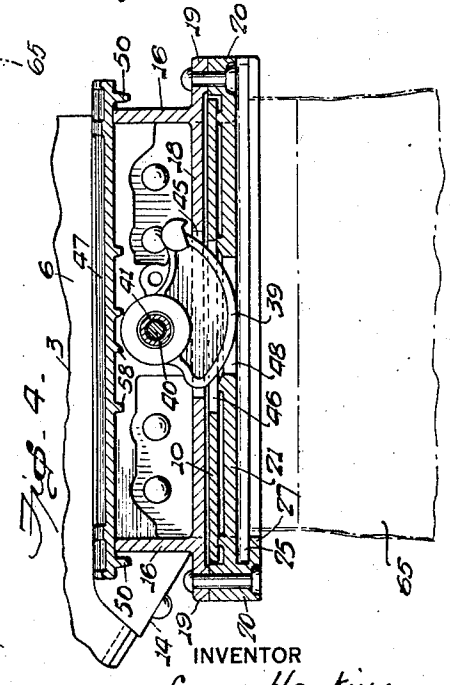

Fig. 4.

Fig. 6

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Fig. 2.

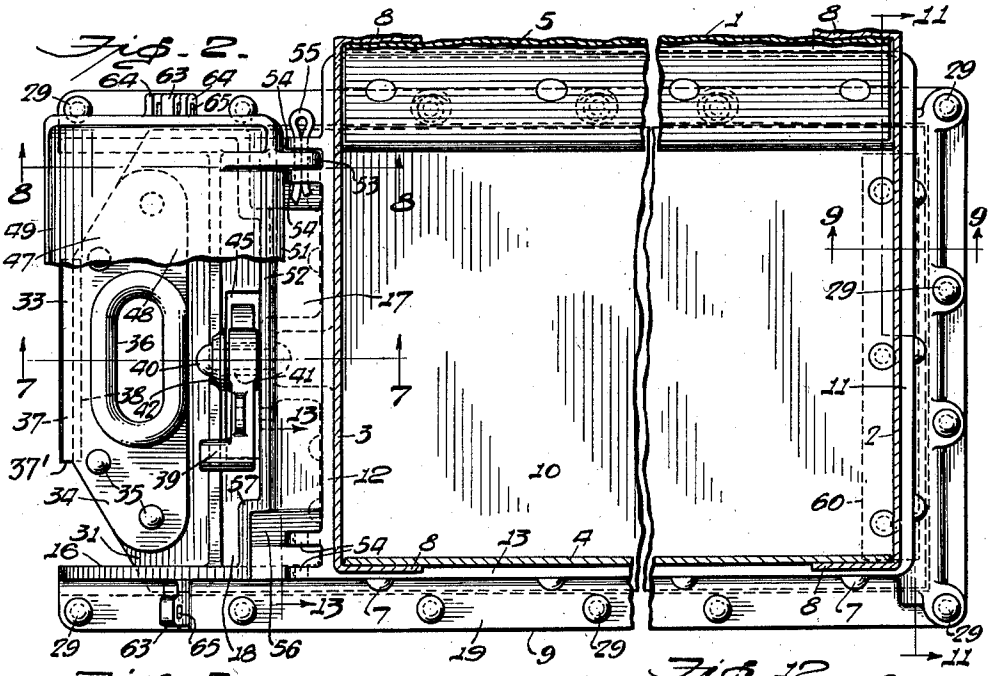

Fig. 3.

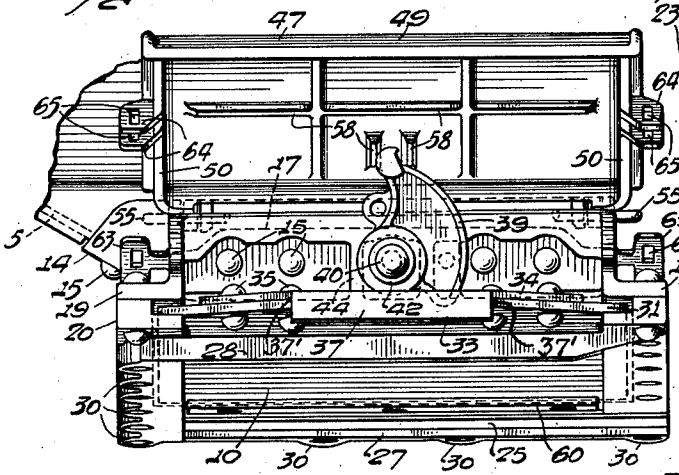

Fig. 13.

