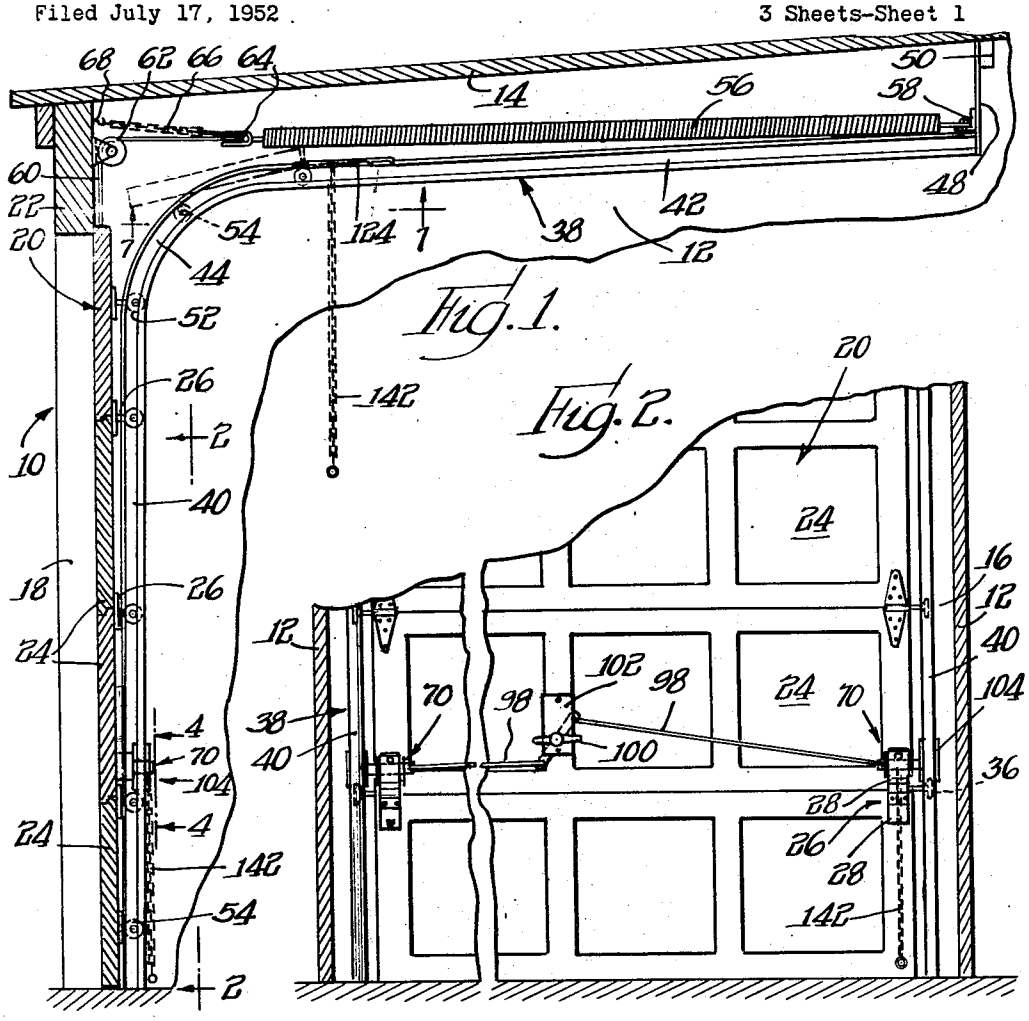
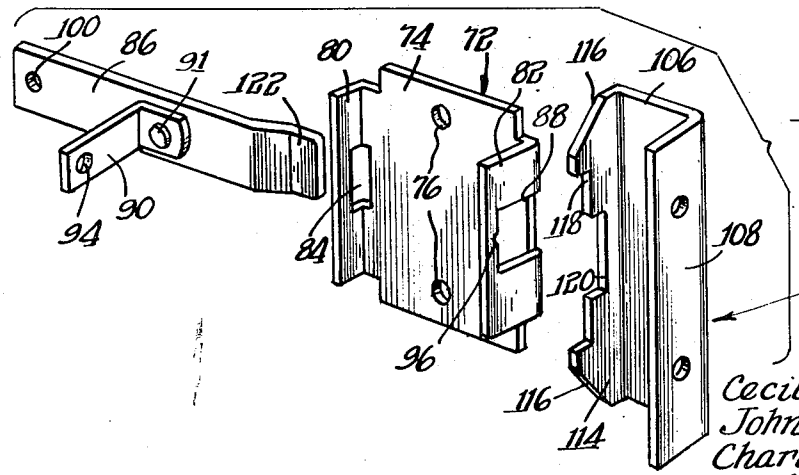
May 17, 1955 C. R. WOLF ET AL 2,708,478

