June 6, 1933. L. E. ENDSLEY ET AL 1,913,154

CAR DOOR

Filed Dec. 14, 1931 2 Sheets-Sheet 1

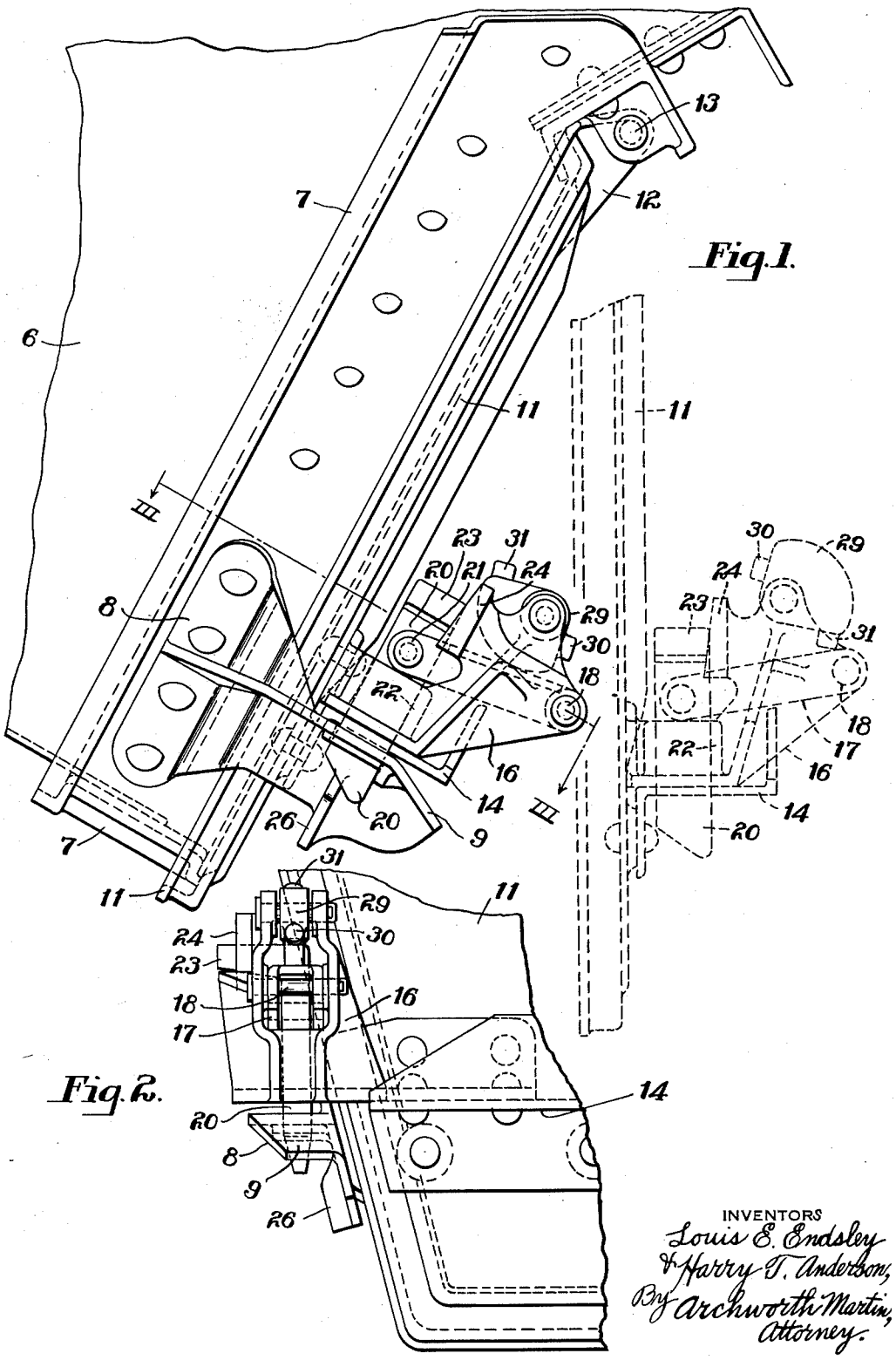



Fig. 1.