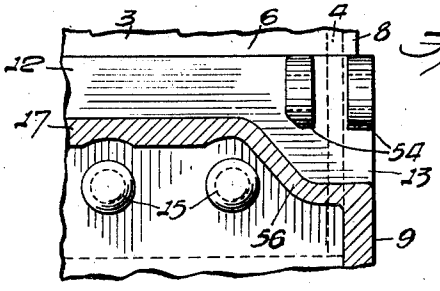

Fig. 12.

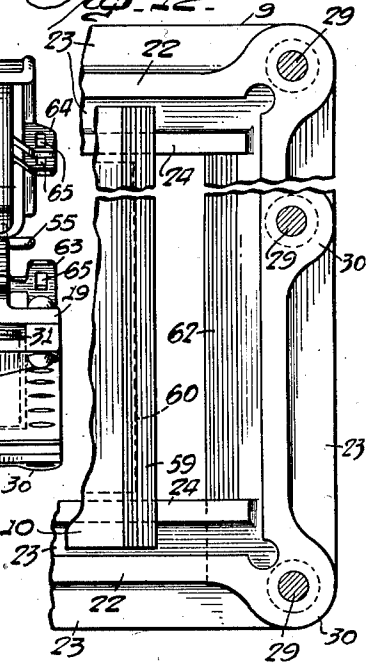

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Fig. 7.

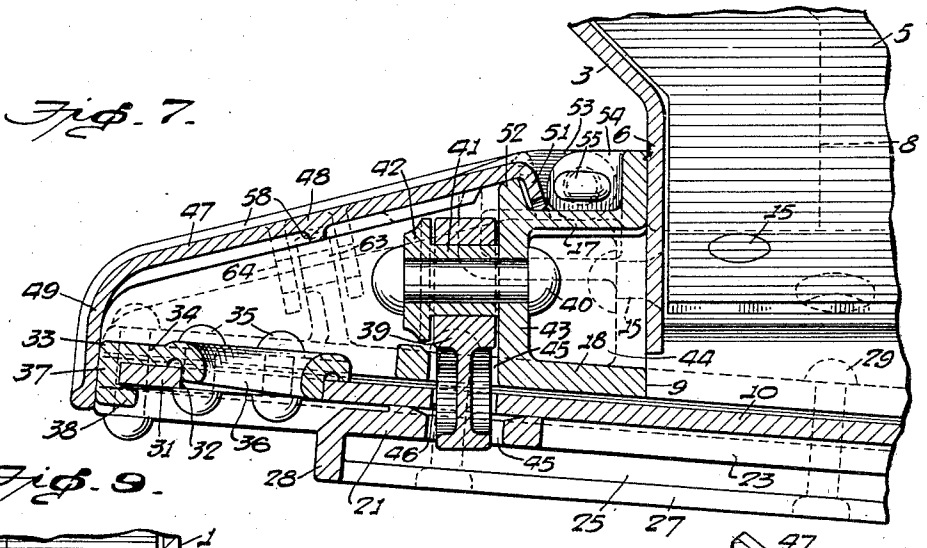


Fig. 9.

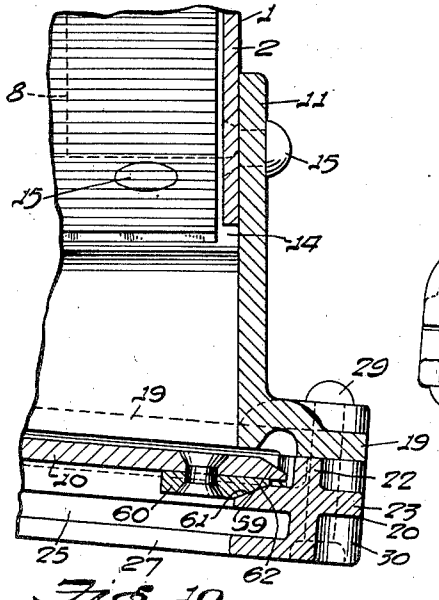


Fig. 8.