FULL OPEN SECTIONAL DOOR LATCH DEVICE

Filed July 17, 1952 3 Sheets-Sheet 1





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FULL OPEN SECTIONAL DOOR LATCH DEVICE

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Fig. 4.

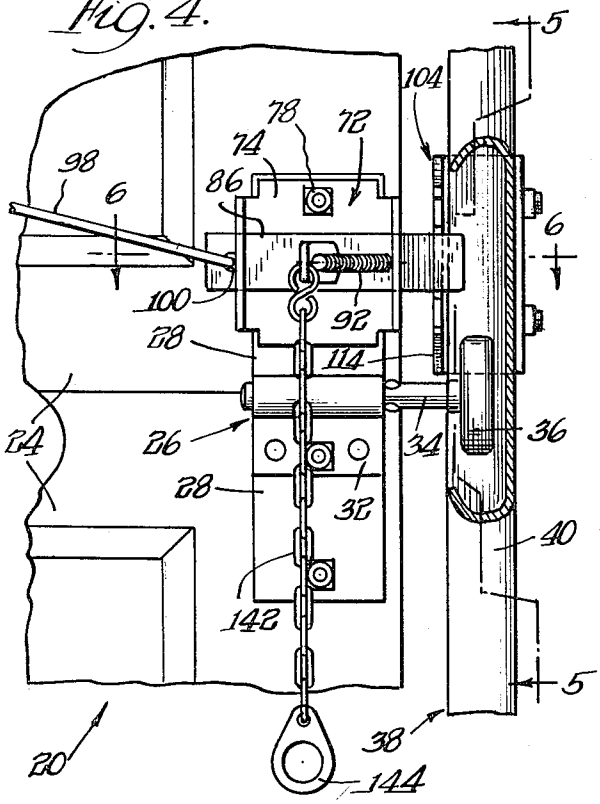


Fig. 5.

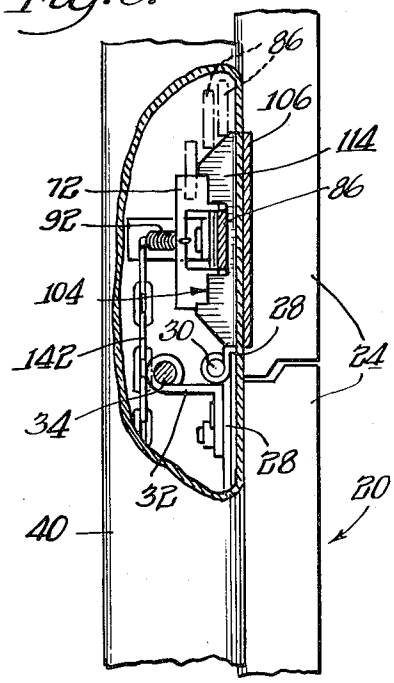
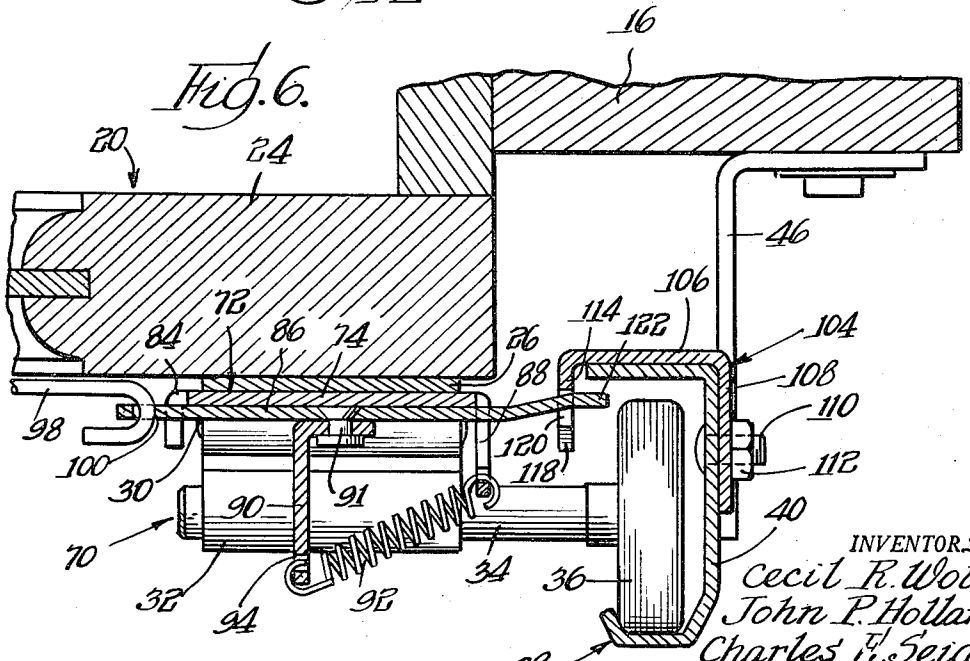


