March 10, 1953 G. B. DOREY 2,630,771

HOPPER CAR DOOR LATCHING MECHANISM

Filed Dec. 5, 1947 3 Sheets-Sheet 1

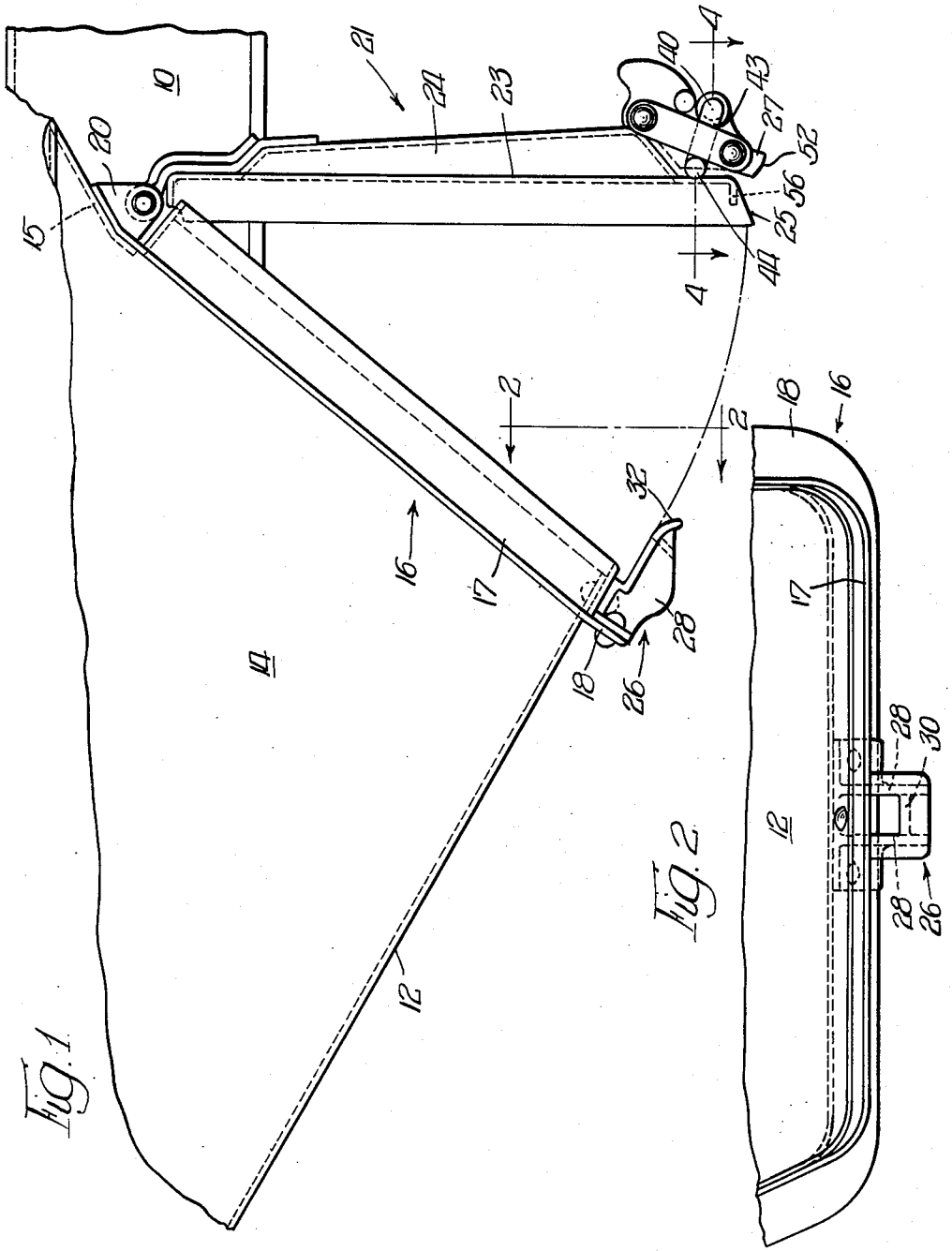


Fig. 1

Fig. 2

