Jan. 15, 1952 E. D. DALL 2,582,928

DOOR LOCK

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Fig. 1

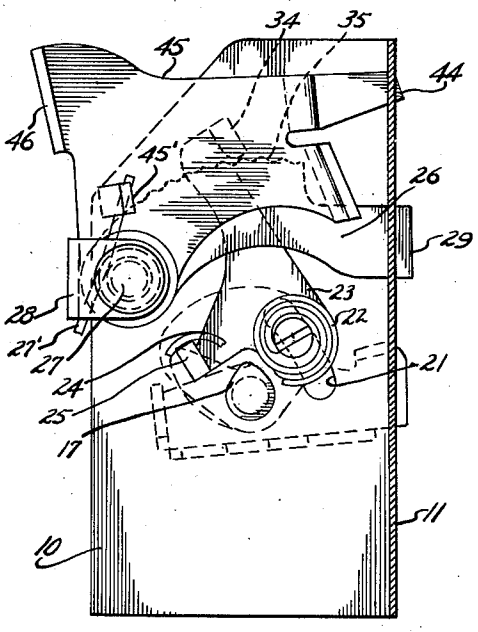


Fig. 2

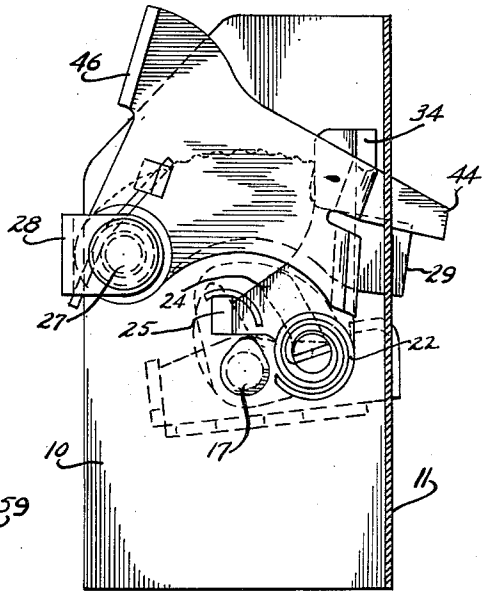
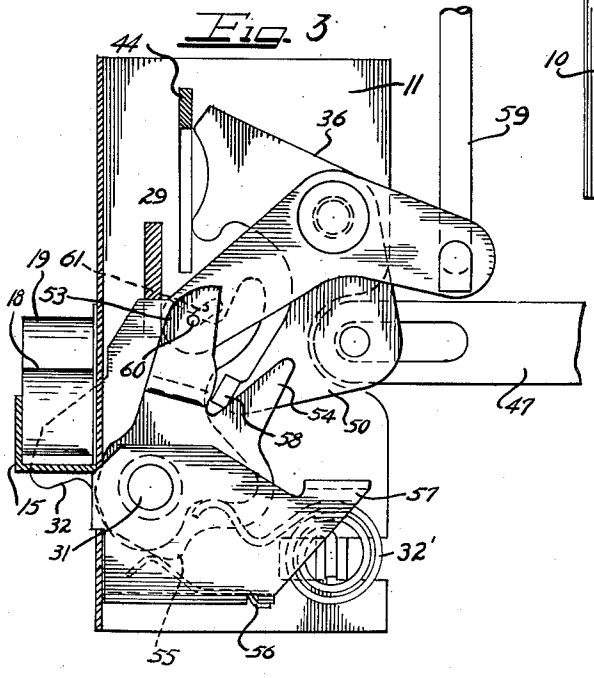


Fig. 3



Inventor
EDWARD D. DALL

By The Firm of Charlesworth & Hills, Attys.