Fig. 6.



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Fig. 7.

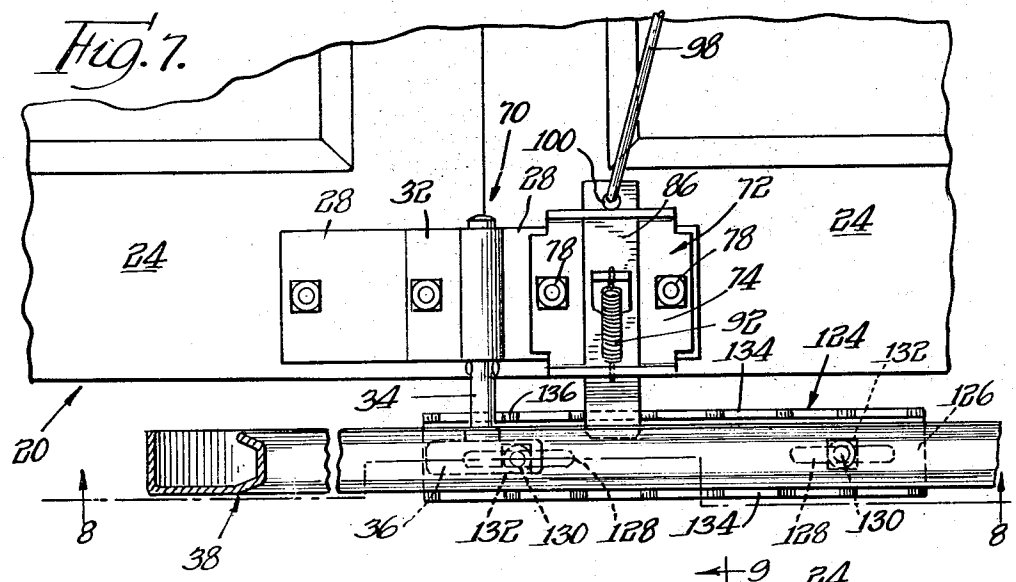


Fig. 8.

