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DOOR LATCH STRUCTURE

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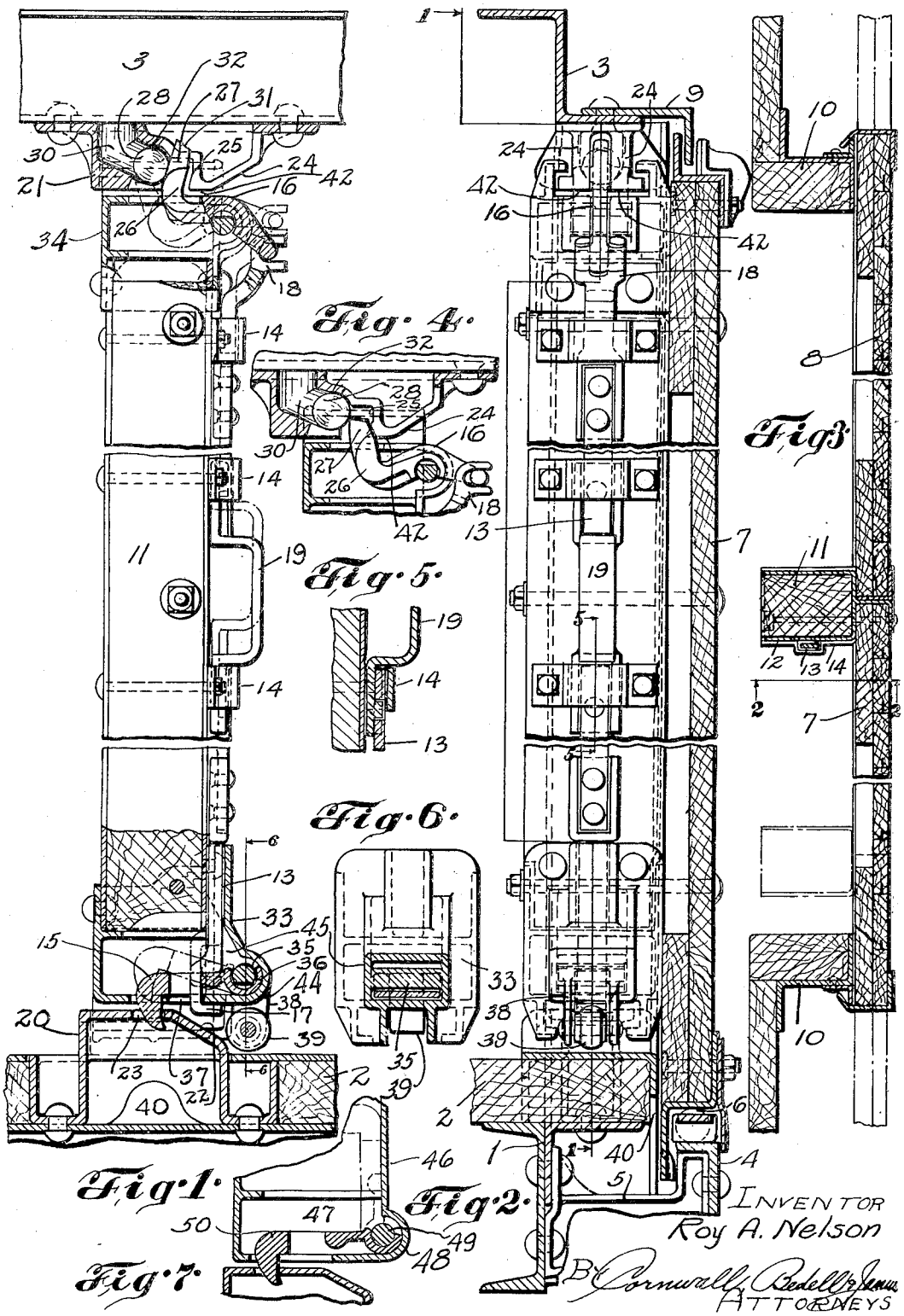

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DOOR-LATCH STRUCTURE.

