Oct. 30, 1934. J. J. TATUM 1,979,234

HOPPER CAR

Filed Aug. 20, 1929 4 Sheets-Sheet 1

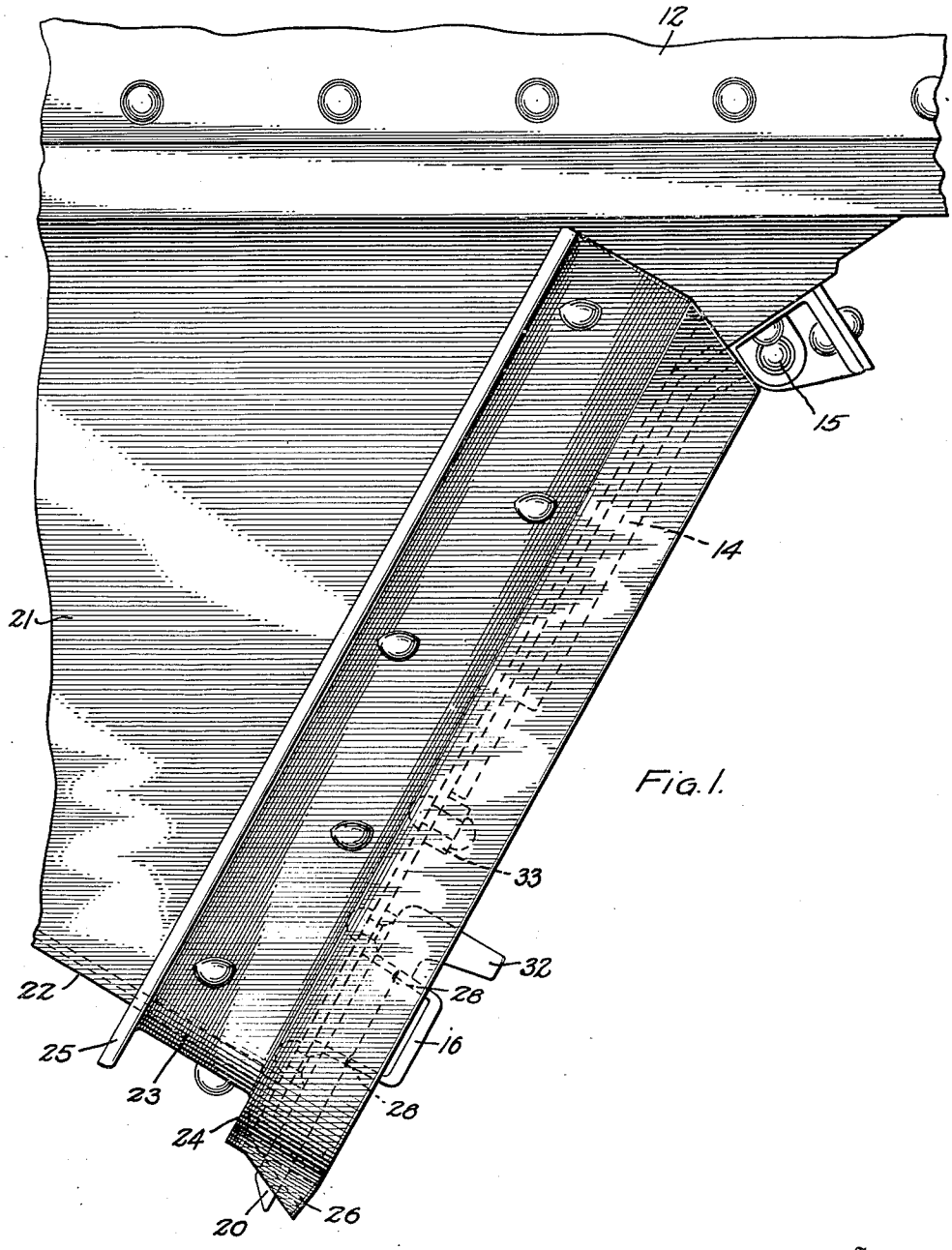


Fig. 1.

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Oct. 30, 1934. J. J. TATUM 1,979,234

HOPPER CAR

Filed Aug. 20, 1929 4 Sheets-Sheet 2

Fig. 2.

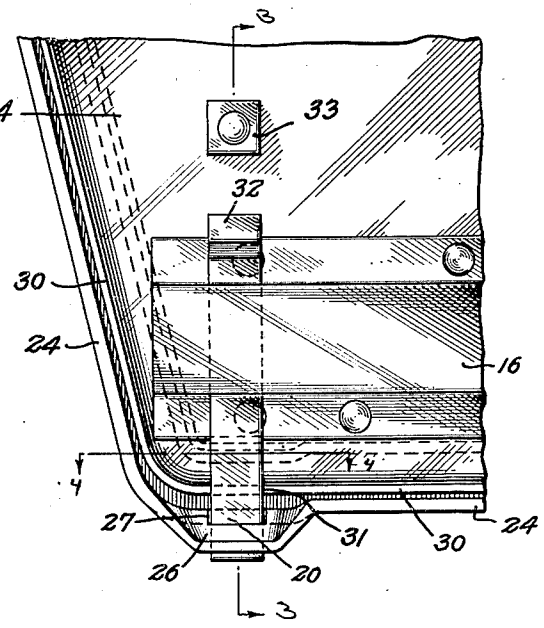


Fig. 3.