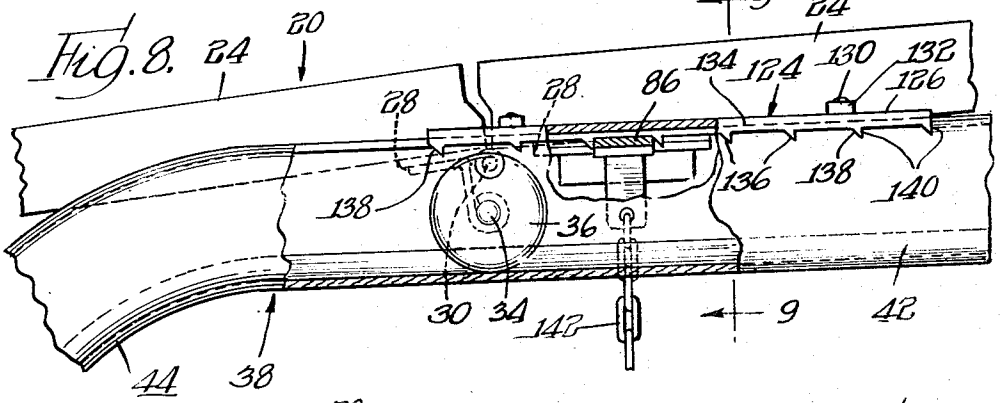
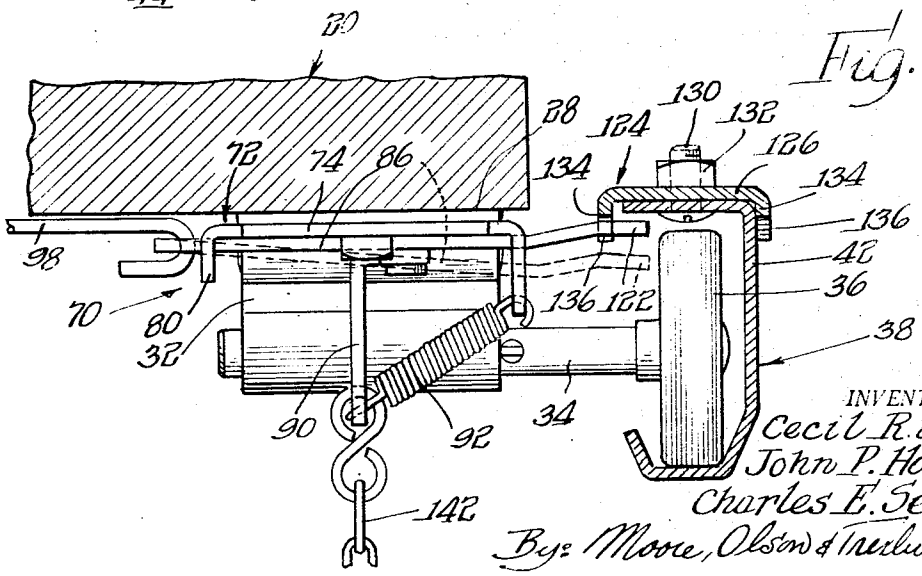


Fig. 9.



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FULL OPEN SECTIONAL DOOR LATCH DEVICE

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Application July 17, 1952, Serial No. 299,516

4 Claims. (Cl. 160—201)

This invention is concerned with overhead opening garage doors of the sectional type and particularly with a door latch device for holding such doors closed or in fully open position.

An object of this invention is to provide a new or improved door latch device for overhead opening garage doors or the like.

Another object of this invention is to provide a door latch device which automatically locks the door in closed position and which operates with a minimum of noise and shock to the door and guiding tracks.

Overhead opening garage doors are always counterbalanced, usually with springs, to simplify opening. All of the weight of the door at first must be lifted up when the door is raised from closed vertical position and in addition the inertia of the stationary door must be overcome. The door is shifted mostly horizontally when at nearly fully open position. Consequently, much more force is necessary to start an overhead opening door upwardly toward open position than is necessary to complete the opening. As a result, the momentum imparted to the door causes it to overshoot its normal overhead balanced or quiescent position and then to rebound with considerable danger to the operator and shock to the door and suspension system. The rebounding force often is augmented by the counterbalancing springs which tend to come to rest as nearly as possible in an unstressed position. Furthermore, sectional overhead opening doors tend to come to rest in a balanced position with the bottom section of the door hanging down some distance from the remainder of the door. This requires considerable headroom above the door to keep the bottom section from hanging too far down into the door opening.

An object of this invention is to provide means for completely eliminating rebounding without imparting shock to the door or tracks in so doing.

A further object of this invention is to provide means for holding an overhead door in the farthest overhead position reached, thereby leading to lower headroom requirements.

A more specific object of this invention is to provide a latch device for holding an overhead opening door in the most completely opened overhead position regardless of where that maximum open position might be in any given door opening operation within wide limits.

Yet another object of this invention is to provide a door latch device for locking an overhead opening door in fully opened position until manually released.

A further object of this invention is to provide a door latch device for holding an overhead opening door in fullest overhead opened position and preventing pulling down of the door by children.

