

July 22, 1952

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2,604,345

DOOR LOCK

Filed Aug. 30, 1946

2 SHEETS—SHEET 1

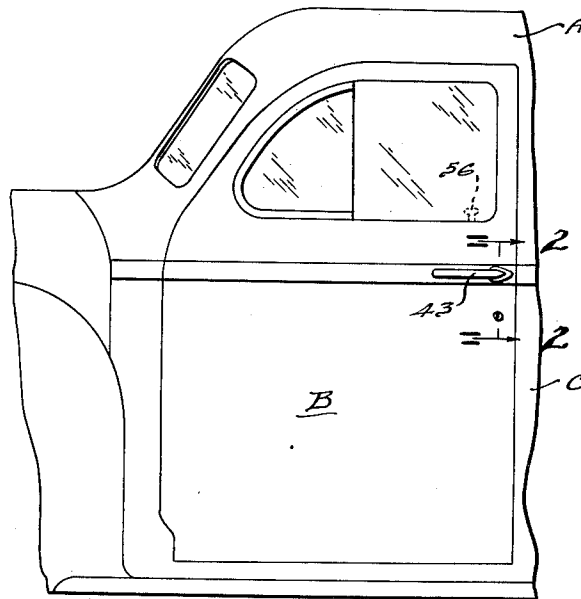


FIG. 1.

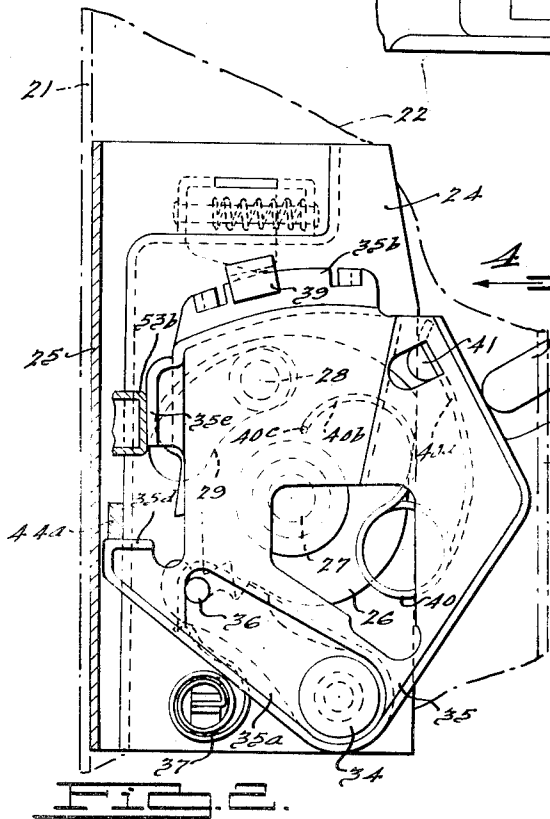


FIG. 2.

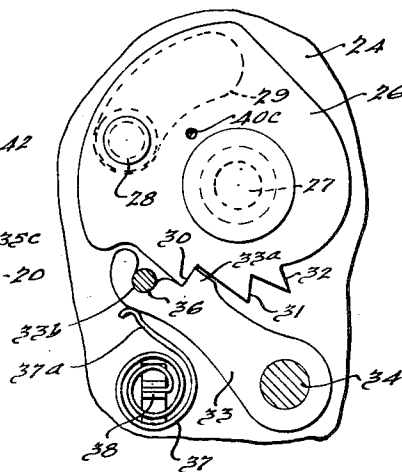


FIG. 3.