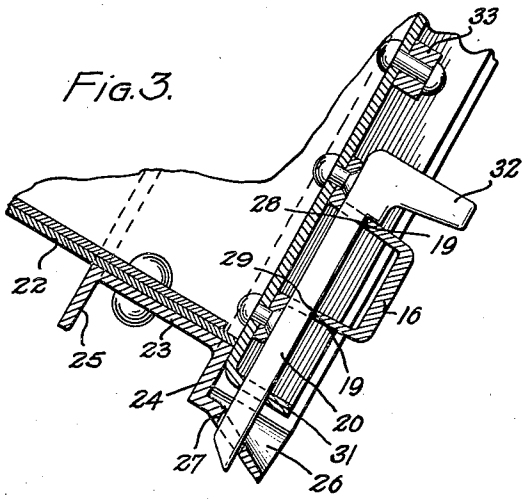
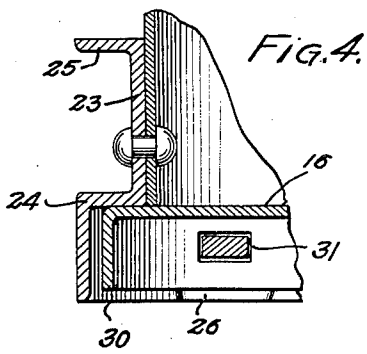


Fig. 4.



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HOPPER CAR

Filed Aug. 20, 1929 4 Sheets-Sheet 3

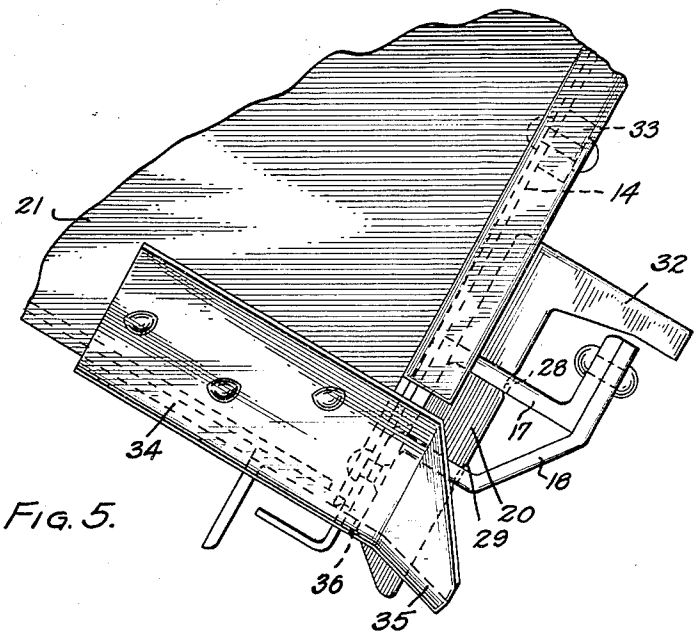


FIG. 5.

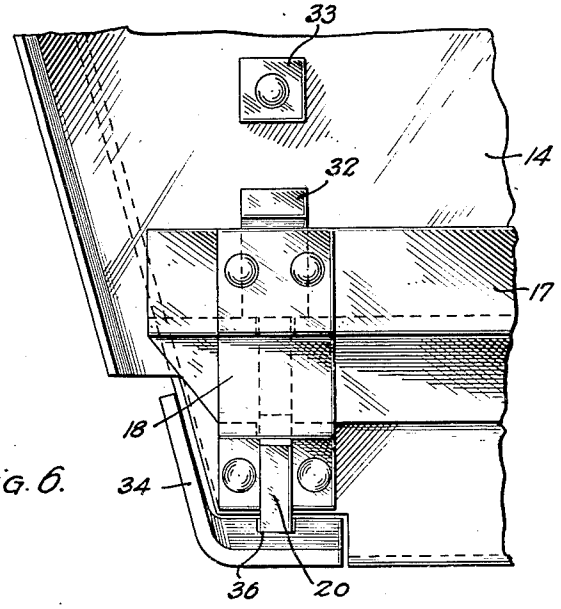


FIG. 6.

