My invention relates to improvements in door locking mechanisms for railway cars. An object of my invention is to provide an improved and simplified form of door latching mechanism for hopper cars.

Another object of my invention is to provide a pivoted mounted shouldered locking member for retaining a discharge door in closed position, said member being centrally disposed with respect to the door, and to provide bracing means for supporting the overhanging portion of the doors in relation to the supporting member.

A more specific object of my invention is to provide a pivoted locked member on the car structure which will extend through an opening in the door to lock the door closed.

My invention also resides in certain details and improvements of parts in connection with the type of mechanism above mentioned.

My invention also relates to the novel combination of a locking hook with a door frame. For further comprehension of my invention reference may be had to the accompanying drawings wherein:

Fig. 1 is a vertical transverse sectional view taken through the lower portion of a hopper car and showing slightly more than half thereof;

Fig. 2 is a vertical longitudinal sectional view taken through the lower portion of the hopper car as on a line 2—2 of Fig. 1;

Fig. 3 is a fragmentary detail view of the latch mechanism proper as viewed on a line 3—3 of Fig. 2;

Fig. 4 is a sectional view through the door of the latch mechanism as viewed on a line 4—4 of Fig. 2.

In said drawings my improvements are shown as applied to a so-called W-type hopper car of the type having transversely aligned hoppers with the doors mounted adjacent the upper edge and adapted to swing in a substantially vertical plane. In cars of the identified type it is customary to provide a pair of transversely aligned hoppers disposed on the respective sides of the centersill, but inasmuch as the hoppers on the opposite sides of the centersills are of the same construction, the drawings and description herein are confined to only one of such hoppers.

In said drawings the centersill structure is shown as a built-up construction including a beam member having a vertical web section 100 and turned flanges 101 and 102 at the top and bottom respectively, also an outturned flange 103 at the lower margin. There are two beam members per sill and these are united by a top cover plate 104. The sidesill construction is identified by a vertical side wall plate 105 and a lower marginal reinforcing angle member 106. Lying between said centersill and side wall is the hopper structure proper which is defined in part by inner and outer side walls 107 and 108 respectively, in cooperation with longitudinally sloping upper and lower sloping walls 109 and 110 respectively.

The inner wall 107 is secured to the centersill by a base portion 111 and is formed adjacent its margin with an outwardly bossed portion 112. The wall 107 adjacent the upper portion of the hopper is formed with an outstanding flange 113 arranged to underlie the upper sloping floor sheeting 109. At its lower margin said inner plate or wall is formed with a flange 114 underlying the sloping bottom sheet 110.

The outer wall 108 is formed with a base portion 115 secured to the side wall of the car, and adjacent the upper portion of the hopper the base portion is formed with an inturned flange 116 adapted to underlie the upper floor sheet 109. Extending transversely of the car beneath the upper sloping floor 109 is a combined hinge butt and bracing member 117, secured to the centersill at 118 and formed adjacent the outer side wall hopper with an overlying flange 119.

Pivotally supported on the said hinge butt member is a discharge door A formed adjacent its upper margin with a curved edge portion 120 which is formed concentrically with respect to the hinge pivot 121 of the door and adapted in all positions of the door to be tangential to the sloping hopper plate 109. The door adjacent its side and bottom margins is formed with upturned flanges as indicated at 122, 123 and 124.
124 respectively, said flanges cooperating to provide a pan-shaped construction. The pan-shaped door when in closed position encloses a frame member B which is bent in the form of a U or stirrup section to provide three walls adapted to overlie and be secured to the respective inner and outer side walls 107 and 108 respectively, and to the hopper bottom wall 110. Said frame is preferably of T-shaped section with its flange 125 outstanding and centrally disposed of the said section. The margins of the said bottom hopper walls are spaced away from the main plane of the door and the frame section spans the distance intermediate said margins and the face of the door. The said framing is secured to the hopper side sheets on one side of the outstanding stem or flange by rivets 126.

The door adjacent its swinging edge is reinforced by a beam member C, said member being preferably of channel section with one flange 127 secured to the underside of the door and having its web 128 substantially normal to the plane of the door and having its outer or free flange 129 spaced at an appreciable distance from the door. The last named flange is preferably slightly curved for a purpose as will be hereinafter more fully pointed out.