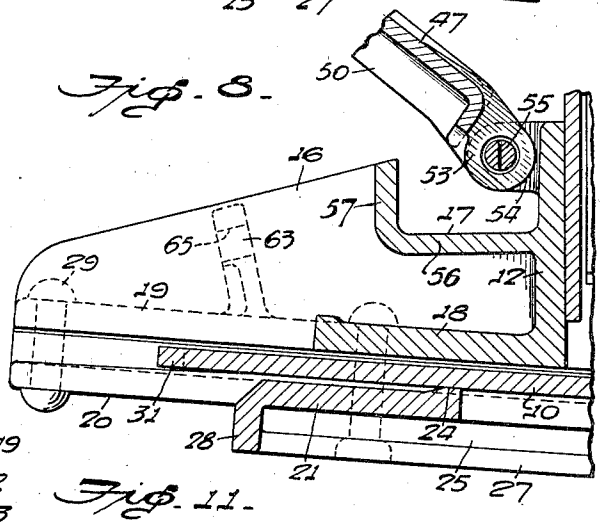


Fig. 11.

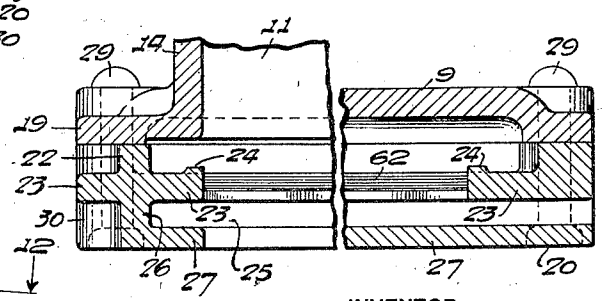
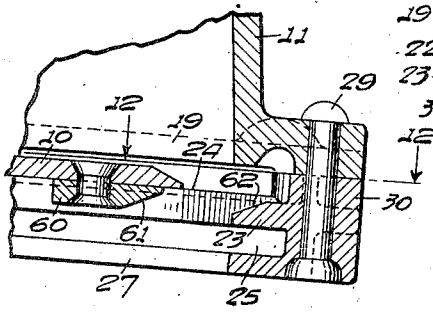


Fig. 10.



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Patented June 9, 1936 2,043,616

UNITED STATES PATENT OFFICE

2,043,616

RAILWAY CAR

Cyrus Hankins, Washington, D. C.

Application December 23, 1933, Serial No. 703,811

20 Claims. (Cl. 105—282)

My invention relates to railway freight cars for transporting in bulk finely divided lading, such as cement and the like, and it more particularly relates to improvements in the door mechanism for such cars of the type described in my copending application Serial Number 702,075, filed December 12, 1933.

A primary object of the invention is to render the lading discharge openings of cars of the character described, substantially watertight.

One of the principal features of the invention consists in providing improved means for pivotally associating a hood or the like which is adapted to house a portion of the door for closing the lading discharge opening with a frame which is secured to the hopper and which is adapted to receive the door.

Another feature of the invention consists in providing the door frame with improved means for supporting the door.

A further feature of the invention consists in providing improved means for reinforcing that portion of the door to which force is applied for operating it.

Other and more specific features of the invention residing in advantageous forms, combinations and relations of parts will hereinafter appear and be pointed out in the claims.

In the drawings, Figure 1 is a vertical transverse sectional view through a hopper of a railway car embodying the invention.

Figure 2 is a horizontal sectional view through the hopper, a portion of the hood for housing the door locking mechanism and the outer end of the door being broken away.

Figure 3 is a fragmentary side elevational view of the hopper, the hood being shown as being supported in an elevated position by the door locking member.

Figure 4 is a sectional view taken on line 4—4, Figure 1.

Figure 5 is a sectional view taken on line 5—5, Figure 1.

Figure 6 is a detailed sectional view taken on line 6—6, Figure 1.