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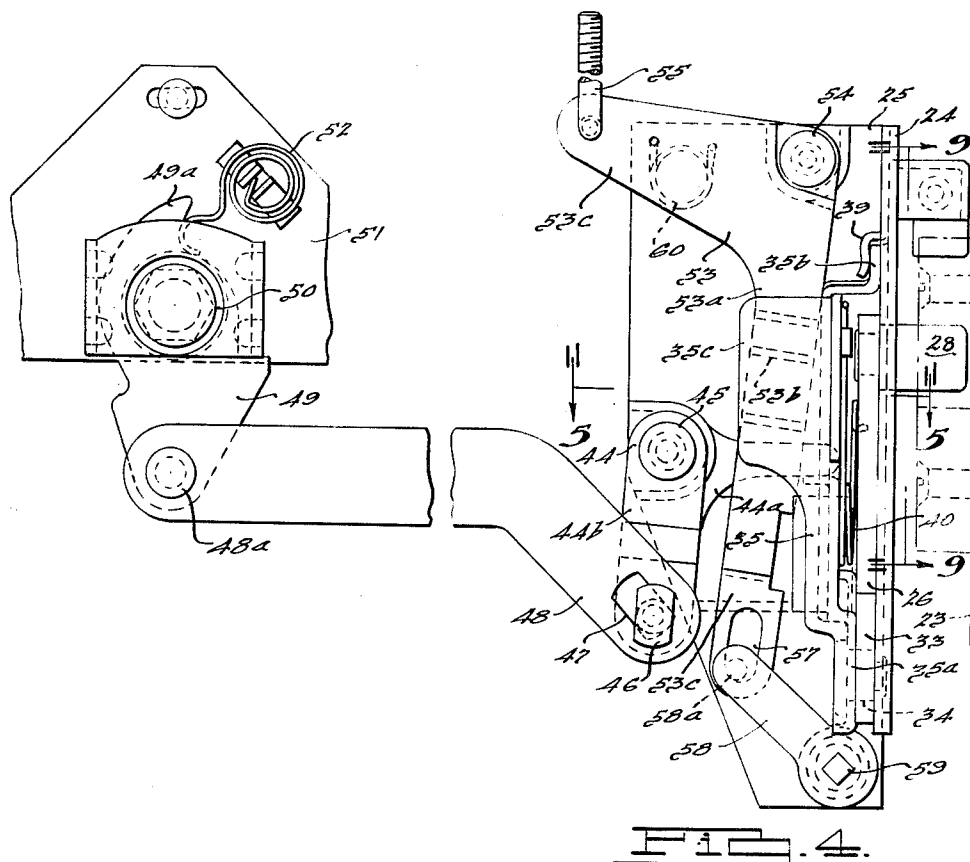
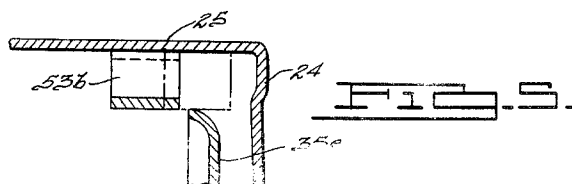
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2 SHEETS—SHEET 2



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## UNITED STATES PATENT OFFICE

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## DOOR LOCK

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6 Claims. (Cl. 292-229)

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This invention relates to latch mechanism for the swinging doors of various structures. Although especially adapted to be used in connection with the doors of vehicle bodies, such as automobile bodies, the present invention may be applied to various other uses.

An object of the invention is to provide a door latch which combines in relatively simple and compact form such desirable features as quietness of operation when closing the door, simplicity and compactness in construction, operational efficiency and economy in manufacture.

In accordance with the embodiment of the invention, herein illustrated, by way of example, there is provided a rotatable latch device mounted on a support for the latch mechanism, said support comprising a plate portion for disposition at the door jamb and having a flange extending angularly from the plate portion. An outer manually operable lever is pivotally mounted on the plate portion. The latch mechanism also comprises detent means engageable with the latch device for holding it in door latching position, the detent means also being pivotally mounted on the plate portion but being adapted to swing independently of said lever. The lever is provided with an arm portion at one side of the pivotal axis thereof, which arm portion is provided with a part arranged in opposing relation to a part of said detent means to abut the same at the same side of the pivotal axes thereof upon swinging movement of said lever arm portion in one rotative direction thereby to pivotally move said detent means in the same rotative direction out of holding position with respect to said latch device. Inner manually operable means capable of moving said detent means in said one rotative or detent disengaging direction is also provided. This inner manually operable means for disengaging the detent means from the latch device includes a bell crank lever pivotally mounted on the flange of the support. Pivotal movable means is provided for simultaneously blocking pivotal movement of said outer manually operable lever and said bell crank lever, said pivotally movable means including a blocking means cooperable with a blocking portion on the lever. The pivotally movable means is moved through the medium of inner manually operable means connected thereto and operative to pivotally actuate the same to simultaneously block pivotal movement of the outer manually operable lever and the bell crank lever.

Other objects of this invention will appear in

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the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a fragmentary side elevation of a portion of an automobile body provided with a swinging front door upon which a latch device made in accordance with the present invention is installed.