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My invention relates to door structure and consists in novel means for latching a door to its frame.

While the field of use of my invention is unlimited, I have designed my present embodiment thereof for application to the abnormally wide doorways of railway freight cars where it is desirable to brace the door intermediate the door posts and, for this purpose, the door is provided with a jamb which may be secured to the side plate and side sill forming portions of the door frame. Usually the door is formed of two sections, the jamb being permanently secured to the edge of one section and that section being adapted to remain in closed position when it is feasible to utilize the small opening provided by the other section, the jamb being detachable from the sill and plate and movable with the section to which it is applied to open position when it is desired to use the full door opening.

Doors of this type are usually heavy and, due to the rough usage encountered, the securing mechanism is also heavy and, moreover, is designed to hold the door engaged with the sill and plate by the weight of the mechanism. Hence, when it is desired to open the door, it is frequently necessary to require one man to hold the latching mechanism in inoperative position and to require another man to move the door on its track.

The main objects of my invention are to provide a simple efficient door latching mechanism and to provide means associated with the latching mechanism which will automatically function when the latching mechanism is unlatched to hold the latching mechanism in unlatched position while the door is being opened and which will automatically be rendered inoperative when the door is returned to closed position, thereby permitting the latching mechanism to function.

These and other detailed objects of my invention are attained in the structure illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section through the jamb structure and associated parts of the car flooring, and it will be understood that this section extends longitudinally of the car and door. The section is taken on line 1—1 of Figure 2.

Figure 2 is a vertical transverse section through the door and car framing and showing the door jamb and latching mechanism in elevation. This section is taken on the line 2—2 of Figure 3.

Figure 3 is a horizontal section through the door and adjacent car framing.

Figure 4 is a detail section through the upper portion of the latching mechanism and corresponds to the section shown in Figure 1 but illustrates the parts in a different position.

Figure 5 is a detail section taken on line 5—5 of Figure 2.

Figure 6 is a detail section taken on line 6—6 of Figure 1.

Figure 7 is a detail illustrating a modified structure which will be described hereafter.

The car sill 1, flooring 2, side plate 3, door track 4, brackets 5 therefor, roller bearings 6, door body sections 7 and 8, guide angle 9, and door posts 10 are all of usual well-known construction and form no part of my present invention.

The jamb 11 is bolted to the door section 7 and consists in a heavy timber provided with a metal sheathing 12.

Slidable vertically on the side of jamb 11 is a latch operating bar 13 held in place by suitable brackets 14 disposed at intervals lengthwise of the jamb. Latch elements 15 and 16 are pivoted to the lower and upper portions of the jamb as will be described further, and are operated about their pivots by bar 13, the latter having a hook 17 at its lower end for engaging latch 15 in front of the latch pivot and having a fork 18 at its upper end for engaging latch 16 at the rear of the latch pivot. The intermediate portion of bar 13 is provided with a handhold 19 and it is obvious that raising the bar will move latch 15 upwardly and will move latch 16 downwardly.

The latches 15 and 16 are mounted in suitable housings 33 and 34 provided on the lower and upper portions of the jamb, respectively. Housing 33 includes side walls 45 and a transverse cylindrical wall 44 having an axially disposed bar 35, the lower face of which is flattened as best shown in Figure 1. Latch 15 has a curved lip 36 adapted to be inserted horizontally into the space between the flat side of bar 35 and the adjacent wall 44 of the housing 33 when the latch is tilted upwardly to a greater extent than is possible when the latch and bar 13 are assembled and the movement of the bar 13 limited by the brackets 14 adjacent to its handle 19.

Latch 16 is similarly assembled with housing 34 and this assembly of the latches with their housings avoids the use of bolts or other retaining means. Suitable ledges 37 on housing 33 limit the downward movement of latch 15 and similar ledges are provided on housing 34 for limiting the upward movement of latch 16. These ribs limit the movement of the operating bar 13.