Figure 7 is an enlarged sectional view taken on line 7—7, Figure 2.

Figure 8 is an enlarged sectional view taken on line 8—8, Figure 2, the hood being shown in an elevated position.

Figure 9 is an enlarged sectional view taken on line 9—9, Figure 2.

Figure 10 is a sectional view similar to Figure 9, the door being shown in a partly opened position.

Figure 11 is a transverse sectional view of the door frame taken on a line corresponding to line 7—7, Figure 2.

Figure 12 is a fragmentary plan view of the inner portion of the door and frame, the view being taken on the line corresponding to line 12—12, Figure 10.

Figure 13 is an enlarged sectional view taken on line 13—13, Figure 2.

Referring more particularly to the drawings, 1 indicates a hopper of a railway car of any suitable construction, the hopper shown for purposes of illustration comprising inner and outer side sheets 2 and 3 respectively, an end sheet 4, and an inclined floor sheet 5. The inner side sheet and the end sheet are substantially vertically disposed while the outer side sheet inclines downwardly and inwardly and terminates in a vertically arranged flange 6. The hopper sheets may be secured together in any convenient manner, such as for instance, by rivets 7 which pass through inturned flanges 8 with which the inner and outer side sheets are respectively provided and adjacent portions of the end and floor sheets which are overlapped by the flanges.

Secured to the lower or discharge end of the hopper is a frame 9 which receives a sliding door 10 for closing the lading discharge opening of the hopper. Although the sliding door is disposed in a substantially horizontal plane, it is inclined slightly with respect to the horizontal so that it will tend to remain in closed position. The door frame is provided with an opening conforming to the discharge end of the hopper and it is also provided with a plurality of walls 11, 12, 13, and 14 which are respectively secured by rivets 15 to the hopper sheets 2, 3, 4, and 5. The walls 11, 12, and 13 of the frame are vertically disposed while the wall 14 which is secured to the floor sheet 5, is inclined upwardly so as to conform to the inclination of that sheet.

The frame is provided with a lateral projection which extends outwardly beyond the outer side sheet 3 of the hopper in which the outer end portion of the door, hereinafter referred to as the door extension, is disposed when the door is in closed position. This lateral projection has substantially vertical side walls 16 which, in effect, respectively constitute continuations of the walls 13 and 14 of the frame. Adjacent their inner ends, the walls 16 are integrally connected by vertically spaced plate like portions 17 and 18 respectively. The upper plate like portion 17 which projects forwardly from adjacent the upper portion of the wall 12 of the door frame and

the lower plate like portion 18 which overlaps the upper face of the door are preferably formed integrally with the wall 12.

Extending continuously around the lower portion of the frame, from the outer end of one of the vertical side walls 16 of the frame extension to the outer end of the other of the side walls is a laterally projecting flange 19 which, in addition to rigidifying the frame, serves as convenient means to which a member 20 for supporting the sliding door 10 may be secured. This member, like other parts of the door frame, is preferably formed as a unitary casting and it is generally of U shape, the arms of the U, however, being connected at a point inwardly of their free ends by a transversely extending plate like portion 21. The door supporting member is preferably formed with an upstanding rib 22 which engages the underside of the laterally projecting flange 19 intermediate its edges and with a plate portion 23 which is spaced below the flange 19 and projects on opposite sides of the rib 22. It will thus be observed that the door frame is provided with a door receiving groove which is formed by a portion of the flange 19, the rib 22 and the inwardly extending part of the plate portion 23. If desired, the inner edges of the plate portion 23 which cooperate with the side edges of the door may be formed with an upwardly extending bead or rib 24 on which the door slides. In order that suitable means such as a boot indicated by dot and dash lines in Figure 1 by the numeral 65, may be removably attached to the door frame for receiving lading as it discharges from the hopper, the door supporting member 20 may be integrally formed along one of its sides and along its inner edge with a groove 25. This groove is formed by a wall 26 which is preferably disposed in the plane of the rib 22 and which terminates in an inwardly projecting flange 27 spaced below the plate portion 23. The outer end of the groove 25 is preferably closed by a flange 28 which depends from the outer edge of the plate portion 21 of the door supporting member and extends from substantially one side of the member to the other.