Fig. 2 is an enlarged vertical section taken substantially through lines 2-2 of Fig. 1 looking in the direction of the arrows.

Fig. 3 is a face view illustrating in detail the rotatable bolt carrying plate and locking detent or dog therefor.

Fig. 4 is a view in elevation of the latch device taken substantially from position 4 in Fig. 2 looking in the direction of the arrow.

Fig. 5 is a fragmentary section taken substantially through lines 5-5 of Fig. 4 looking in the direction of the arrows.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

In the drawings there is illustrated, by way of example, a certain embodiment of the present invention as applied to a door and door frame structure of an automobile body. As illustrated in Fig. 1, the automobile body, designated generally at A, is provided with a front door B which is hinged at its front edge so as to swing against a door post or body pillar C in accordance with conventional practice. The door comprises an outer metal door panel 20 and an inner metal door panel 21, see Fig. 2. The panel 21 terminates in a transverse jamb edge or portion 22 facing the fixed jamb face or edge 23 (Fig. 4) of the door frame post or body pillar C.

Adapted to be secured, as by means of screws, to the inner side of the jamb portion 22 of the door is a case plate 24 having a flange 25 engaging the inner door panel 21. Mounted on the case plate 24 is a rotatable latch device which in the illustrated embodiment comprises, for example, a bolt plate or member 26 which is rotatable upon a pivot or stud 27 in the form of a

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shoulder rivet secured to the case plate. Rigidly fastened to the plate member 26 at a point spaced from the pivotal axis 27 thereof is a cylindrical latch bolt 28. This bolt projects outwardly in a longitudinal horizontal direction through an arcuate slot 29 in the case plate and also through a similar and registering arcuate slot in the jamb face 22 of the door. These slots are covered and closed by the plate 26 when the door is open, as shown in Fig. 3.

The rotatable latch device or bolt plate 26 is formed on its periphery below the pivot 27 with a toothed portion forming a series of three spaced abutments or shoulders 30, 31 and 32, all of which preferably having the same depth and forming inclined detent or dog engaging surfaces. Cooperable with the toothed portion of the bolt plate 26 is a swinging detent or dog 33 pivotally mounted at its lower end upon the shank of a stud or shoulder rivet 34 secured to the case plate 24. The detent 33 is provided with a detent or dogging portion 33a engageable successively with the abutments or teeth 30, 31 and 32 of the bolt plate. When the detent engages the abutment 30 the bolt 28 is in unlatched position at the lower end of the slot 29, as shown in Fig. 3. When the detent is in engagement with the abutment 31, the bolt is in the safety locking position and when the detent is in engagement with the abutment 32 the latch bolt is in the final locking position, as illustrated in Fig. 2. Overlying the detent arm 33 and the bolt carrying plate 26 is a detent actuating or release lever 35 having at its lower end an embossed portion 35a contacting the face of the detent arm and pivotally mounted upon the stud or shoulder rivet 34 so as to swing freely thereon. Secured to and projecting from the detent release member 35 is a pin 36 which is adapted to engage within a notch 33b in the outer end of the detent 33 whereby upon swinging the lever 35 inwardly or counterclockwise from the position shown in Fig. 2 the pin 36 will swing the detent 33 downwardly so as to release the toothed portion 33a of the detent from engagement with any one of the abutments 30, 31 and 32. The detent 33 is yieldingly urged toward the bolt plate 26 by means of a coiled spring 37 having its inner end anchored at 38 between spaced lugs struck out from the case plate 24 and having its outer end 37a engaging the outer end of the detent.

The upper end of the detent release lever 35 is embossed at 35b so as to slidably engage the case plate 24 and is guided thereon by means of a tongue 39 struck out from the case plate and overlying the embossed portion 35b.