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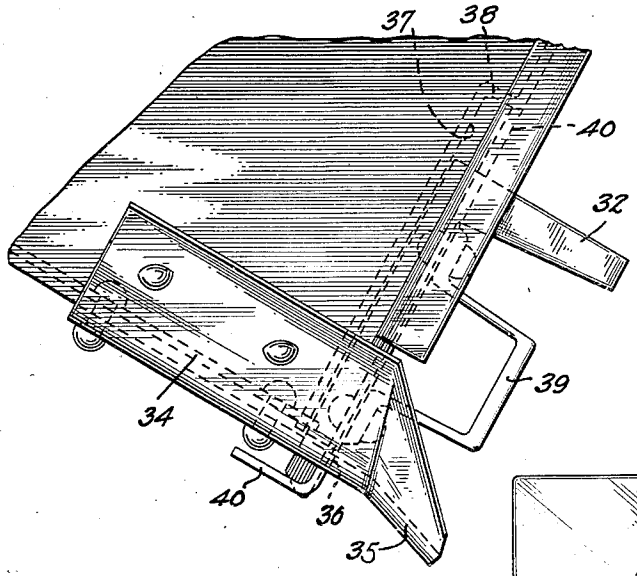
Attorney

Oct. 30, 1934. J. J. TATUM 1,979,234

HOPPER CAR

Filed Aug. 20, 1929 4 Sheets-Sheet 4

Fig. 11.



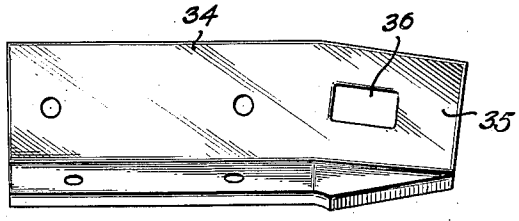


Fig. 8.

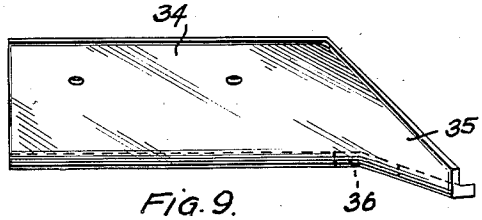


Fig. 9.

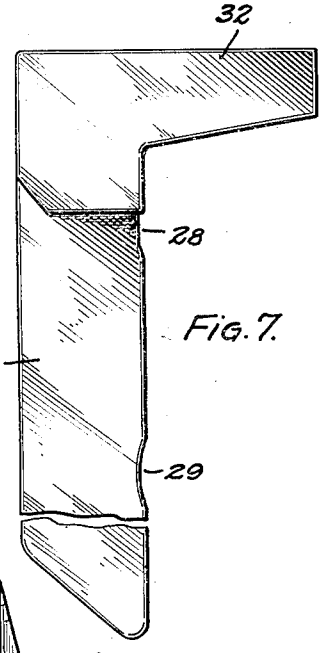


Fig. 7.

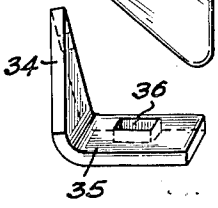


Fig. 10.

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Patented Oct. 30, 1934

1,979,234

UNITED STATES PATENT OFFICE

1,979,234

HOPPER CAR

John J. Tatum, Baltimore, Md.

Application August 20, 1929, Serial No. 387,241

42 Claims. (Cl. 105—308)

Simple but effective locking devices to hold the doors of hopper cars closed are essential to safety and necessary to keep the contents of the car from leaking from the car. Many devices have been designed and tried with more or less success. In most, if not all, locking devices a manual operation is necessary to move the locking devices into locked position, thus leaving the success of the device to the carefulness of the operators who many times fail.

The object of my invention is to provide a hopper door locking mechanism that will be attached to the car door structure between the two outside hopper sides to prevent interference with American Railway Association third rail clearance location, so as to provide for the width of the hoppers over all being made as wide as possible without being restricted by the door locking device being applied beyond the outer face of the outside side hopper sheets, and that will provide a positive self-locking bolt lock for the door when the door is swung to a closed position, with a self-locking bolt movably located in the door spreader bar or brace, or back of the door spreader bar or brace, in a recess provided in the face of the door for the bolt to work in with minimum weight, minimum number of pieces in its construction, at a minimum cost in production, which will be inexpensive in maintenance and upkeep.

In the drawings:

Figure 1 is a detail side elevation of a hopper car embodying my invention.

Figure 2 is an enlarged detail view of the hopper and door.

Figure 3 is a sectional view on the line 3—3, Figure 2.

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

Figure 5 is an enlarged detail side elevation at the bottom of the hopper and door showing another embodiment of my invention.

Figure 6 is a front elevation of Figure 5.

Figure 7 is a side elevation of the bolt.

Figure 8 is a top plan view of a keeper and guide.

Figure 9 is a side elevation of Figure 8.

Figure 10 is an end elevation of Figure 8.