A further object of this invention is to provide a door latch device adapted to hold an overhead opening door in closed, locked position, and also in fullest overhead opened position.

Other and further objects and advantages of the present invention will be apparent from the following description

when taken in connection with the accompanying drawings wherein:

Fig. 1 is a fragmentary cross-sectional view through a garage showing the invention as applied to a garage door;

Fig. 2 is a fragmentary plan view of the door from inside of the garage as taken along the line 2—2 of Fig. 1;

Fig. 3 is an enlarged exploded perspective view of a part of the door latch device;

Fig. 4 is an enlarged plan view of the door latch device as taken along the line 4—4 of Fig. 1;

Fig. 5 is an end view partially in section taken along the line 5—5 of Fig. 4;

Fig. 6 is a further enlarged view of the door latch device in cross section as taken along the line 6—6 of Fig. 4;

Fig. 7 is an enlarged plan view looking upwardly at the door in overhead position substantially along the line 7—7 of Fig. 1;

Fig. 8 is a view partly in cross section taken along the line 8—8 of Fig. 7; and

Fig. 9 is a further enlarged cross-sectional view taken along the line 9—9 of Fig. 8.

Referring first to Figs. 1 and 2 for the setting of the invention, there will be seen a garage generally designated by the numeral 10 having side walls 12, a roof 14, and a front wall 16 having a door opening 18. The door opening 18 is closed by a hinged, sectional door 20 closing against a header 22.

The door 20 comprises a plurality of sections 24 hingedly connected to one another as at 26. Each hinge 26 comprises a pair of hinge plates 28 (Figs. 4–9) mounted on confronting edges of adjacent door sections or panels 24 and pivotally connected by a hinge pin 30 (Figs. 5, 6, and 8). An angle bracket 32 (Figs. 4–9) is bolted to one of each pair of hinge plates and carries an axle 34 rotatably supporting a wheel or roller 36.

The rollers 36 are received in guiding tracks 38 of substantially conventional construction and having vertical and horizontal sections 40 and 42, respectively (Fig. 1), interconnected by curved portions 44. The vertical track sections are supported from the front wall 16 by suitable brackets 46 (Fig. 6) and the horizontal track sections are supported at the back by hangers 48 secured to a rafter 50 or the like of the garage. The upper and lower door sections are provided with rollers 52 and 54 mounted relatively toward the free edges of these door sections and received in the track 38 as shown in Fig. 1.

The door is counterbalanced by a pair of tension springs 56 suitably fixed to an angle member 58 extending between the rear hangers 48. Cables 60 secured to the sides of the door near the lower edge thereof pass upwardly over a pair of pulleys 62 rotatably mounted on the front wall or door header and over sheaves 64 mounted on the free ends of the springs 56. The free end of each cable 60 is secured to a link chain 66, and each chain is looped over a hook 68 in the front wall or header. Tension on the spring 56 is adjustable by looping one or another of the links of each chain 66 over the corresponding hook 68.

Door latches 70 are provided on opposite sides of the door on the next to the bottom door section 24. Each door latch 70 comprises a latch bar guide, case, or bracket 72 best seen in the perspective view of Fig. 3. The guide 72 is provided with a back plate 74 having bolt holes 76 for bolting to the upper hinge plate 28 of the lowest hinge 26 as illustrated at 78 in Figs. 4 and 7. The guide 72 is provided with vertically disposed inner and outer right angle flanges 80 and 82, respectively. The inner flange 80 is slotted at 84 adjacent the base plate 74 snugly, but slidably, to receive a latch bar 86. The outer flange 82 is provided with an opening 88 of

the same width as the slot 84 for receiving the latch bar 86, but of a considerable greater depth to allow the latch bar 86 to shift perpendicularly to its surface adjacent the outer flange 82.

Intermediate its length the latch bar 86 is provided with an L-shaped bracket or arm 90 held in place by means such as a countersunk rivet 91. A coil spring 92 (Figs. 4–7 and 9) is stretched between the outer end of the arm 90 and the upper edge of the flange 82, the arm 90 being apertured at 94 and the flange at the outer edge of the slot being notched at 96, for receipt of the end of spring 92. The spring 92 tends to pull the latch bar 86 outwardly and flat against the back or base plate 74 and tends to urge the latch bar 86 to the right as shown in Figs. 4, 6, and 9.