Fig. 2.

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Filed Dec. 14, 1931 2 Sheets-Sheet 2

Fig 3.

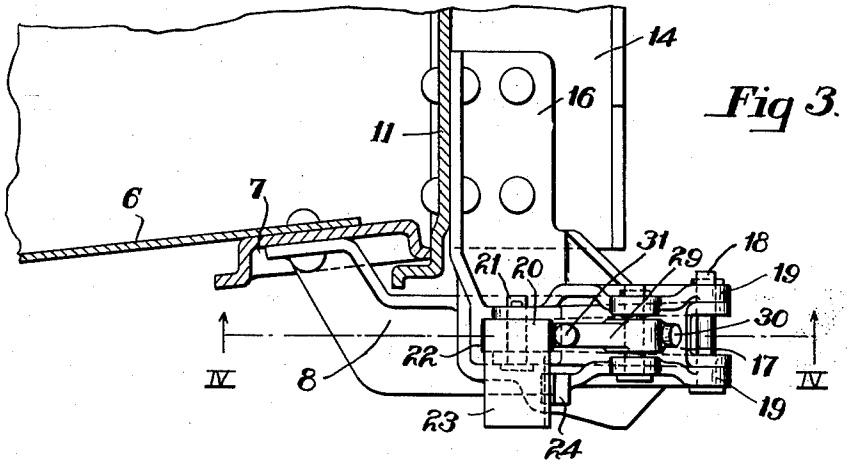
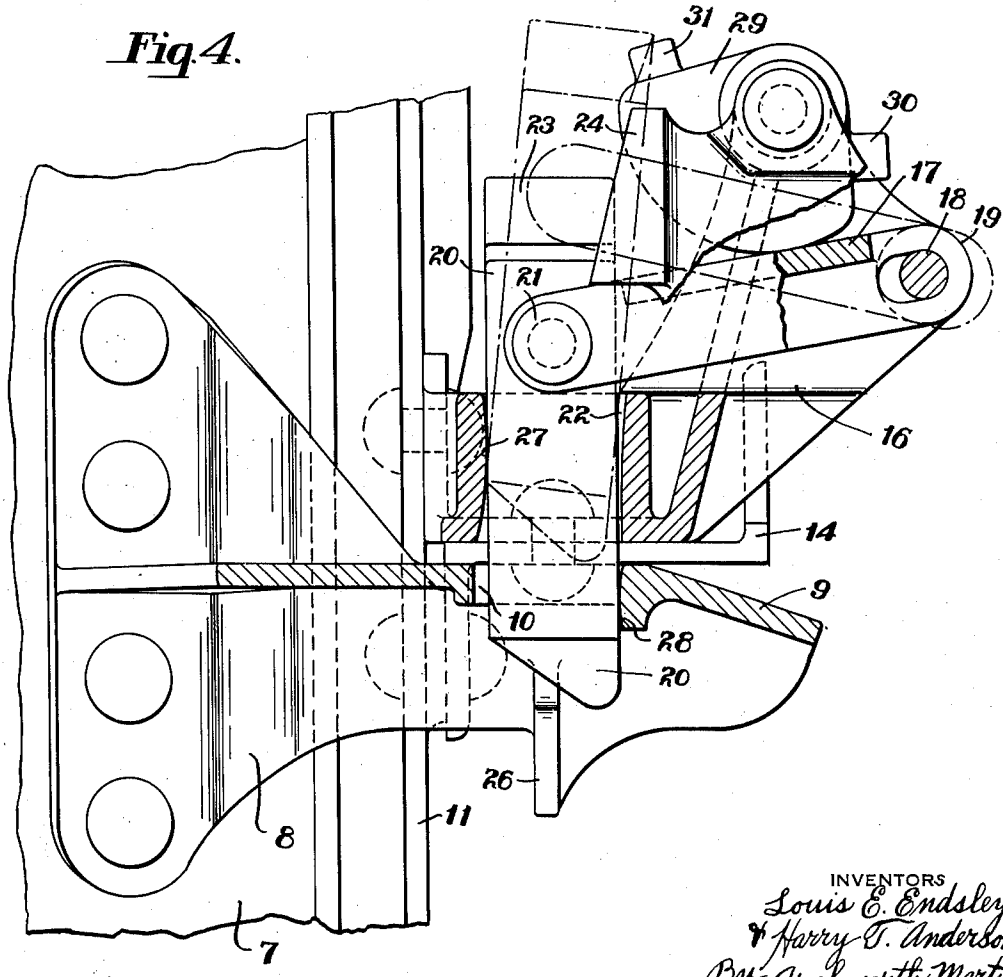



Fig 4.