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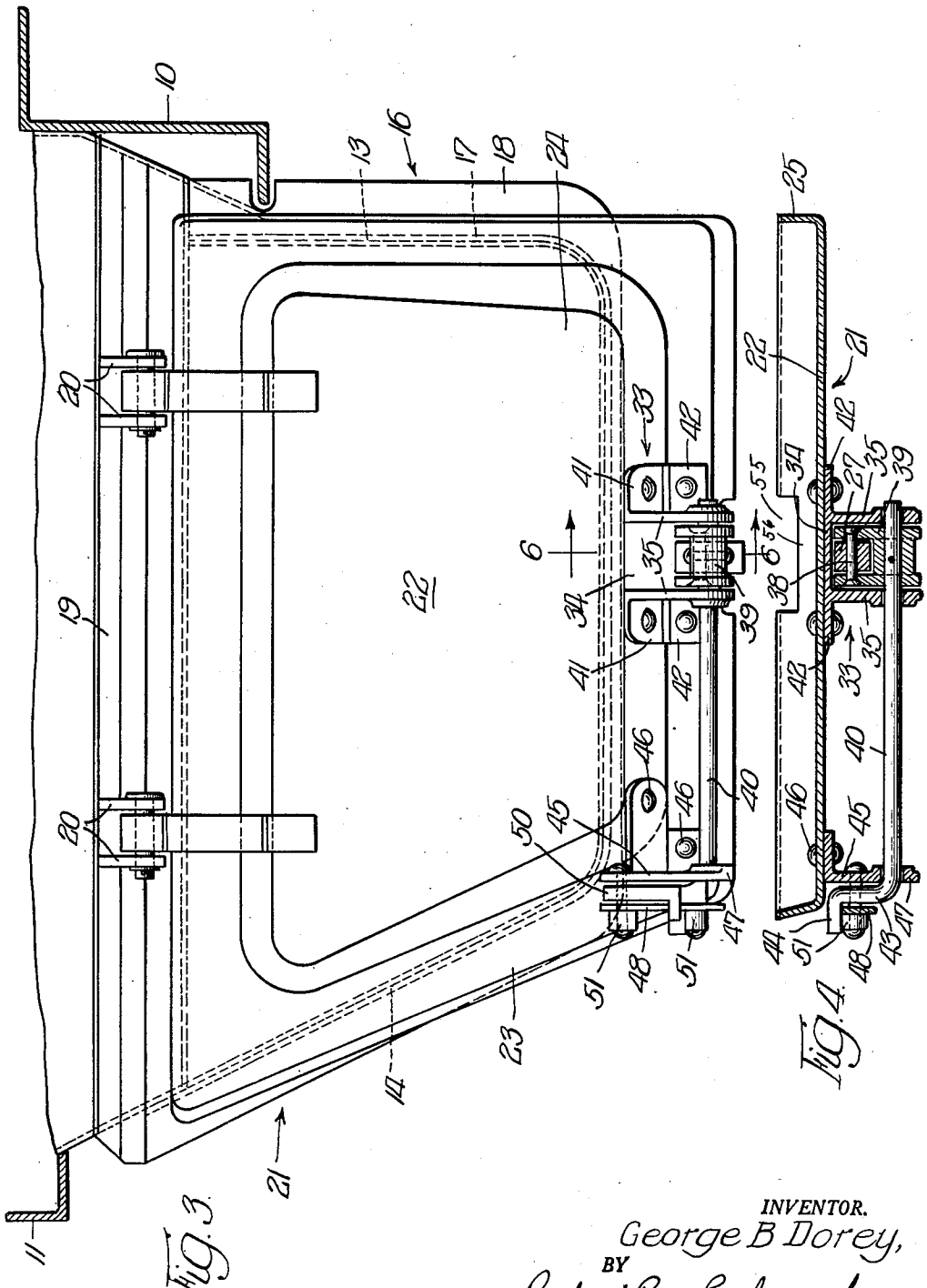


Fig. 3

Fig. 4

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HOPPER CAR DOOR LATCHING MECHANISM