The inner side of housing 33 is provided with ribs 38 on which a roller 39 is journaled a slight distance above the car floor and any sagging or teetering of the door will be counteracted by the engagement of roller 39 with the car floor.

Secured to the car sill and plate near the position of the jamb when the door is closed are stop castings or pressings 20 and 21, respectively. The lower stop 20 includes an inclined portion 22 and a recess 23, one edge of which forms a catch for latch 15. The upper stop 21 includes spaced inclined portions 24 and correspondingly spaced upright surfaces 25 forming catch elements for latch 16. When the door is moved to closed position, the forward end of latch 15 rides up inclined portion 22 of stop 20 until the latch drops into recess 23.

Latch 16 comprises spaced lugs 26 and a forwardly projecting tongue 27 between them. When the door is moved to closed position, the lugs 26 ride down the inclined portions 24 of stop 21 until these lugs are free to move upwardly to engage elements 25.

Associated with stop 21 is a latch holding device comprising a ball 28 mounted in an inclined runway 30 in stop 21 and held against separation from the stop by slightly contracting the ends of the runway.

The normal position of the latch 16, when the door is closed, is indicated in full lines in Figure 1, in which ball 28 is at the lower end of its runway 30 and is resting against the forward face of tongue 27 on the latch 16. When bar 13 is raised, swinging latch 16 in an anti-clockwise direction about its pivot, tongue 27 will move to the dot-and-dash line position shown in Figure 1, during such movement thrusting ball 28 to the left and, at the end of such movement, permitting ball 28 to return to the position shown in which it engages the upwardly facing outer end 31 of tongue 27 and preventing upward movement of the latch since the line of thrust is at right angles to the element 32 of the runway which is immediately above ball 28 in this position.

As the door is moved from its closed position the latch lugs 26 slidably engage the lower faces 42 of stop 21 before tongue 31 leaves ball 28 and the latch lugs 26 then ride up the inclined portion 24 of stop 21.

As the door is returned to closed position (see Figure 4), the tongue 27 engages the ball 28 as indicated, thrusting the latter along its inclined runway 30, the tongue 27 being held against downward movement by the weight of the bar 13 on the opposite end of latch 16. As soon as lugs 26 have passed the lower edge of catch elements 25, the latch 16 automatically moves into catch-engaging position, as shown in Figure 1, due to the weight of bar 13.

It will be understood that the manual operation of bar 13 and that the holding of latch 16 in depressed position by ball 28 also control the position of lower latch 15.

Since the opening 23 in stop 20 will admit loose material to the interior of the stop, I prefer to provide the latter with a lateral opening 40 which will permit escape of any material entering the stop.

The jamb is adapted for all steel construction as well as for wooden doors or wood and steel combinations, and the door may be used on other structures besides railway cars, such, for instance, as on warehouses, in vaults, or, in fact, wherever conditions are present in which the described structure could be advantageously employed.

In the construction shown in Figure 7, the lower housing 46 has side walls 47 and a transverse wall 48 curved about the cross bar 49. The bar 49 is located nearer to the open side of the housing than in the structure shown in Figure 1 and when the latch 50 is swung upwardly to the dot-and-dash line position indicated, it may be removed from engagement with bar 49. This arrangement eliminates the necessity of flattening the bar 49 or providing different distances between the bar and the wall 48 in any other manner.

Obviously the details of my invention may be varied without departing from the spirit thereof, and I contemplate the exclusive use of all modifications which come within the scope of my claims.

I claim:

1. In combination, a door frame mounted element, a door mounted latch member for engagement with said element, and means associated with said element and adapted to automatically hold said latch from such engagement when the latter is moved from such engagement.