It will be understood that the latch 70 on the left side of the door as viewed from the inside of Fig. 2 is similar to that just described on the right side of the door. Outward movement of the latch bars 86 under the influence of the springs 92 is limited by latch release wires or rods 98 (Figs. 2, 4, 6, 7, and 9) looped through apertures 100 in the inner ends of the latch bars. The latch wires 98 are designed to be pulled toward the center of the door by rotation of a handle 100 (Fig. 2) on a lock mechanism 102. The handle 100 and lock mechanism 102 may be of conventional construction and detailed description thereof is accordingly believed unnecessary. A pull on the latch wires 98 as brought about by twisting the handle 100 will retract the latch bars 86 longitudinally against the action of their biasing springs 92.

Latch strikes 104 (Figs. 1–6) are secured to the vertical track sections 40 on opposite sides of the door in alignment with the latches 70 with the door in closed position. Each latch strike as best seen in the perspective view of Fig. 3 comprises a wall 106 adapted to lie along one edge of the track and having a right angle attaching flange 108 secured by means such as relatively flat, round headed bolts 110 and nuts 112 to the side of the vertical track section 40. The operative part of each latch strike 104 comprises a flange 114 parallel to the attaching flange 108 and on the opposite longitudinal edge of the wall 106 therefrom. The corners of the flange 114 are beveled as at 116. Only the upper corner need be beveled on each latch strike 104, but as the latch strikes are used in relatively inverted positions, it is most advantageous to manufacture them with both corners beveled. The flange 114 is provided with a relatively wide opening 118 along the free edge, and this opening opens into a relatively narrow opening 120 of exactly the proper width to receive the end of the latch bar 86, the end of the latch bar 86 being offset toward the door at 122 for this purpose.

When the door is closed, each latch bar 86 encounters one of the beveled corners 116 and is cammed outwardly thereby as shown in dashed lines in Fig. 5, the latch bar moving away from the base plate 74 of the bracket 72 and pivoting about the flange 80. The spring 92 then causes the latch bar to snap back against the back or base plate 74 with the end 122 of the latch bar in the recess 120 of the strike 104 as shown in Figs. 4–6. Retraction of the latch bars 86 by rotation of the handle 100 slides them longitudinally away from the flanges 114 of the strikes 104 so that the door may be raised.

One of the tracks 38, the right hand track as viewed from the inside of the garage having been chosen as an illustrative example, is provided with a safety strike 124 (Figs. 7–9) on the horizontal track section 42 adjacent the curved track section 44. The safety strike is designed for cooperation with the latch 70 on the corresponding side of the door and positively prevents rebounding of the door; the safety strike further holds the door locked in fully opened overhead position where children cannot lower it and needs very little headroom above the top of the door opening.

The safety strike comprises a base plate 126 adapted to lie along the top of the track section and provided with elongated slots 128 for receiving bolts 130 passed through the top flange of the horizontal track section 42. Nuts 132 threaded on the bolts 130 clamp the base plate 126 of the safety strike 124 in adjusted position against the top flange of the horizontal track section. The base plate 126 is provided along its longitudinal edges with right angularly disposed flanges 134 having a plurality of spaced apart teeth 136. As may be seen in Fig. 8 where the teeth are shown in profile, the teeth have beveled edges 138 facing toward the curved track section 44 and square latching shoulders 140. When the door is opened, the latch bar 86 cams over the beveled tooth edges 136, pivoting about the latch bar guide flange 80 as shown in Fig. 9. The spring 92 urges the latch bar 86 toward the back or base plate 74 of the guide so that the end 122 of the latch bar successively snaps against the flange 134 behind the abrupt shoulders 140 of the teeth. When the door has passed the point where there is the least possible tension on the springs 56, momentum of the door causes the door to continue to open and thus to stretch the springs until it stops the door. The resulting stretching of the springs tends to cause the door to rebound with considerable force. However, since the tip of the latch bar snaps behind the shoulders of successive teeth, the door cannot rebound any substantial distance before it is stopped by engagement of the latch bar against one of the shoulders of the teeth. Since the door is substantially at rest when the latch bar engages the shoulder of one of the teeth to prevent rebounding, very little strain is thrown on the door and suspension system, and operation is very quiet.