Figure 11 is a detail side elevation of the lower portion of the hopper and door showing another embodiment of my invention.

The reference numeral 12 designates a hopper car of any approved construction having hoppers which are closed at their discharge end by swinging doors 14 hinged at 15. The doors, preferably, are provided with spreader bars 16, which may be of the channel type as shown in Figures 1 to 3, or may be composed of Z bar 17 shown in Figure 5, and a bracket 18 connected with the bar 17 and the door. In both of these constructions the spreaders are provided with openings 19 in which the door bolts 20 are slidably mounted.

Referring to Figures 1 to 4, it will be seen that I place on the side sheets 21 and the bottom sheet 22 of the hopper at their discharge end a channel iron 23, one edge of which is Z shaped, as at 24, while the other end is plain flanged, as at 25. The Z portion of the channel iron is flush with the discharge end of the hopper and constitutes a seat for the door of increased area, as compared with the edge of the bottom sheet 22 of the hopper which results in a more effective sealing surface between the door and hopper thereby reducing leakage to a minimum. When it is understood that the bottom sheet of the hopper wears at its outer edge from coal sliding over it when being unloaded, and the outer edge of the side sheets of the hopper bulges outward under load, all of which results from deterioration, the importance of the bracing effect of the channel iron 23 to the side sheets, and the location of the Z end of the channel iron at the discharge end of the bottom sheet of the hopper will be appreciated.

One of the flanges of the Z end of the channel iron 23 is depressed to form a bolt guide 26, the floor of which slants downwardly, the function of which is to engage the lower bevelled end of the bolt 20 as the door is being swung to closed position and gradually raise the bolt and guide the bolt to the keeper opening 27 into which the bolt drops by gravity when the door reaches its closed position. In order to lock the bolt against accidental movement toward unlocked position I provide notches, or indentations, 28 and 29 in one face thereof which are adapted to interlock with one wall of the bolt openings in the spreader 16. The weight of the door resting against the bolt forces these indentations in the bolt against the housing surrounding the bolt and prevents the bolt creeping out of locked position. The same condition exists when the car is loaded except to whatever extent the weight of the loading is against the door adds a greater pressure against the locking bolt. This automatic locking of the locking bolt insures against accidents and loss of contents from the car. As shown, the door 14 is provided with an outward strengthening flange 30 and a bolt opening 31 is formed in said flange at the bottom of the door. The bolt 20 is provided at its upper end with a handle 32. To limit the upward movement of the bolt I provide a stop

33 on the door which may, if desired, be pressed in the door.

As shown in Figures 5, 6, 8, 9 and 10, I may secure at the lower outer corner of the hopper an angle plate 34, the vertical wall of which is riveted to the side plate of the hopper, while the bottom wall is riveted to the bottom sheet of the hopper. This plate has an extension 35, downwardly deflected and provided with a keeper 36 for the bolt. This depressed portion 35 functions as a guide for the bolt as herein described.

In Figure 11 I form a depression 37 in the door 40 in which the bolt 20 is slidably housed, the top wall 38 functioning as a stop to limit the vertical movement of the bolt. In this construction it will be noted that the door spreader 39 overlies the bolt housing 37 and holds the bolt in operable position in said housing.

What I claim is:

1. In combination, in a hopper car, a swinging door, a spreader bar on the door, a bolt slidably mounted on said door, a keeper carried by the hopper structure and means to move the bolt upwardly as the door is swung to closed position, the bolt being free to drop by gravity to locked position when it is in line with said keeper, and means carried by the bolt designed to interlock with the spreader bar and lock the bolt against accidental movement.

2. In combination, in a hopper car, a hopper having a door bearing edge at its lower end, a bolt keeper extending beyond said bearing edge, a swinging door, a spreader bar on the door and a bolt slidably mounted on the door and adapted to enter said keeper when the door is closed, and means carried by the bolt designed to interlock with said spreader bar to hold the bolt against accidental movement toward unlocked position.

3. In combination, in a hopper car, a hopper having a doorway provided with a bottom door bearing edge, a bolt keeper extending forwardly in advance of the doorway beyond said bearing edge, and located at a point between the sides of the hopper, said bolt keeper having a bolt opening, a swinging door, a bolt slidably mounted on said door, the keeper having a downwardly offset portion shaped to form a channeled guide with a sloping bottom to engage the bolt as the door is being closed and raise and guide it to the bolt opening, and a stop to limit the upward movement of the bolt.

4. In combination, in a hopper car, a hopper, a swinging door for said hopper, a spreader bar secured to said door, a locking bolt mounted on and slidable transversely of said bar, and a keeper carried by the hopper designed to receive said bolt, and means on the bolts designed to interlock with the spreader bar.