By providing the door supporting member with a relatively narrow surface, such as the upper end of the rib 22, for engaging the underside of the flange 19, it will be appreciated that considerably less difficulty will be encountered in properly forming these abutting surfaces so as to insure intimate engagement between the flange and the door supporting member than if the latter were provided with a relatively broad upper surface. However, in order to provide the door supporting member with metal of sufficient area to permit it to be apertured to receive rivets 29, for attaching it to the flange 19, portions of the rib 22 are enlarged as at 30 to provide bosses. On the sides of the door supporting member which are provided with the groove 25, the bosses 30 are formed above and below the outwardly projecting part of the plate portion 23 while on the remaining side of the member, the bosses are only formed above the plate portion.

The door 10 is provided with an extension 31 which when the door is in closed position, is disposed within the lateral projection of the door frame. The portion of the extension which is normally disposed beyond the outer edge of the lower plate portion 18 of the door frame is formed with an aperture 32 for receiving a suitable operating tool or the hand of an operator so that the door may be easily moved. To rigidify this portion of the door, it may advantageously be provided with a reinforcing member 33 having a plate portion 34 overlapping the upper surface of the door and secured thereto by rivets 35. The reinforcing member is formed with an opening which registers with the aperture 32 in the door, and surrounding the opening is a marginal flange 36 which depends into the aperture and preferably engages portions of the door bounding the latter. This flange protects the portions of the door bounding the aperture from blows which may be transmitted to it in the event the door becomes difficult to move. Moreover, the outer edge of the door is protected from such blows, by forming the reinforcing member with a depending portion 37 overlaps the outer edge of the door and which terminates in an inwardly extending flange 38 overlapping the underside of the door. The ends of the portion 37 form shoulders or abutments 37' which afford convenient means to which blows may be imparted from a hammer or the like tending to shift the door sidewise for the purpose of loosening the door prior to being moved to open position. In order that the reinforcing member may be readily applied to the door, the portion of the marginal flange 36 nearest the outer edge of the door is of less depth than other portions of the flange, as is clearly shown in Figure 7, and the upper surface of the inturned flange 38 is spaced a sufficient distance below the underside of the door so that the reinforcing member may be removed and applied to the door by rotating it about a point adjacent the point of intersection of the portion 37 and the flange 38.

To lock the door in closed position, and thereby prevent it from accidentally opening while the car is in transit, a suitable locking member 39, such as a cam, may be employed. The locking member is preferably pivotally mounted and the pivotal axis thereof may be advantageously arranged so that the member will swing in a path transversely of the direction of movement of the door. The pivotal mounting or support for the locking member comprises a rivet 40 and a bushing or sleeve 41 which encircles the rivet and extends into an opening formed in the locking member. The outer end of the bushing 41 is formed with an annular flange 42 which provides a seat for the head on the outer end of the rivet. The inner end of the rivet extends through a wall 43 which is formed integrally with the upper and lower plate portions 17 and 18 respectively of the door frame and which forms the forward wall of an inwardly opening recess with which the wall 12 of the frame is provided. This recess has side walls 44 formed integrally with and projecting forwardly from the wall 12 and the forward wall 43 of the recess integrally connects the side walls 44 adjacent their outer edges.

The lower plate portion 18 and the plate portion 21 are formed with aligned openings 45 for receiving the locking member 39 and, for the same purpose, the door is formed with an opening 46 which, when the door is in closed position, is adapted to register with the openings 45. Thus when the door is in closed position the locking member 39 may readily pass into the openings 45 and 46 and thereby assume a position preventing opening movement of the door.

To protect the door and the door locking mechanism from rain, snow or the like and thereby prevent moisture and foreign matter from entering the hopper and damaging the lading therein, a hood 47 is associated with the hopper for hous-

ing the locking mechanism and the outer end of the door. This hood is preferably formed as a unitary casting and is provided with a top wall 48 which inclines downwardly and outwardly when the hood is in closed position. It is also provided with an end wall 49 which is adapted to project downwardly beyond the outer edge of the door and with side walls 50 which extend downwardly from the top wall 48 to overlap the outer sides of the side walls 16 of the door frame. The inner edge of the hood is formed with a depending flange 51 which is adapted to overlap the inner face of a rib 52 which projects upwardly from the front edge of the upper plate portion 17 of the frame. It will thus be observed that the hood will effectively protect the locking mechanism and the outer end of the door from rain, snow and the like and also other foreign substances which it is desirable to exclude from the hopper.