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Fig. 8

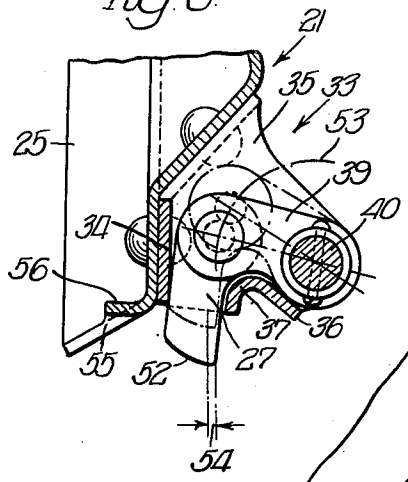


Fig. 5

Fig. 6

Fig. 7

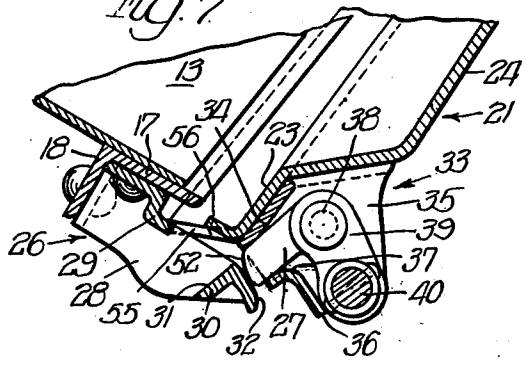
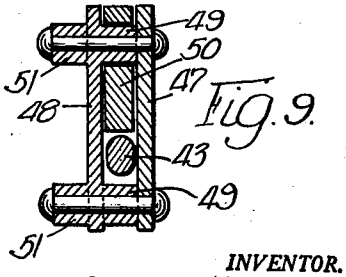


Fig. 9



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UNITED STATES PATENT OFFICE

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HOPPER CAR DOOR LATCHING MECHANISM

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Application December 5, 1947, Serial No. 789,947

5 Claims. (Cl. 105—308)

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My invention relates to an improved hopper car door latching mechanism for railway cars and the like.

An object of the invention is to provide a simple and effective latching mechanism applicable to dump car doors and is especially suitable for that type of door generally designated as a unit door wherein the latching means is disposed centrally of the door.

A particular object of the invention is the provision of a latching mechanism which can be so arranged as to effect the latching of the door at a location midway between the ends thereof and to provide means whereby operation of the mechanism may be conveniently and safely carried out from a location adjacent a side of the car.

Still another object of the invention is to provide a latch of the sliding type which will also have a limited degree of swinging movement and thus operate as a cam to force the door tightly closed.

My invention further resides in certain features of construction and details of parts such as will be fully pointed out and claimed.

In the drawings forming a part of this specification, Fig. 1 is a portion of a side elevation of a hopper car showing as much of the structure as necessary to illustrate my improvements, said view showing the car with the dumping door in open position. Fig. 2 is a vertical elevational view of the lower portion of the hopper structure illustrated in Fig. 1, said view being taken as seen from right to left in a direction as indicated by the line 2—2. Fig. 3 is a vertical elevational view of the structure shown in Fig. 1, as viewed from right to left, said view illustrating approximately one half of a transverse sectional view of a hopper car. Fig. 4 is a plan sectional view of the door and latching mechanism as viewed on a line 4—4 of Fig. 1. Fig. 5 is a side elevational view of a portion of a hopper car on an enlarged scale showing the door in closed and latched position, said view illustrating my improvements as applied to a door of conventional construction. Fig. 6 is a sectional vertical view of the lower portion of the hopper shown in Fig. 5 as taken at a location corresponding substantially to a line 6—6 of Fig. 3. Fig. 7 is a view similar to Fig. 6 except that the door is shown in partially open position with the latching element in partially retracted position. Fig. 8 is a vertical sectional view on an enlarged scale showing the lower portion of the door and is similar to the view shown in Fig. 6 except that

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the door only is illustrated and the latch parts are shown in conventional dot and dash lines as positioned with the latch in partially retracted position, said view being for the purpose of illustrating the swinging action of the latch element. Fig. 9 is a vertical elevational sectional view taken adjacent the outer end of the latch shaft on a line 9—9 of Fig. 5.

As shown in the drawings, 10 denoted the centersill structure of a hopper car and 11 the lower portion of one of the car side walls. Intermediate said centersill and side wall there is shown a hopper embodying my improved construction. In the type of car illustrated, the hoppers are arranged in transversely alined relation on each side of the centersill but the drawings and description herein are confined to only one of such hoppers. Said hopper is defined by a longitudinally sloping floor sheet 12 and inner and outer side walls as indicated at 13 and 14 respectively, the latter sloping inwardly downwardly towards the longitudinal center of the car.

As customary in the type of car illustrated a transversely extending ridge is provided which forms the sloping floors above the hopper, the lower portion of one of said sheets being indicated at 15. Extending around the hopper bottom and side walls is a frame 16 preferably of angle shape with one flange 17 overlying the hopper walls and having the other flange 18 outstanding from said hopper walls to provide reinforcement. The frame extends in the form of a stirrup around the bottom and side walls and the upper member of the frame as indicated at 19 underlies the ridge sheet. Said top member of frame is provided with hinge butts 20—20 and pivotally mounted thereto is the dumping door 21.