5. In a hopper car, in combination, a hopper, a swinging door for said hopper, a spreader bar on the door, a bolt slidably mounted on the door, a hopper floor brace extending beyond the door bearing face of the hopper, a bolt keeper formed in said brace, a guide in said brace to raise the bolt as the door is being closed and guide it to said keeper, and means on the bolt to interlock with said spreader bar to hold the bolt against accidental unlocking movement.

6. In combination, in a hopper car, a hopper, a channel iron surrounding the edge of the hopper discharge end, said iron having a Z shape at one edge and a plain flange at the other edge, the Z shaped edge being designed to function as a door sealing and bearing surface, and a bolt keeper formed in the outer flange of the Z end.

7. In combination, in a hopper car, a hopper, a channel iron surrounding the edge of the hopper discharge end, said iron having a Z shape at one edge and a plain flange at the other edge, the Z shaped edge being designed to function as a door sealing and bearing surface, and a bolt keeper formed in the outer flange of the Z end, and a depression formed in the outer flange of the Z end designed to engage a locking bolt on a hopper door when the door is being closed and lift and guide the bolt to said bolt keeper.

8. In combination, in a hopper car, a hopper, a door, a spreader bar on the door, a locking bolt slidable vertically in the spreader bar, a channel iron extending along the edge of the hopper discharge end, said iron having a Z shape at one edge and a plain flange at the other edge, the Z shaped edge being designed to function as a door sealing and bearing surface, and a bolt keeper formed in the outer flange of the Z end, and a depression formed in the outer flange of the Z end designed to engage the locking bolt on a hopper door when the door is being closed and lift and guide the bolt to said bolt keeper, means on the bolt to interlock with the spreader bar to hold the bolt against accidental movement toward unlocking position.

9. In a combination, in a hopper car, a swinging door, a self locking bolt slidably mounted in the door spreader on said door, a keeper carried by the hopper structure and arranged for the bolt, positioned in the spreader bar between the two outside hopper sheets, and means to move the bolt upwardly as the door is swinging to a closed position, the bolt being free to drop by gravity to a self locked position when it is in line with said keeper, and means carried by the bolt designed to interlock with the said spreader bar and lock the bolt against accidental movement.

10. In combination, in a hopper car, a hopper having a door bearing edge at its lower end, a bolt keeper extending beyond said bearing edge and located between the outside side hopper sheets, a swinging door, a spreader bar on the door and a bolt slidably mounted on the door and adapted to enter said keeper when the door is closed, and means carried by the bolt designed to interlock with said spreader bar to hold the bolt against accidental movement towards unlocked position.

11. In combination, in a hopper car, a hopper having a door bearing edge, a bolt keeper extending beyond said bearing edge, and having a bolt opening located between the two outer side hopper sheets, a swinging door, a bolt slidably mounted on said door, the said keeper having a downwardly offset portion forming a channeled guide with a bottom sloping to the bolt opening to engage the bolt as the door is being closed and raise and guide it to the bolt opening, and a stop to limit the upward movement of the bolt.

12. In a hopper car, in combination, a hopper, a swinging door, a bolt loosely mounted for free endwise sliding motion on the door and adapted to drop into locked position by gravity, and a bracing member tying the bottom and side walls of the hopper and provided with a flange extending therefrom, said flange forming a keeper, said keeper having a bolt receiving socket and an inclined guide surface leading thereto, said guide surface being arranged in the path of the lower end of the bolt in the swinging movement of the door for moving the bolt upwardly as the door is swung to closed position for downward move-

ment by gravity into said socket when coming into registry therewith.

13. In a hopper car, in combination, a hopper, a hopper door, a fastening bolt carried by said door, a hopper floor brace fastened to the hopper and extending outwardly beyond the door bearing face of the hopper, a bolt keeper formed in said outwardly extending portion of the brace, and a channeled guide on said outwardly extending portion of the brace arranged in an inclined plane to lift the bolt on the hopper door and guide the bolt to said keeper as the door is being closed.

14. In combination, in a hopper car, a swinging door, a channeled spreader on the door, a bolt slidably mounted for endwise vertical movement in the upper and lower spaced walls of the spreader, a keeper carried by the hopper structure, and means to engage the lower end of the bolt and move the bolt upwardly as the door is swung to a closed position, the bolt being free to drop by gravity to a self-locked position when it is in line with said keeper.

15. In combination, in a hopper car, a hopper having a door bearing edge at its lower end, a bracing element having a side portion secured to and projecting beyond a side sheet of the hopper and a base portion secured to the bottom of the hopper and extending outwardly beyond said bearing edge, said base portion of the bracing element being provided with a keeper and a channeled guide having a sloping bottom forming a guide leading to the keeper, a swinging door, and a bolt slidably mounted on the door and adapted to ride up on said guide surface and to drop by gravity and enter said keeper when the door is closed.