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# UNITED STATES PATENT OFFICE

LOUIS E. ENDSLEY, OF PITTSBURGH, AND HARRY T. ANDERSON, OF BUTLER, PENNSYLVANIA; SAID ENDSLEY ASSIGNOR TO FORT PITT MALLEABLE IRON COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

## CAR DOOR

Application filed December 14, 1931. Serial No. 580,822.

Our invention relates to car doors and the like, and more particularly to latching or fastening devices for said doors. The invention is hereinafter described as employed more particularly in connection with the drop doors of railroad hopper cars, but it will be understood that it may be employed in connection with doors of other types.

One object of our invention is to provide a latch device that will draw and maintain a door more snugly in engagement with a door frame than in the case of various types of prior art devices.

Another object of our invention is to provide latching devices that will maintain a door snugly closed, notwithstanding wear and slight distortion of various parts of the apparatus, and which latching devices do not have to be specially made for each particular door in order to secure effective closing of the doors with which the devices are employed.

Another object of our invention is to provide a latching device that may be conveniently operated, without the necessity of employing lever bars or wrenches.

One form which our invention may take is shown in the accompanying drawings wherein Figure 1 is a fragmentary side view of a portion of a hopper car, with the drop door locked in position; Fig. 2 is a face view of the structure of Fig. 1; Fig. 3 is a view taken on the line III—III of Fig. 1, and Fig. 4 is a view taken on the line IV—IV of Fig. 3, on an enlarged scale.

The numeral 6 shows a portion of a side sheet or hopper of a car constructed in any well-known manner. A strengthening channel 7 is secured to the sheet 6 at its forward edge, and a keeper 8 is secured to the sheet 6 and the channel 7. The keeper is provided at its forward end with an inclined latch-engaging surface 9 for engagement by the door latch when the door is being closed, so that such latch will be automatically raised and caused to drop into the slot 10 of the keeper.

A door 11 is provided with hinges 12 that are pivotally supported at 13 from the car bottom, in any well-known manner. A cross bar 14 of Z bar form is secured to the door adjacent to its lower end and may extend entirely across the door or entirely across a pair of doors and serves not only to stiffen the door or doors, but to support a latching device at each end, as hereinafter explained. Since the latching devices will be duplicates, only one of them need be here shown.

A latch-supporting bracket 16 is secured to the cross bar 14 and to the door 11, by rivets or otherwise, as shown more clearly in Fig. 3. A link 17 is pivotally connected at its outer end to a pin 18 that extends through ears 19 projecting from the bracket. The pivot connection is somewhat loose, as shown more clearly in Fig. 4, so that the link may have slight longitudinal movement.

The inner end of the link 17 is pivotally connected to a latch bar or locking pin 20, by a pin 21. The latch 20 is slidable through a slot or guideway 22 of the bracket 16 and has a laterally-extending wing portion 23 that engages with an inclined camming surface 24 that is formed on the bracket 16.

In closing the door 11, it is swung from the dotted line position in Fig. 1 toward its full-line position, to cause the lower end of the latch 20 to ride across the keeper surface 9. When the door is nearly at its fully closed position, a crow bar may be inserted between an extended portion 26 of the keeper 8 and the outer side of the door and swung to force the door closed and permit the latch 20 to drop more completely into the slot 10 of the keeper.

If it is necessary that the door be forced still further toward its closed position, the upper end of the latch 20 may be struck to drive the latch still further into the keeper. During downward movement of the latch, its lateral extension or wing portion 23 will slide along the camming surface 24, thus causing the latch to function after the manner of a lever and force the door completely closed. This is particularly advantageous where the door or the hopper sheets are sprung somewhat, and will insure against the leakage of fine lading, such as slack coal or ore, past the lower edge of the hopper and the door.