The door 21 is preferably formed of sheet metal with a body portion 22 having flat marginal edge portions 23 which constitute a seating surface arranged to abut the frame when the door is in closed position. Inwardly of the seating surface, the door is formed with a depressed embossment 24 which operates as a reinforcement for the door and also provides additional load capacity.

The margins of the door are reinforced by upstanding flanges 25 which extend completely around the door and in combination with the flat seating portions provide a pan shaped door.

The door as will be noted is hinged adjacent the upper part of the door opening and assumes a substantially vertical position when open. The

door is arranged to be manually moved or kicked to closed position to meet with the edge portions of the hopper frame and it is with the mechanism employed for retaining said door in closed position that my invention is primarily concerned.

The latching mechanism employed for retaining the door in closed position includes a shouldered keeper 26 carried by the sloping hopper bottom wall and a co-operating sliding latch member 27 carried by the door. The keeper 26 is preferably in the form of a bracket located in the angle presented by the walls 17 and 18 of the frame and is secured to said respective walls. In its preferred form the bracket includes a pair of walls 28—28 spaced apart to accommodate the latch member therebetween and said walls are integrally united by transverse walls 29 and 30, the latter having its inner face 31 constituting the shoulder which is engaged by the latch element. The outer end of the keeper is formed with an inclined runway 32 which forms a beveled approach to the shoulder 31 and operates to displace the latch from its normally projected position as the door is moved to closed position.

In order to guidably support the latch element 27 a housing 33 is secured to the outer face of the door. The housing 33 includes a base wall portion 34 and a pair of spaced walls 35—35 extends outwardly from said base portion. The base wall 34 and the outstanding walls 35—35 combine to present a channel shaped structure within which the latch element is contained and pivotally retained. Outwardly of the latch there is provided a wall 36 which integrally unites the respective walls 35—35 and said wall 36 diverges outwardly and upwardly from the latch at 37 to present a curved concave surface around which the latch is arranged to have a rocking action as will be more fully pointed out hereinafter. The said base wall 34 in combination with the outstanding walls 35—35 and the curved outer wall 37 thus combine to form a sleeve within which the lower end of the latch is received and guided.

The latch element at its upper end is pivotally connected at 38 with a lever arm 39 which in turn is fixedly associated with an operating shaft 40. The shaft 40 is disposed outwardly of the latch and preferably extends through the pair of walls 35—35 and is thus rotatably supported. Outwardly of each wall 35, the housing is provided with walls 41 and 42 which overlie the door and whereby the housing is secured to the door.

The shaft is extended lengthwise from the housing 33 towards the outer hopper side wall 14 and adjacent the side edge of the door there is provided on the shaft an operating arm 43. Said arm 43 extends radially in the general direction of the arm 39 and is provided at its outer end with an operating head portion in the form of a laterally extending trunnion 44.

The shaft 40 is supported adjacent the arm 43 by means of a supporting bracket 45 which is secured to the door by rivets 46. Said bracket 45 includes an outer wall 47 which lies inwardly of and immediately adjacent to the arm 43 and thus operates as a guiding wall for the said arm in its swinging movement. A strap plate 48 is disposed outwardly of the bracket and is spaced outwardly from the wall 47 by means of bosses 49—49 a sufficient distance to accommodate the arm 43 between wall 47 and plate 48. A locking dog 50 is pivotally mounted on the upper boss 49 for the purpose of locking the shaft and consequently the latch against movement in a releasing direction.

Extending laterally outwardly from the plate 48 are fulcrum bosses 51—51 which are disposed in alignment with the trunnion 44 whereby a removable operating bar may be inserted between the said trunnion and bosses for operating the arm 43. The operating head 44 being disposed at an appreciable distance from the latch operates as a weighted element to normally urge the latch to fully projected position. The latch thus automatically gravitates to a normally projected position and as the door is slammed or kicked towards locked position the lower portion of the latch element rides on the beveled runway 32 of the keeper and the latch element is forced upwardly. In order to facilitate upward displacement of the latch element by contact with the keeper, the lower surface of the latch element is curved as indicated at 52.

As will be best seen by reference to Fig. 8, the linkage effect introduced by the pivoted connection of the arm 39 operates to impart a swinging movement to the latch element inasmuch as the upper end of the latch moves in an arcuate path indicated by the arc 53 while the lower part of the latch rocks on the arcuate shaped cam surface 37. The swinging movement of the latch thus brought about by the linkage connection at the upper end of the latch results in a take up of the latch as denoted at 54 operating to wedge the door to a tightly closed position.