The intermediate portion of the release lever 35 between the embossed portions 35a and 35b thereof is spaced from the bolt plate 26 a sufficient distance to provide clearance for a main spring 40 which constantly urges the bolt plate 26 in a counterclockwise direction, as viewed in Fig. 2, toward bolt unlatching position. The spring 40 in the present instance has one or more intermediate coils terminating at one end in an outward extension 40a anchored at its upper end to a tongue 41 struck out from the metal of the lever 35. The opposite end of the main spring has an upward curved extension 40b anchored at 40c to the plate 26 at a point above the pivot 27 thereof. The main spring 40 is installed under predetermined load or tension so as to exert constant rotative effort on the bolt plate 26 and the detent release lever 35, this spring urging the lever toward the position shown in Fig. 2 and the

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bolt plate toward the position shown in Fig. 3. Thus, it will be seen that the main spring will resist inward movement, i. e. to the left in Fig. 2, of the release lever 35 and will also resist rotative motion of the bolt plate 26 in a clockwise direction from the position of Fig. 3 toward the position of Fig. 2. In this embodiment of the invention, therefore, a single spring means is utilized to control the bolt plate 26 and the detent actuating lever 35, the spring providing a direct connection between these parts. The outer edge of the lever 35 is formed with a lateral flange or extension 35c engageable by a plunger 42 which may be shifted inwardly by means of a pivoted pull out handle 43 (Fig. 1) or by any other suitable means such as a push button operable from the outside of the door.

Operation of the detent release lever 35 may be accomplished from the inside of the door by means of remote control mechanism which may be manually operated, as by means of a door handle or push button device, from a point at the inside of the door remote from the case plate. The remote control mechanism comprises a bell crank or two arm lever 44 pivoted at 45 through the medium of a shoulder rivet to the case plate flange 25. The bell crank 44 has a longitudinally extending arm 44a overlying at its outer end a lateral flange 35d formed on an extension of the detent release lever 35, see Fig. 2. The lever 44 also has a depending lever arm 44b connected by a stud 46 to the slotted end 47 of a remote control link 48 which at its opposite end is pivoted at 48a to the lower end of a swinging lever 49. The upper end of this lever is pivoted at 50 to a mounting plate 41 secured to the inner door panel 21. The lever is secured at its pivot 50 to the shank of the inner door handle (not shown) and is provided with an upward projection 49a engaged by a spring 52 effective to return the lever and the door handle to their normal positions after the inner door handle has been released. By turning the inner door handle to rock the lever 49 the link 48 will be shifted to the left in Fig. 4, thus rocking the bell crank 44 and depressing the lever arm 44a which by engagement with the flanged end 35d of the detent release lever 35 will swing the lever and cause the pin 36 thereon to swing the detent or dog 33 downwardly until the dog or tooth portion 33a thereof clears and is free of any one of the abutments 30-32 on the bolt plate 26.

In accordance with the present invention means is provided for blocking the detent release lever 35 against actuation either by the plunger 42 or the lever arm 44a and in any position of the bolt plate 26. This additional locking means comprises a bell crank or two arm blocking lever 53 pivoted at 54 to the case plate flange 25, see Fig. 4. The blocking lever has a depending arm 53a stamped to form an intermediate embossed portion or blocking projection 53b which, as shown in Figs. 2 and 5, is arranged in such manner as to be shifted into and out of blocking position with respect to an inner flanged edge portion 35e of the lever 35. The blocking lever 53 has a longitudinally extending arm 53c pivotally connected at its terminal end to a vertically extending rod or plunger 55. This rod projects through the garnish molding at the lower edge of the window opening and carries at its upper end a knob or button 56 (see Fig. 1) which is accessible at the inner side of the window glass of the door. When the

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knob or button 56 is pulled upwardly the rod 55 will swing the lever 53 about its pivot 54 thereby shifting the blocking projection 53b out of blocking relation to the flange portion 35e, as shown in full lines in Figs. 4 and 5. When, however, the knob or button 56 is pushed down to shift the rod 55 downwardly from the position shown in Fig. 4, the lever 53 will be rocked about its pivot thereby shifting the blocking projection 53b to the dotted line position shown in Fig. 5 into blocking or abutting relation to the flange portion 35e of the lever 35. When this occurs the lever 35 will be blocked against operation either through the medium of the inner door handle or the outer door handle or other manually operable means. Thus, the door cannot be opened through actuation of the detent release lever 35 when the blocking projection 53b is in the dotted line position of Fig. 5.