Adjacent the central portion of the beam member C the body of the door is provided with an opening 229. Cooperating with the curved flange of the beam member is a hook D pivotally mounted at 130 on a bracket member E. The bracket E is provided with a hood-shaped portion defined by sloping sides 131—133 arranged in the form of an inverted V, said bracket having spaced walls 132 between which the hook D is guided and thereby restrained against excessive sidewise movement. The walls 132, at the location where the pivot 130 extends, are provided with enlarged portions or bosses 133 to provide increased bearings for the pivot.

On either side of the hood-shaped portion 131 the bracket is provided with flanges 134—135 which overlie and are secured to the hopper bottom plate and to the portion of the frame member which projects beyond the margin of the sloping bottom wall, being riveted to the said plate and frame member by rivets 135 and 136 respectively. The hood-shaped member is extended up to and in abstract relation with the face of the door. A when the latter is in closed position and is provided with an opening 137 which is adapted to substantially register with the opening 229 in the door. The said hood-shaped member is reinforced by a beading 138 which operates as a seal around the opening in the door to prevent lading from seeping between the face of the bracket and the face of the door.

Adjacent its outer edge the hook D is provided with a shank portion 140 extending adjacent the beam member C and leading to a shouldered portion 141 of slightly curved formation corresponding to the curved outer flange 129 of the beam member and adapted to cooperate with the beam flange to maintain the door in closed position. Beyond the shoulder the hook is formed with a beveled portion 142 adapted to ride on the door beam when the door is slammed to closed position whereby the hook is displaced upwardly to permit the door beam to pass beneath the hook.

On the outer side of the door and straddling the said hook is a reinforcing and bracket member F. Said member F is provided with a flange portion 143 which overlies the body of the door and extends around the opening in the door, being secured to the door by rivets 144. The member F is further provided with an angularly related flange 145 on each side of the opening secured by rivets 146 with the web 128 of the beam member C.

Around the sides and upper portion of the door opening 229 there is provided a wall section 147 which extends in the direction of the hook and straddles the latter. Above the opening there is outstanding an integral trimmer 148 in which is pivotally mounted a locking dog 149, said dog 149 being spaced a limited distance from the body of the door by a bosslike projection 150. The dog is maintained in operative relation with respect to the bracket by an overlying washer 151, the latter being maintained in place by a rivet 152. The locking dog is provided on one side with an outstanding projection 153 for convenience to the operator in moving the dog. On one side of the bracket there is formed an integral projection 154 which lies in the path of movement of the dog in order to retain the latter in an overbalanced position when the dog is moved to an inoperative position or unlocked position.

I claim:

1. In a railway car, the combination of a hopper including side walls and a bottom wall; of a discharge door pivotally mounted adjacent the upper portion of the hopper and having an opening adjacent the free edge thereof; and a shouldered locking member pivotally mounted within the hopper and having a portion extending through the opening in the door, said portion having a shoulder for cooperation with a member on the outer side of the door for maintaining the door in closed position.

2. In a railway car, the combination of a load-containing hopper and a discharge door pivotally mounted adjacent the upper portion of the hopper and having an opening adjacent its free edge; a beam on the outer side of the door adjacent the free edge thereof; and a pivoted door-retaining member mounted within the hopper and having a
portion extending through the opening in the door for engagement with the beam for the purpose of retaining the door in closed position.

3. In a railway car, the combination with a load-containing hopper; of a discharge door pivotally mounted adjacent the upper portion of the hopper and adapted to swing to abut the said hopper, said door having an opening adjacent the free edge thereof; and a locking hook pivotally mounted within the hopper and having a portion extending through the opening in the door for engagement with the door.

4. In a railway car, the combination with a hopper construction including side and bottom walls and a discharge door pivotally adjacent the upper portion of the hopper and having an opening therein; of a housing disposed centrally within said hopper, said housing including a hood-shaped portion having spaced walls; a locking hook pivotally mounted within said walls and having a shouldered portion located outwardly beyond the hopper, said hook extending through the opening in the door for cooperating engagement with the door to retain the same in closed position; and a locking member pivotally mounted on the door and adapted to assume a position in the path of movement of the hook.