16. In combination, in a hopper car, a hopper having a door bearing edge, a bracing element having a side portion secured to and projecting beyond a side sheet of the hopper and a base portion secured to the bottom of the hopper and extending outwardly beyond said bearing edge, and having a depressed portion provided with a bolt opening therein lying in rear of the plane of the outer edge of the side portion of the bearing element, a swinging door, and a bolt slidably mounted on said door, said depressed portion having an inclined guide surface to engage the bolt as the door is being closed and raise and guide it to the bolt opening, the bolt being loosely mounted to drop by gravity into engagement with said bolt opening.

17. In a hopper car, a hopper having a doorway, a swinging door for closing said doorway, guiding means on the door, a gravity dropping locking bolt having a lower locking end, said bolt loosely engaging said guiding means for endwise sliding motion in a vertical plane, and a bolt keeper on the hopper having means for guiding the lower end of the bolt to the keeper and lifting the bolt in the closing movement of the door to adapt it to drop by gravity to locking position on coming into alinement with the keeper, the bolt having means operating under pressure of the closed door to lock the bolt against upward movement and displacement from the keeper.

18. In a hopper car, a hopper having a doorway, a swinging door for closing said doorway, guiding means on the face of the door adjacent to the lower edge thereof, a gravity dropping locking bolt having a lower locking end, said bolt loosely engaging said guiding means and being normally unrestrained for free endwise sliding motion in a vertical plane, and a combined bottom and side wall brace of channeled form having a bolt keeper extending forward therefrom at the base of the doorway having a guide channel leading thereto and provided with an inclined bottom surface for raising the bolt in the closing of the door and permitting the bolt to drop by gravity into engagement with the keeper on coming into alinement therewith.

19. In a hopper car, a hopper having a doorway, a swinging door for closing said doorway, guiding means on the face of the door adjacent to the lower edge thereof, a gravity dropping locking bolt having a lower locking end, said bolt loosely engaging said guiding means for endwise sliding motion in a vertical plane, a combined bottom and side wall brace of channeled form having a bolt keeper extending forwardly therefrom at the base of the doorway having means for guiding the lower end of the bolt to the keeper and lifting the bolt in the closing movement of the door to adapt it to drop by gravity to locking position on coming into alinement with the keeper, and a stop for limiting the upward movement of the bolt.

20. In a hopper car, a hopper having a doorway, a swinging door for closing said doorway, guiding means on the door, a gravity dropping locking bolt having a lower locking end, said bolt loosely engaging said guiding means for endwise sliding motion in a vertical plane, a bolt keeper on the hopper having means for guiding the lower end of the bolt to the keeper and lifting the bolt in the closing movement of the door to adapt it to drop by gravity to locking position on coming into alinement with the keeper, the bolt having means operating under pressure of the closed door to lock the bolt against upward movement and displacement from the keeper, and a stop for limiting the upward movement of the bolt.

21. In a hopper car, a hopper having a doorway, a swinging door for closing said doorway, guiding means on the door, a gravity dropping locking bolt having a lower locking end, said bolt loosely engaging said guiding means for endwise sliding motion in a vertical plane, and a bolt keeper on the hopper having means for guiding the lower end of the bolt to the keeper and lifting the bolt in the closing movement of the door to adapt it to drop by gravity to locking position on coming into alinement with the keeper, the bolt having means to interlock with the first-named guiding means under pressure of the closed door to hold said bolt from upward movement and displacement from the keeper.

22. In a hopper car, a hopper having a doorway, a swinging door for closing said doorway, guiding means on the door, a gravity operating locking bolt having a lower locking end, said bolt loosely engaging said guiding means for endwise sliding motion in a vertical plane, and a brace extending longitudinally of the sill of the doorway and projecting outwardly therefrom, said sill having a bolt keeper opening and a downwardly offset portion forming a channeled guideway with a sloping bottom for leading the locking end of the bolt thereto, said guideway being provided with an inclined bottom for raising the bolt in the closing of the door and permitting the bolt to drop by gravity into engagement with the keeper on coming into alignment therewith.

23. In a hopper car, a hopper having a doorway, a swinging door for closing said doorway, guiding means on the door, a gravity operating locking bolt having a lower locking end, said bolt loosely engaging said guiding means for endwise sliding motion in a vertical plane, and a brace ex-

tending longitudinally of the sill of the doorway and projecting outwardly therefrom, said sill having a bolt keeper opening and a channeled guideway for leading the locking end of the bolt thereto, said guideway being provided with an inclined bottom for raising the bolt in the closing of the door and permitting the bolt to drop by gravity into engagement with the keeper opening on coming into alinement therewith, said bolt having means operating under pressure of the closed door to lock the bolt against upward movement and displacement from the keeper.