With the latch in fully projected position, the arm 39 lies substantially at right angles to the latch element and thus operates to retain the latch tightly against the base plate 34. In order to provide adequate clearance for the latch parts, the upstanding flange 25 at the front of the door is cutaway for a limited distance as indicated at 55 and the restricted flange portion 56 is disposed at a somewhat steeper angle than the main section of door flange.

What I claim is:

1. In a railway car door locking device for combination with a car body and a dumping door pivotally mounted thereon: a shouldered keeper carried by said car body at the margin of said door when closed, a latch carried by said door arranged on one side to have limited area engagement with the inside of said shouldered keeper and on the opposite side to have limited area engagement with said door, an arm pivoted at one end about an axis fixed with respect to said door and pivoted at its other end to said latch about an axis fixed with respect thereto whereby on moving said latch into locking position to wedge said door tightly closed the same is guided substantially at three points, and torque transmitting means operatively connected to said arm at said one end thereof for rocking said arm about the first mentioned axis to transmit through said arm the force required to close said door tightly.

2. In a railway car door locking device for combination with a car body and a dumping door pivotally mounted thereon: a shouldered keeper carried by said car body at the margin of said door when closed, a latch carried by said door arranged on one side to have limited area engagement with the inside of said shouldered keeper and on the opposite side to have limited area engagement with said door, an arm pivoted at one end about an axis fixed with respect to said door and pivoted at its other end to said latch about an axis fixed with respect thereto whereby on moving said latch into locking posi-

tion to wedge said door tightly closed the same is guided substantially at three points, and a shaft carrying said arm and arranged on application of torque thereto to rock the same about the first mentioned axis to transmit through said arm the force required to close said door tightly.

3. In a railway car door locking device for combination with a car body and a dumping door pivotally mounted thereon: a shouldered keeper carried by said car body at the margin of said door when closed, a latch carried by said door arranged on one side to have limited area engagement with the inside of said shouldered keeper and on the opposite side to have limited area engagement with said door, guide means for said latch to direct the movement thereof in an arcuate path, and an arm pivoted at one end about an axis fixed with respect to said door and pivoted at its other end to the end of said latch away from the portion thereof arranged to engage said keeper and about an axis fixed with respect thereto whereby on moving said latch into locking engagement with said keeper to wedge said door tightly closed it engages said keeper on one side and said door on the other as aforesaid and is maintained in wedging relation therewith by force transmitted through said arm accompanied by arcuate movement of the second mentioned axis with respect to the first mentioned axis.

4. In a railway car door locking device for combination with a car body and a dumping door hinged thereon along its upper side: a shouldered keeper carried by said car body at the lower margin of said door when closed, a latch guided on said door for arcuate movement generally transverse to said lower margin and arranged on one side to have limited area engagement with the inside of said shouldered keeper and on the opposite side to have limited area engagement with said door substantially at said lower margin, an arm pivoted at one end about an axis fixed with respect to said door outwardly thereof and pivoted at its other end to the end of said latch away from the portion thereof arranged to engage said keeper and about an axis fixed with respect thereto whereby on moving said latch into locking engagement with said keeper to wedge said door tightly closed it engages said keeper on one side and said door on the other as aforesaid and is maintained in wedging relation therewith by force transmitted through said arm accompanied by arcuate movement of the second mentioned axis with respect to the first mentioned axis, and torque transmitting means operatively connected to said arm at said one end thereof for rocking said arm about the first mentioned axis to transmit through said arm the force required to close said door tightly.

5. In a railway car door locking device for combination with a car body and a dumping door hinged thereon along its upper side: a shouldered keeper carried by said car body centrally of the lower margin of said door when closed, a latch centrally guided on said door for movement generally transverse to said lower margin and arranged on one side to have limited area engagement with the inside of said shouldered keeper and on the opposite side to have limited area engagement with said door substantially at said lower margin, an arm pivoted at one end about an axis fixed with respect to said door outwardly thereof and pivoted at its other end to the end of said latch away from the portion thereof arranged to engage said keeper and about an axis fixed with respect thereto whereby on moving said latch into locking engagement with said keeper to wedge said door tightly closed it engages said keeper on one side and said door on the other as aforesaid and is maintained in wedging relation therewith by force transmitted through said arm accompanied by arcuate movement of the second mentioned axis with respect to the first mentioned axis, and a shaft carrying said arm, said shaft being journaled along the swinging edge of said door and projecting beyond the outer side thereof and arranged on application of torque thereto to rock said arm about the first mentioned axis to transmit through said arm the force required to close said door tightly.

GEORGE B. DOREY.

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