The latch will have in effect a three-point engagement—one upon the camming surface 24, another upon the point 27 of the slot 22, and the third at 28, which is the end wall of the slot 10. The latch 20 has sufficient clearance with the front and rear walls of the slot portion 22 of the bracket to permit tilting thereof on the fulcrum surface 27 of this slot. Therefore, the thrust imparted upon the point 27 through inward tilting of the upper end of the latch 20 by the camming surface 24, will exert an inward thrust upon the door to close it snugly.

A cam lock 29 that functions somewhat after the manner of a pawl is pivotally supported in the upper end of the bracket 16, above the link 17. When the cam member 29 is in the position shown in Fig. 4, it holds the link 17 against upward movement, and therefore prevents accidental displacement of the latch 20. The cam 29 is provided with extended lugs 30 and 31. By hitting the lug 30 with a hammer, the cam can be driven to released position, and thus permit raising of the link 17 and the latch 20, while hammer blows upon the extension 31 will force the cam to tightly locked position. Since the cam is disposed in a plane perpendicular to the plane of the door, the lugs 30 and 31 are readily accessible for use of a hammer thereon.

The camming member 24 is of sufficient length that not only will it give a desired degree of tilting movement to the latch bar 20 as it slides into the keeper, to thereby cause sealing engagement of the door with its frame, but there may be sufficient range of tilting movement to take up looseness that results from wear or warping of the parts. Furthermore, the parts need not be machined in order that tight closing of the door may be effected.

The camming surface 24 extends in the same general direction as the longitudinal axis of the latch bolt 20, and is of such length that, as the wing 23 of the latch bolt slides along the same, the top end of the latch bolt is forced toward the door, with a range of movement determined by the length and degree of slope of said surface.

The latch pivots about the camming surface 27, shortening the distance between the upper end of the latch 20 and the surface 27, and lowering the latch-engaging point on the camming surface 28, thus giving a greater take-up by this action, which constitutes in effect a shifting of the fulcrum 27 toward the head of the bolt, thus effecting a greater take-up at the lower end of the latch bar 20.

This construction provides for freer movement of the latch pin in its upper position, and great accuracy of manufacture is not necessary, due to this large take-up by the shifting of the fulcrum point. This arrangement further provides what is in effect a floating latch bar; that is, the longitudinal axis is shifted or tilted, and there is greater clearance between the latch bar and its support when it is in its uppermost position, thus facilitating entry of the bar into the openings at 22 and 10.

We claim as our invention:—

1. The combination with a car body member and a car door member, of a keeper carried by one of said members, a latch bar, a slideway on the other of said members for guiding the latch bar toward and from the keeper, a camming surface adjacent to one end of the slideway for exerting lateral thrust on the latch bar during longitudinal movement thereof, and a fulcrum device adjacent to said slideway for causing tilting movement of the bar when lateral thrust is applied to one end thereof.

2. The combination with a door-locking structure comprising a keeper and a latch member, of a cam member of segmental form pivoted for movement into and out of locking engagement with the latch member, and extensions at the ends of said segment for receiving hammer blows.

3. The combination with a door-locking structure comprising a keeper and a latch member, of a cam member of segmental form pivoted for movement into and out of locking engagement with the latch member, and extensions at the ends of said segment for receiving hammer blows, the cam member being pivoted on an axis parallel to the plane of the door to which the locking device is applied.

4. The combination with a door locking structure, of a keeper, a longitudinally movable latch bar, a guideway positioned intermediate the ends of the latch bar for directing it into the keeper, means for shifting the upper end of the latch bar laterally, and a curved fulcrum surface on the said guideway arranged to be engaged by one side of the latch bar and to change the fulcrum point thereof during said lateral and longitudinal movements.

In testimony whereof we, the said LOUIS E. ENDSLEY and HARRY T. ANDERSON have hereunto set our hands.

LOUIS E. ENDSLEY.
HARRY T. ANDERSON.