5. In a railway hopper car, the combination with a hopper including a sloping hopper floor defining the lower edge of a discharge hopper; of a discharge door pivoted above said lower edge and having a face adapted to abut the edge of said sloping floor when the door is in closed position; a hood-shaped member within the hopper lying in the angle formed by said floor and door, and being secured to the hopper bottom wall, said door having an opening disposed in alignment with the said hood; and a shouldered locking member pivotally mounted between the walls of the hood-shaped member and extending through the opening in the door for supporting cooperation with means on the outer side of the door.

6. In a railway hopper car, the combination with a sloping hopper floor; of a discharge door adapted to meet in abutting relation with said floor and having an opening disposed with one edge lying adjacent to the sloping hopper floor; a bracket member disposed in the angle presented by the sloping hopper floor and the door and presenting walls spaced from each other to define two walls of an opening, said opening being adapted to substantially register with the opening in the door; a door-retaining member pivotally mounted between the said walls and extending through the opening in the door for supporting cooperation with seating means on the door, said seating means on the door including a beam member having portions extended to either side of the retaining member for bracing the unsupported portions of the door; and means on the outer side of the door for rigidifying the edge of the opening in the door.

7. In a railway car, the combination with means for supporting the swinging edge of a door, said means including a supporting member extending through an opening in the door; a beam member extending at an angle to said supporting member adjacent the opening in the door and being adapted to reinforce one edge of the opening in the door; a U-shaped reinforcing member extending around the remaining edges of the opening for reinforcing completely around the opening, said U-shaped member having a trunnion outstanding from the door; and a pivotally mounted member mounted on said trunnion for locking the supporting member in operative position.

8. In a railway hopper car, the combination of a hopper including a sloping bottom wall and a door pivoted adjacent its upper edge and adapted to swing into abutting relation with the sloping bottom wall; a bracket having a hood-shaped portion mounted upon the said bottom wall and having a portion abutting the face of the door; and a locking hook mounted within the said hood of the bracket and having a shouldered portion lying beyond the hopper and adapted to extend through the opening in the door for cooperation with a member on the door.

9. In a railway car, the combination with a hopper construction including a sloping floor and a discharge door pivotally mounted at a location remote from said sloping floor, said door having an opening above the margin of the sloping floor and being adapted when in closed position to abut the margin of said sloping floor; and a shouldered hook pivotally mounted in the plane of the hopper and having a shouldered portion for engagement with means on the outer face of the door, said means on the outer face of the door including a beam member extended to either side of the hook for supporting portions of the door remote from said hook.

10. In a railway car, the combination of a hopper including a sloping floor and a discharge door adapted to abut the said floor, the face of the door being adapted to form an angle with the sloping floor, a hollow hood-shaped member disposed in the angle presented by said door and floor; and a shouldered member pivotally mounted on the said member and having a portion extended across the plane of the door for cooperation with seating means on the side of the door.

11. In a railway car, the combination with a hopper including side walls and a bottom wall; of a discharge door pivotally mounted adjacent the upper portion of the hopper, said door having an opening adjacent
the free edge thereof; and a locking member pivotally mounted within the hopper and having a portion extending through the opening of the door, said member being provided with a shouldered portion adapted to have cooperating engagement with the door for maintaining the door in closed position.

12. In a railway car, the combination with a hopper including a bottom wall and a door pivotally adjacent its upper edge and adapted to swing into abutting relation with the hopper bottom wall; of a bracket secured to the hopper bottom wall, said bracket being of a hood shape construction presenting walls spaced from each other and having a ridge-like upper portion adapted to divert the lading in the hopper to either side of the hood; and a shouldered member pivotally mounted between the said walls and adapted to extend across the plane of the door for supporting cooperation with means on the outer side of the door for the purpose of retaining the door in closed position.

13. In a railway car, the combination with a hopper including a sloping floor and a discharge door adapted to abut the said floor, the face of the door being adapted to form an angle with the sloping floor when the door is in closed position; of a hollow hood-shaped member disposed in the angle presented by said floor and door, said hood-shaped member including an inverted V-shaped upper portion for the purpose of diverting the lading to either side of the said member; a shouldered locking element pivotally carried by the said hood-shaped member; and means on the outer side of the door for cooperating engagement with the shoulder on the locking member for retaining the door in closed position.

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