The inside blocking lever 53 may also be actuated, where desired, by means of a key controlled device from the outside of the door, such device being ordinarily incorporated in one or both of the front door locks but usually omitted in connection with the rear door locks of the vehicle. Where a key controlled device is used the arm 53a of the bell crank 53 may have a depending extension 53c provided with a vertical slot 57 within which is slidable a pin 58a attached to the upper end of a crank arm 58 pivoted at its lower end to the case plate, the lever being provided with a square opening or socket to receive a key actuated shaft 59. This shaft is connected to the cylinder mechanism of any conventional lock having the usual key control. By turning the key in the lock in the outside of the door the crank arm 58 may be swung to rock the lever 53 and shift the blocking projection 53b in the same manner as is accomplished by shifting the rod 55. The locking lever 53 is yieldingly controlled by means of a snap-over coil spring 60 one end of which is connected to the case plate flange 55 and the other end to the lever arm 53c, this spring serving to yieldingly hold the lever arm in either shifted position thereof.

It will be noted that the detent or dog 33 is free to swing on the pivot 34 independently of the detent release lever 35. Since the detent engaging steps or abutments 30-32 are of equal depths the blocking projection 53b may be shifted into blocking relation to the flange portion 35e in any position of the bolt plate 26, i. e. in the unlatched, safety locking and final locking positions thereof. Thus, when the door is open and the detent is in engagement with the abutment 30, as shown in Fig. 3, the button 56 and rod 55 may be shifted downwardly to move the blocking projection 53b to its blocking position as shown in dotted lines in Fig. 5. The door may then be closed causing the bolt to move from unlatched position shown in Fig. 3 to its final locking position shown in Fig. 2. The movement of the bolt is accomplished through engagement thereof with a suitable striker or keeper device mounted on the jamb face 22 of the body pillar. During this operation the bolt plate 26 will be rotated and the successive teeth or abutments 31 and 32 will pass over the detent projection 33a, depressing the detent against the action of its spring 37 and successively moving the detent away from the pin 36. Thus, when the release lever 35 is blocked the detent 33 is permitted independent swinging motion as the bolt plate 26 is rotated from either unlocked position or safety locking position to final lock-

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ing position. With this arrangement, therefore, it is possible to close the door from the outside and automatically lock the door without requiring the use of the key. The step 30 on the bolt plate has the additional advantage of ensuring that the bolt 28 will at all times assume a predetermined position when the door is open. Any upward shifting of the bolt when the door is open will be resisted by the spring loaded detent 33 which will at all times urge the bolt plate to full unlocked position with the detent in full engagement with the step 30.

I claim:

1. In a door latch mechanism, a support having a plate portion for disposition at the door jamb and having a flange extending angularly from said plate portion, a rotatable latch device mounted on said plate portion, detent means engageable with said latch device for holding it in door latching position, a detent release lever pivotally mounted on said plate portion and having a blocking portion, said detent means being pivotally mounted on said plate portion to swing independently of said lever, said release lever having an arm portion at one side of the pivotal axis thereof provided with a part arranged in opposing relation to a part of said detent means to abut the same at the same side of the pivotal axes thereof upon swinging movement of said lever arm portion in one rotative direction thereby to pivotally move said detent means in the same rotative direction out of holding position with respect to said latch device, a bell crank lever pivotally mounted on said support and having a lever arm engageable with a part on said release lever for swinging the same in said one rotative direction, inner manually operable means for actuating said bell crank lever, a member having blocking means for cooperation with said blocking portion, means movably mounting said member on said support, and inner manually operable means for moving said member to dispose said blocking means in position to be engaged by said blocking portion thereby to block movement of the release lever in said one rotative direction.

2. In a door latch mechanism, a support having a plate portion for disposition at the door jamb and having a flange extending angularly from said plate portion, a rotatable latch device mounted on said plate portion, detent means engageable with said latch device for holding it in door latching position, a detent release lever having a blocking portion, means pivotally mounting said detent means and said detent release lever on said plate portion for swinging movement independently of each other about a common pivot axis, said release lever having an arm portion at one side of the pivotal axis thereof overlying a portion of the detent means and provided with a part arranged in opposing relation to a part of said detent means to abut the same upon swinging movement of said lever arm portion in one rotative direction thereby to pivotally move said detent means in the same rotative direction out of holding position with respect to said latch device, a bell crank lever pivotally mounted on said support and having a lever arm engageable with a part on said release lever for swinging the same in said one rotative direction, inner manually operable means for actuating said bell crank lever, a member having blocking means for cooperation with

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said blocking portion, means movably mounting said member on said support, and inner manually operable means for moving said member to dispose said blocking means in position to be engaged by said blocking portion thereby to block movement of the release lever in said one rotative direction.