In order to release the door from overhead position, a link chain 142 (Figs. 1, 2, 4, 5, 8, and 9) or other flexible member is attached to the end of the L-shaped bracket or arm 90 and preferably is provided with a handle 144 (Fig. 4). A pull on the chain 142 pivots the latch bar 86 to the position shown in dashed lines in Fig. 9. This allows the latch bar to clear the teeth so that the springs 56 can partially reclose the door. Continued pulling on the chain 142 perhaps augmented by a pull on the usual handles for lowering overhead doors then will lower the door to closed position.

The flanges 134 and teeth 136 on the safety strike have been provided on both sides of the base plate 126 so that the safety strike may be placed on either track depending upon the exigencies of the situation with teeth positioned for coperation with the latch bar on the corresponding side of the door.

The door latch device disclosed thus automatically locks the door in either fully closed or fully opened overhead position. Rebounding is completely eliminated and little overhead clearance above the door opening is necessary since the door is held in the fullest possible overhead open position. Since the door is latched in overhead opened position, the door cannot be inadvertently closed by children. The latch bar makes a clicking sound as it ratchets over the teeth of the safety strike. This forms an audible signal informing the person opening the door that the door has reached opened position and is safely locked in place where it cannot rebound or fall down to endanger him.

The single example of our invention shown and described will be understood to be for illustrative purposes only. The invention will be understood as including all that which falls fairly within the spirit and scope of the appended claims.

We claim:

1. An overhead opening door construction comprising a door movable between lowered closed position and opened overhead position, overhead means providing a shoulder and a camming surface leading thereto, lower means providing a shoulder and a camming surface leading thereto, a latch member, means for yieldably

mounting said latch member on said door for movement perpendicular to said door and parallel to the plane of said door, said latch member being adapted to cam over and engage behind the overhead shoulder to hold the door in opened position and to cam over and engage behind the lower shoulder for holding said door in closed position, means for moving said latch member parallel to said door to remove said member from behind the lower shoulder, and means for moving the latch member perpendicular to the door to remove the latch member from behind the overhead shoulder.

2. An overhead opening door construction including a sectional door, guide devices on said door, guide tracks including horizontal and vertical track sections interconnected by curved track sections and receiving said guide devices for guiding said door between lowered closed position and opened overhead position, an elongated latch member, means mounting said latch member on said door for movement longitudinally of said door and perpendicularly to the plane of said door, means on a horizontal track section having a shoulder for cooperation with said latch member to retain said door in fully opened overhead position, means on a vertical track section providing a shoulder cooperable with said latch member to hold said door in closed position, means for shifting said latch member longitudinally with respect to said door to release it from the shoulder on the vertical track section, and means for shifting said latch member perpendicular to the plane of said door to move said latch member away from the shoulder on the horizontal track section to permit closing of said door.

3. A door latch comprising an elongated latch bar, means for mounting said latch bar on a door including a base plate having a pair of edge flanges thereon, one of said flanges having a slot of substantially the same size as the cross section of said latch bar for receiving said latch bar for longitudinal sliding movement, the other of said flanges having a slot larger than the cross

section of said latch bar in a direction perpendicular to said base plate for receiving said latch bar for longitudinal sliding movement and for movement of the end thereof adjacent said other flange in a direction perpendicular to said base plate, and spring means urging said latch bar toward said base plate in a direction perpendicular to said base plate and toward the flange having the larger slot.

4. A door latch comprising an elongated latch bar, means for mounting said latch bar on a door including a base plate having a pair of edge flanges thereon, one of said flanges having a slot of substantially the same size as the cross section of said latch bar for receiving said latch bar for longitudinal sliding movement, the other of said flanges having a slot larger than the cross section of said latch bar in a direction perpendicular to said base plate for receiving said latch bar for longitudinal sliding movement and for movement of the end thereof adjacent said other flange in a direction perpendicular to said base plate, an arm projecting transversely from said latch bar, and a spring stretched from said arm to the other of said flanges diagonally of said latch bar normally to urge said latch bar toward said base plate in a direction perpendicular to said base plate and toward the second mentioned flange.

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