24. In a hopper car, a hopper having a doorway, a swinging door for closing said doorway guiding means on the door, a gravity operating locking bolt having a lower locking end, said bolt loosely engaging said guiding means for endwise sliding motion in a vertical plane, and a brace extending longitudinally of the sill of the doorway and projecting outwardly therefrom, said sill having a bolt keeper opening and a downwardly offset portion forming a channeled guideway for leading the locking end of the bolt thereto, said guideway being provided with an inclined bottom for raising the bolt in the closing of the door and permitting the bolt to drop by gravity into engagement with the keeper opening on coming into alinement therewith, and a stop for limiting the upward movement of the bolt.

25. In a hopper car, a hopper having a doorway, a swinging door for closing said doorway, guiding means on the door, a gravity operating locking bolt having a lower locking end, said bolt loosely engaging said guiding means for endwise sliding motion in a vertical plane, and a brace extending longitudinally of the sill of the doorway and projecting outwardly therefrom, said sill having a bolt keeper opening and a channeled guideway for leading the locking end of the bolt thereto, said guideway being provided with an inclined bottom for raising the bolt in the closing of the door and permitting the bolt to drop by gravity into engagement with the keeper opening on coming into alinement therewith, a stop for limiting the upward movement of the bolt, the said bolt having means operating under pressure of the closed door to interlock it with the first-named guiding means against upward movement and displacement from its keeper.

26. In a hopper car, a hopper having a doorway, a swinging door, a vertically sliding gravity dropping locking bolt on the door, and a keeper on the hopper having a guide for leading the bolt thereto and lifting the bolt in the closing movement of the door to permit it to drop by gravity into engagement with the keeper on coming into alinement therewith, the said bolt having means operating under pressure of the closed door to interlock it with the first named guiding means against upward movement and displacement from its keeper.

27. In a hopper car, a hopper having a doorway, a keeper on the hopper, a swinging door for closing said doorway, a channeled spreader secured to the door and having spaced superposed walls provided with bolt guides, and a gravity bolt slidable vertically in said guides.

28. In hopper car, a hopper having a doorway, a swinging door for closing the doorway, said door having an outwardly extending flange at its lower edge provided with a bolt guide opening, a spreader bar on the door above said flange having spaced and superposed walls provided with bolt guide openings in alinement with each other and with the walls and with the guide opening in the flange, a flange on the hopper, and a sliding bolt engaging the guide openings in the flange and walls of the spreader and adapted to interlock with said keeper.

29. In a hopper car, a hopper having a doorway, a keeper on the hopper, a door for closing said doorway, a bracing member at the bottom of the doorway and extending outwardly therefrom, a bracing member on the door provided with superposed walls having bolt guides therein, and a gravity dropping locking bolt on the door movable in said guides in said door bracing member, the bracing member at the bottom of the doorway having a keeper opening to receive the bolt and a guide channel struck up therein leading to said keeper opening and having an inclined bottom wall to raise the bolt for a locking action in the closing movement of the door.

30. In a hopper car, a hopper having a doorway, braces secured to the side walls of the hopper and projecting outwardly therefrom at the sides of the doorway, a bracing member secured to the bottom of the hopper and projecting outwardly therefrom at the base of the doorway, said bracing member having a bolt keeper, a vertically swinging door for closing the doorway, a bracing member on the door forming a bolt guide, and a vertically sliding bolt engaging said bolt guide and adapted to interlock with the keeper, the bolt and its guiding means being arranged to lie substantially in the space bounded by the bracing members.

31. In combination, in a hopper car, a hopper having a doorway provided with a bottom door bearing edge, a bolt keeper extending in advance of the doorway beyond said bearing edge, and located at a point between the sides of the hopper, said bolt keeper having a bolt opening, a swinging door, a bolt slidably mounted on said door, the keeper having a downwardly offset portion forming a channeled guide with a sloping bottom to engage the bolt as the door is being closed and raise and guide it to the bolt opening.

32. In combination, in a hopper car, a hopper having a doorway provided with a bottom door bearing edge, a bolt keeper extending in advance of the doorway beyond said bearing edge, and having a bolt opening located between the two outer side hopper sheets, a swinging door, a plurality of superposed reinforcing flange members secured to the face of the door adjacent to the lower edge thereof, a bolt slidably mounted in said reinforcing flange members, the keeper having a downwardly offset portion forming a channeled guide with a sloping bottom to engage the bolt as the door is being closed and raise and guide it to the bolt opening, and a stop to limit the upward movement of the bolt.

33. In combination, in a hopper car, a swinging door, a plurality of superposed bracing flange members on the door adjacent to the lower edge thereof, a bolt mounted loosely for free endwise sliding motion in said flange members so as to be adapted to drop into locked position by gravity, and a keeper carried by the hopper structure at the base of the doorway and having a downwardly offset portion forming a channeled guide with a sloping bottom guiding surface engageable with the lower end of the bolt to gradually move the bolt upwardly as the door is swung to closed position and to free the bolt for movement by gravity to locked position when it is in line with said keeper.