Although any convenient means may be employed for associating the hood with the hopper, it is preferred to pivotally connect the hood directly to the door frame. The pivotal connection between these parts may be formed by integrally providing the inner end of the hood with spaced lugs 53 which are adapted to respectively cooperate with two pairs of lugs 54 which project forwardly from and are integrally formed with the wall 12 of the frame above the upper plate portion 17 thereof. The respectively cooperating lugs of the frame and hood have registering apertures for receiving any suitable hinge pins such as cotters 55. As water and foreign matter are likely to collect on the upper surface of the upper plate portion 17, it is desirable in order to prevent the hinge lugs on the door and frame from acting as a dam to retain such water and foreign matter, to provide sufficient clearance between the lugs and the upper surface of the plate portion, so that any matter which may collect on the latter may readily escape therefrom. This clearance may be provided by forming the end portions of the plate 17 with downwardly offset portions as indicated at 56 and also by increasing the width of the plate, as indicated at 57, adjacent the offset portions.

When the hood and locking member are in operative position, as shown in Figure 1, it will be perceived that it is impossible to move the locking member into an inoperative position until after the hood has been raised. It will also be perceived that even after the hood and locking member have been moved into inoperative positions, it will be necessary to maintain the hood in such position so that an operator may easily grasp the door to move it to open position. To make it unnecessary for the operator to hold the hood in an elevated position while opening or closing the door, the locking member is so designed that when it is moved into an inoperative position, as indicated in Figure 3, it will engage the underside of the hood and support the latter in its elevated inoperative position. The underside of the hood may be conveniently formed with downwardly extending ribs 58 which are spaced transversely of the hood so that the locking member may be interposed between them. In this manner accidental disengagement of the locking member and hood is prevented while the door is being operated.

Considerable difficulty is often encountered in moving the door to a fully closed position due to the fact that portions of the lading, as it is being discharged, lodge in the grooves in which the door slides. The lading which accumulates in the grooves along the sides of the door does not hinder closing movement of the door because it will be ploughed out as the door is moved toward closed position, but the lading which accumulates in the groove for receiving the inner end of the door seriously hinders proper closing of the door. To obviate this difficulty, the portion of the flange 19 forming the groove at the end of the door frame is provided with a longitudinally extending downwardly opening recess into which lading which may have accumulated in the groove may be forced by the inner end of the door. Moreover, the inner end of the door is somewhat pointed as indicated at 59 so that that portion of the door may readily enter the groove even though the lading which may have accumulated therein may have become packed and, therefore, tend to resist penetration. To further assist the door in its final closing movement and to also seal the door along its inner edge, the underside of the latter is provided with a transversely extending strip 60 having a beveled portion 61 for engaging a similarly inclined or beveled portion 62 on the door frame. These beveled portions function as a wedge and insure intimate engagement between the door and door frame to prevent the escape of any fine lading from the hopper adjacent the inner edge of the door.

As it may be desirable to prevent unauthorized tampering with the hood 47, means may be provided for receiving the usual car seals (not shown). This means may consist of upwardly extending lugs 63 formed on opposite sides of the frame which are adapted to be respectively interposed between pairs of lugs 64 formed on the hood. The cooperating lugs on each side of the hood and frame are provided with apertures 65 which are adapted to register when the hood is in closed position in order to receive a suitable seal (not shown). As long as one of the seals remains intact, it will be appreciated that access cannot be had to the door locking mechanism nor can the door be moved to open position.