3. In a latch mechanism for a swinging door, a support having a plate portion for disposition at the door jamb and having a flange extending angularly from said plate portion, a rotatable latch device mounted on said plate portion, an outer manually operable lever having a blocking portion, detent means engageable with said latch device for holding it in door latching position, means pivotally mounting said detent means and said lever on said plate portion for swinging movement independently of each other about a common pivot axis, said lever having an arm portion at one side of the pivotal axis thereof overlying a portion of the detent means and provided with a part arranged in opposing relation to a part of said detent means to abut the same upon swinging movement of said lever arm portion in one rotative direction thereby to pivotally move said detent means in the same rotative direction out of holding position with respect to said latch device, inner manually operable means for pivotally moving said detent means in said rotative direction out of holding position with respect to said latch device and including a bell crank lever pivotally mounted on said flange, means for simultaneously blocking pivotal movement of said outer manually operable lever and said bell crank lever, said last named means including a member pivotally mounted on said support for swinging movement, said member having blocking means for cooperation with said blocking portion, and inner manually operable means connected to said member for swinging the same into and out of blocking position.

4. In a door latch mechanism, a support having a plate portion for disposition at the door jamb and having a flange extending angularly from said plate portion, a rotatable latch device mounted on said plate portion, detent means engageable with said latch device for holding it in door latching position, a detent release lever pivotally mounted on said plate portion and having a blocking portion, said detent means being pivotally mounted on said plate portion to swing independently of said lever, said release lever having an arm portion at one side of the pivotal axis thereof provided with a part arranged in opposing relation to a part of said detent means to abut the same at the same side of the pivotal axes thereof upon swinging movement of said lever arm portion in one rotative direction thereby to pivotally move said detent means in the same rotative direction out of holding position with respect to said latch device, a bell crank lever pivotally mounted on said flange and having a lever arm engageable with a part on said release lever for swinging the same in said one rotative direction, inner manually operable means for actuating said bell crank lever, a member having blocking means for cooperation with said blocking portion, means pivotally mounting said member on said flange, and inner manually operable means for swinging said member to dispose said blocking means in position to be engaged by said blocking portion thereby to block swinging movement of the release lever in said one rotative direction.

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5. In a door latch mechanism, a support having a plate portion for disposition at the door jamb and having a flange extending angularly from said plate portion, a rotatable latch device mounted on said plate portion, detent means engageable with said latch device for holding it in door latching position, a detent release lever having a blocking portion, means pivotally mounting said detent means and said detent release lever on said plate portion for swinging movement independently of each other about a common pivot axis, said release lever having an arm portion at one side of the pivotal axis thereof overlying a portion of the detent means and provided with a part arranged in opposing relation to a part of said detent means to abut the same upon swinging movement of said lever arm portion in one rotative direction thereby to pivotally move said detent means in the same rotative direction out of holding position with respect to said latch device, a bell crank lever pivotally mounted on said flange and having a lever arm engageable with a part on said release lever for swinging the same in said one rotative direction, inner manually operable means for actuating said bell crank lever, a member having blocking means for cooperation with said blocking portion, means pivotally mounting said member on said flange, and inner manually operable means for swinging said member to dispose said blocking means in position to be engaged by said blocking portion thereby to block swinging movement of the release lever in said one rotative direction.

6. In a latch mechanism for a swinging door, a support having a plate portion for disposition at the door jamb and having a flange extending angularly from said plate portion, a rotatable latch device mounted on said plate portion, an outer manually operable lever pivotally mounted on said plate portion and having a blocking portion, detent means engageable with said latch device for holding it in door latching position, said detent means being pivotally mounted on said plate portion to swing independently of said lever, said lever having an arm portion at one side of the pivotal axis thereof provided with a part arranged in opposing relation to a part of said detent means to abut the same at the same side of the pivotal axes thereof upon swinging movement of said lever arm portion in one rotative direction thereby to pivotally move said detent means in the same rotative direction out of holding position with respect to said latch device, inner manually operable means for pivotally moving said detent means in said rotative direction out of holding position with respect to said latch device and including a bell crank lever pivotally mounted on said flange, pivotally movable means for simultaneously blocking pivotal movement of said outer manually operable lever and said bell crank lever, said pivotally movable means including blocking means for cooperation with said blocking portion, and inner manually operable means connected to said pivotally movable means and operative to pivotally actuate the same to simultaneously block pivotal movement of said outer manually operable lever and said bell crank lever.

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