2. In combination, a door frame mounted catch element, a door mounted latch member for engagement with said catch element, and means mounted on said catch element for automatically holding said latch member out of engagement with said catch element, when said member is moved from such engagement, until the door on which it is mounted is moved to open position, said means being adapted to be moved out of operating position by said latch member when said door is moved to closed position.

3. In combination, a door frame, a catch element thereon, a door movable toward and from said element, a latch movably mounted

on said door and adapted to engage said element to hold the door in place, and means on said frame operating automatically when said latch is retracted from said engagement to hold the latch retracted until said door is moved away from said catch element.

4. In combination, a door frame, a catch element thereon, a door movable toward and from said element, a latch movably mounted on said door and adapted to engage said element to hold the door in place, means on said frame operating automatically when said latch is retracted from said engagement to hold the latch retracted until said door is moved away from said catch element, and an element on said door adapted to render said means inoperative when said door is again moved toward said catch element.

5. In combination, a member adapted to be mounted on a door frame and including a catch, a device associated with said member and movable by gravity into position adjacent said catch, a latch adapted to be mounted upon a door and having a movement in one direction into position adjacent to said catch member and having another movement in another direction to engage with said catch member, said latch including an element adapted, during said first movement, to move said device from the path of said latch during said second movement thereof.

6. In a door stop and latch engaging device, a catch element, and a member mounted on the body of said device so as to move automatically to and from a position adjacent to said catch element to prevent movement of a latch in one direction into engagement with said catch element.

7. In a door latch holding device, a body having an inclined runway, a catch element adjacent to said runway, and a gravity-operated member on said runway adapted to prevent the movement of a latch into engagement with said catch element until after said member has been positively moved away from said catch element.

8. In a door latch holding device, a body having an inclined runway, a catch element adjacent to said runway, and a gravity-operated member on said runway adapted to prevent the movement of a latch in one direction into engagement with said catch element until after said latch has moved in another direction to move said member away from said catch element.

9. In a member adapted to be mounted on a door frame, an upright latch engaging surface, an inclined runway terminating near its lower end in front of said surface, and a rolling element confined between the ends of said runway, there being a horizontal top section of said runway adjacent to its lower end to positively resist vertical upward movement of said rolling element.

10. In combination, a door stop having a latch engaging surface, a door, a latch member pivoted on said door and provided with a hook to swing into engagement with said surface, and provided with a projection in front of said hook, an inclined runway in said stop in front of said surface with a short horizontal upper side near its lower end, a rolling element in said runway adapted to positively engage said side and the top of said projection when said hook is moved downwardly from engagement with said surface, to hold said hook down until said member is moved horizontally away from said stop, said projection being adapted to move said element up said inclined runway in front of said projection when said member is moved horizontally toward said stop.

11. In combination, a door latch housing having side walls, a cross bar between said walls, and a transverse wall extending about said cross bar but spaced therefrom, and a latch having a lip extending about said bar between the same and said wall, the distance between a portion of said bar and the adjacent portion of said transverse wall being greater than the corresponding distance elsewhere to provide for insertion and removal of said latch when the outer end of said lip is adjacent to said bar and wall portions.

12. In combination, a door latch housing having side walls, a round cross bar between said walls and integral therewith, and a curved transverse wall extending about said cross bar but spaced therefrom, and a latch having a curved lip extending about said bar and between the same and said wall, one side of said bar being flattened whereby, when said latch is in one angular position, said lip may be inserted between said bar and transverse wall, or removed therefrom, by a straight line movement to or from said bar.

13. In combination, a door latch housing having sides, a cross bar between said sides, a transverse member extending partway about said bar but spaced therefrom, and a latch having a lip extending partway about said bar to pivot the latch thereon, said transverse member and bar being arranged to retain said lip against movement away from said bar throughout an arc of pivotal movement of said latch about said bar and to accommodate such movement throughout a different arc of pivotal movement.

In testimony wherof I hereunto affix my signature this 27th day of April, 1928.

ROY A. NELSON.