I claim:

1. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper and having a lateral projection extending beyond the latter, a door slidably mounted on the frame for closing said lading discharge opening, said lateral projection involving a wall attached to the hopper and a plate portion above the door extending outwardly from said wall adjacent the upper portion thereof, said plate portion being provided adjacent its outer edge with an unstanding rib, and said door when in closed position having a portion disposed outwardly of the outer edge of the plate portion, and movable means adapted to overlap the upper face of said portion of the door, said movable means when in lapping relation with the door extending forwardly from said plate portion and having a portion overlapping the inner face of said upstanding rib.

2. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper and having a lateral projection extending beyond the latter, a door slidably mounted on the frame for closing said lading discharge opening, said lateral projection including side walls, a rear wall secured to the hopper, and a plate portion extending outwardly from said rear wall above the door and integrally connecting the inner ends of said side walls adjacent the upper portions thereof, said door when in closed

position having a portion disposed outwardly of the outer edge of said plate portion and between said side walls, and a movable member adapted to overlap the upper surface of said portion of the door, said member and plate portion respectively having angularly disposed portions adapted to be disposed in contiguous overlapping relation.

3. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper and having a lateral projection extending beyond the latter, a door slidably mounted on the frame for closing said lading discharge opening, said lateral projection including vertically spaced upper and lower plate portions and a wall connecting said plate portions adjacent their inner edges and secured to said hopper, the lower one of said plate portions being adapted to overlap the upper face of the door and the upper one of said plate portions being provided adjacent its outer edge with an upstanding rib, said door when in closed position having a portion disposed outwardly of the outer edges of each of said plate portions, and movable means adapted to cover the upper surface of said portion of the door, said movable means extending forwardly from said upper plate portion and having a portion adapted to overlap the inner face of said upstanding rib.

4. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a door slidably mounted on the frame for closing said lading discharge opening, said door when in closed position having a portion projecting laterally beyond adjacent portions of the hopper, and means for housing said projecting portion of the door including a hingedly mounted member adapted to overlap the upper surface thereof, said frame and member being respectively integrally formed with lugs for receiving means to hingedly connect the member to the frame.

5. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper and having a lateral projection extending beyond the latter, a door slidably mounted on the frame for closing said lading discharge opening, said lateral projection including a wall attached to the hopper and a plate portion above the door extending outwardly from said wall adjacent the upper portion thereof, said door when in closed position having a portion disposed outwardly of the outer edge of said plate portion, a pivoted member adapted to extend forwardly from said plate portion for housing said portion of the door, and means rigid with said wall of the lateral projection and spaced above the plate portion thereof for receiving means affording a pivotal support for said member.

6. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper and having a lateral projection extending beyond the latter, a door slidably mounted on the frame for closing said lading discharge opening, said lateral projection including a wall attached to the hopper, a plate portion above the door extending forwardly from the wall adjacent the upper portion thereof, said door when in closed position having a portion projecting outwardly beyond the outer edge of said plate portion, a pivoted member for housing said portion of the door, and means rigid with said wall and projecting forwardly therefrom in spaced relation to the upper surface of said plate portion to receive means affording a pivotal support for said member, said plate-like portion being offset downwardly adjacent said means.

7. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a door slidably mounted on the frame for closing the lading discharge opening, said frame having vertically spaced portions defining a groove for receiving the inner end of the door when the door is in closed position, the upper one of said spaced portions being provided with a longitudinally extending recess communicating with said groove.

8. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a door slidably mounted on the frame for closing said lading discharge opening, said frame being provided with a laterally extending flange along its inner end, and means rigid with said flange defining with the latter a groove for receiving the inner end of the door, the underside of said flange being provided with a longitudinally extending recess communicating with said groove.

9. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a door slidably mounted on the frame for closing said lading discharge opening, said door having a portion adapted to extend beyond an adjacent portion of the hopper when the door is in closed position, said portion of the door being provided with an aperture for receiving door operating means, and a member reinforcing said portion of the door having a plate portion overlapping the upper face thereof and provided with an opening registering with said aperture, said member having depending portions projecting into said aperture.

10. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a door slidably mounted on the frame for closing said lading discharge opening, said door having a portion adapted to extend beyond an adjacent portion of the hopper when the door is in closed position, said portion of the door being provided with an aperture for receiving door operating means, and a member overlapping the upper face of said portion of the door and being provided with an opening registering with said aperture, said member having a depending flange surrounding said opening, said flange extending into the aperture of said door and engaging portions of the door bounding said aperture.

11. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a door slidably mounted on the frame for closing said lading discharge opening, said door having a portion adapted to extend beyond an adjacent portion of the hopper when the door is in closed position, said portion of the door being provided with an aperture for receiving door operating means, and a member reinforcing said portion of the door and provided with an opening registering with said aperture, said member having a depending portion overlapping the outer edge of the door.

12. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a door slidably mounted on the frame for closing said lading discharge opening, said door having a portion adapted to extend beyond an adjacent portion of the hopper when the door is in closed position, said portion of the door being provided with an aperture for receiving door operating means, and a mem-

ber reinforcing said portion of the door having a plate-like portion overlapping the upper face thereof and provided with an opening registering with said aperture, said member being provided with a portion extending downwardly from the plate portion thereof at a point outwardly of the outer edge of the door, said downwardly extending portion terminating in an inwardly extending flange underlying said door.

13. A railway car having a hopper provided with a lading discharge opening, a sliding door for closing said opening, means for locking the door in closed position, said door when in closed position having a portion projecting outwardly beyond adjacent portions of the hopper, and a pivoted hood adapted to cover the projecting end of the door when the door is in closed position, the underside of said hood having depending portions, said locking means when in inoperative position being adapted to engage said hood intermediate said depending portions to support the hood in an elevated position.

14. A railway car having a hopper provided with a lading discharge opening, a sliding door for closing said opening, means for locking the door in closed position, said door when in closed position having a portion projecting outwardly beyond adjacent portions of the hopper, and a pivoted hood adapted to cover the projecting end of the door when the door is in closed position, said hood being integrally provided on its underside with depending portions spaced transversely of the hood, said locking means when in inoperative position being adapted to engage said hood intermediate said spaced portions to support the hood in an elevated position.

15. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a sliding door for closing said discharge opening, and means rigid with the frame and extending beneath the door for supporting the latter, said means being integrally provided with an inwardly opening grooved portion for supporting means adapted to receive lading as it discharges from the hopper.

16. A railway car having a hopper provided with a lading discharge opening, a door frame of substantially rectangular shape rigid with the hopper, and a sliding door for closing said opening, the lower portion of said frame being provided with integrally connected vertically spaced plate-like portions, the upper one of said plate-like portions affording a support for the sliding door and the lower one of said plate-like portions extending inwardly from adjacent at least two sides of the frame for supportingly cooperating with means adapted to receive lading as it discharges from the hopper.

17. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a sliding door for closing said opening, said frame including an upper part having a laterally projecting flange adjacent its lower end and a lower part comprising a unitary casting secured to said flange, said lower part having a portion forming with said flange a groove for receiving the door and also having below said portion an inwardly opening groove for supportingly cooperating with the means adapted to receive lading as it discharges from the hopper.

18. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a door slidably mounted on the frame for closing the lading discharge opening, said door when in closed position having a portion projecting laterally beyond adjacent portions of the hopper, means for locking the door in closed position, and a movable member for housing said locking means and said projecting portion of the door when the door is in closed position, said member and door frame respectively having portions provided with registrable apertures for receiving a seal adapted to prevent unauthorized movement of said member.

19. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a door slidably mounted on the frame for closing the lading discharge opening, said door when in closed position having a portion projecting laterally beyond adjacent portions of the hopper, and a movable member for housing said portion of the door when the door is in closed position, said movable member having a portion adapted to be disposed in the path of movement of the door for preventing movement of the door toward open position while said member is in housing position, said member and door frame respectively having portions provided with means for receiving a seal adapted to prevent unauthorized movement of said member.

20. A railway car having a hopper provided with a lading discharge opening, a door frame rigid with the hopper, a door slidably mounted on the frame for closing said discharge opening, one end of said door being adapted to project laterally from an adjacent part of the hopper when the door is in closed position and having an aperture for receiving means for operating the door, and a member for reinforcing said end of the door having an opening registering with said aperture, said member having a portion affording an abutment cooperable with the means for subjecting the door to a blow tending to shift the latter sideways.

CYRUS HANKINS.