34. In combination, in a hopper car, a swinging door, a vertically sliding locking bolt carried by

the door, a hopper having a door bearing edge, a combined hopper floor and side hopper sheet brace having a bolt keeper and a downbent portion to engage the lower end of the locking bolt and lift it gradually as the door is closed to a position in line with the keeper to adapt the bolt to drop by gravity into engagement with said keeper, and means on the bolt to prevent it from being jolted out of a locked position.

35. In a hopper car, in combination, a hopper, a combined hopper side and floor sheet brace fastened to the hopper and having one of its angles extending outwardly beyond the door bearing face of the hopper, the brace having a bolt keeper formed in said outwardly extending portion of the brace, and a guide on said outwardly extending portion of the brace arranged in an inclined plane to lift a bolt on the hopper door and guide the bolt to said keeper as the door is being closed.

36. In combination, in a hopper car, a hopper having a door bearing edge at its lower end, a combination side hopper floor and door bolt keeper angle-shaped bracing element having a side portion secured to and projecting beyond a side sheet of the hopper and a base portion secured to the bottom of the hopper and extending outwardly beyond said bearing edge, said base portion of the bracing element being provided with a keeper opening and a sloping surface forming a guide leading to the keeper opening, a swinging door, and a bolt slidably mounted on the door and adapted to ride up on said guide surface and to drop by gravity and enter said keeper opening when the door is closed.

37. In a hopper car, a hopper having a doorway, a swinging door for closing said doorway, guiding means on the door, a gravity operating locking bolt having a lower locking end, said bolt loosely engaging said guiding means for endwise sliding motion in a vertical plane, and a hopper side and floor sheet brace extending vertically and longitudinally of the sill of the doorway and projecting outwardly therefrom, said brace having a bolt keeper opening in its lower portion, and a channeled guideway for leading the locking end of the bolt thereto, said guideway being provided with an inclined bottom for raising the bolt in the closing of the door and permitting the bolt to drop by gravity into engagement with the keeper on coming into alinement therewith.

38. In a hopper car, a hopper having a doorway, a swinging door for closing said doorway, guiding means on the door, a gravity operating locking bolt having a lower locking end, said bolt loosely engaging said guiding means for endwise sliding motion in a vertical plane, and a hopper side and floor sheet brace extending vertically and longitudinally of the sill of the doorway and projecting outwardly therefrom, said brace having a bolt keeper opening in its lower portion and a channeled guideway for leading the locking end of the bolt thereto, said guideway being provided with an inclined bottom for raising the bolt in the closing of the door and permitting the bolt to drop by gravity into engagement with the keeper opening on coming into alinement therewith, and a stop for limiting the upward movement of the bolt.

39. In combination, in a hopper car, a hopper having a doorway provided with a metal shaped bearing, with a right angle flange on one edge and a Z shape formed on the opposite edge, a bolt keeper guide extending in advance of the doorway beyond said bearing edge, and located at a point between the sides of the hopper, said bolt keeper guide having a bolt opening, a swinging door, a bolt slidably mounted on said door, and means on the hopper to engage the bolt as the door is being closed, the outer flange of the Z shape provided with a depression for guiding the bolt to a locked position.

40. In combination, in a hopper car, a hopper having a doorway provided with a metal shaped bearing, having a right angle flange on one edge and a Z shape formed on its opposite edge, a bolt keeper guide extending in advance of the doorway beyond said bearing edge, and having a bolt opening located back of the outer edge of guide, and between the two outer side hopper sheets, a swinging door, a plurality of superposed reinforcing flange members secured to the face of the door adjacent to the lower edge thereof, an anti-creeping sliding bolt mounted in said reinforcing flange members, and means on the keeper to engage the bolt as the door is being closed and to raise and guide it to the bolt opening, and a stop on the door to limit the upward movement of the bolt.

41. In combination, in a hopper car, a swinging door, a plurality of superposed bracing flange members, forming a hollow square with the door, attached to the door adjacent to the lower edge thereof, an anti-creeping bolt mounted loosely for free endwise sliding motion in said flange members so as to be adapted to drop into an anti-creeping position by gravity, and a keeper carried by the hopper structure at the base of the doorway and having an inclined guiding surface engageable with the lower end of the anti-creeping locking bolt to gradually move the bolt upwardly as the door is swung to closed position and to free the bolt for movement by gravity to locked position when it is in line with said keeper positioned to receive the anti-creeping locking bolt.

42. In combination, in a hopper car, a hopper having a door bearing edge, a combined hopper side and floor sheet brace fastened to the hopper and having one of its continuous flanges extending outwardly beyond the door bearing face of the hopper, said extended flange being formed to provide a bolt keeper having a bolt opening, located at a point between the two outer side hopper sheets, a swinging door and bolt slidably mounted on said door, and means on the keeper to engage the bolt as the door is being closed and to raise and guide it to the opening for the bolt.

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