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Fig. 4

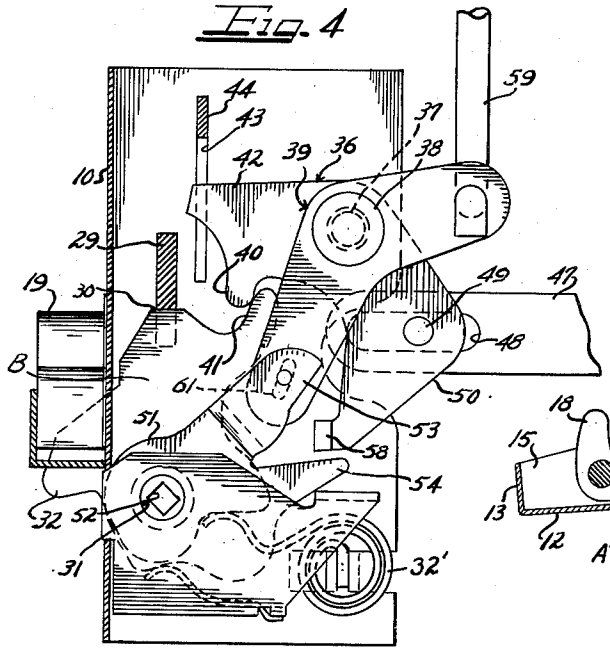


Fig. 6

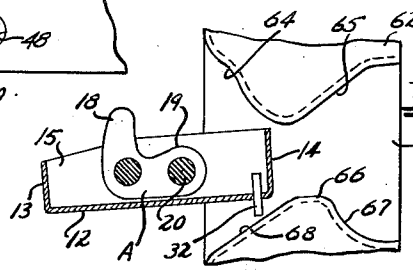


Fig. 7

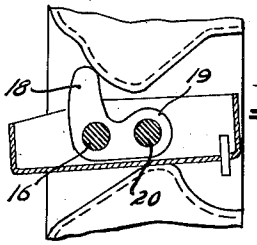


Fig. 5

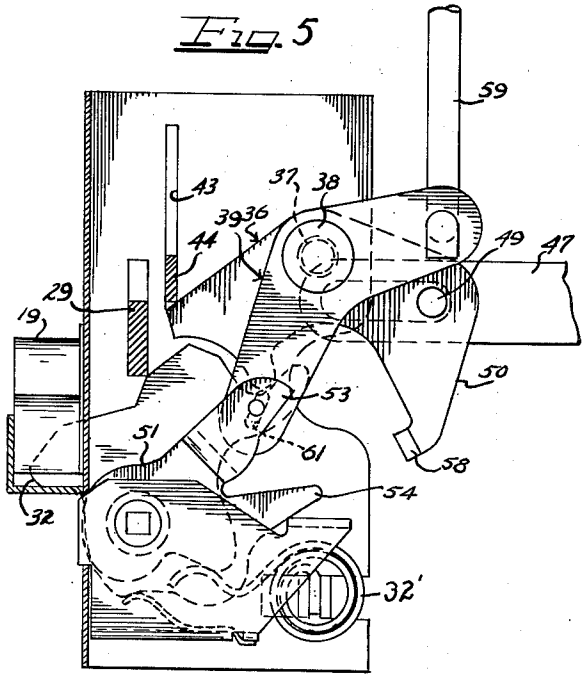
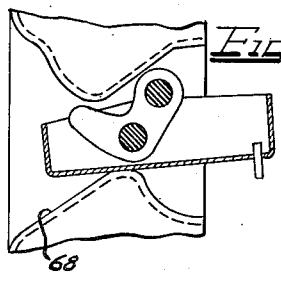


Fig. 8



Inventor
EDWARD D. DALL

By The Firm of Charlesworth Atty.

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Fig. 9

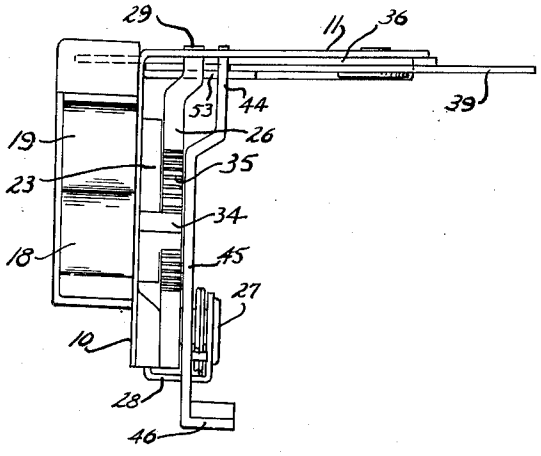


Fig. 14

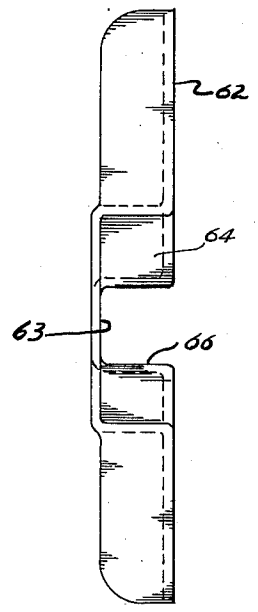
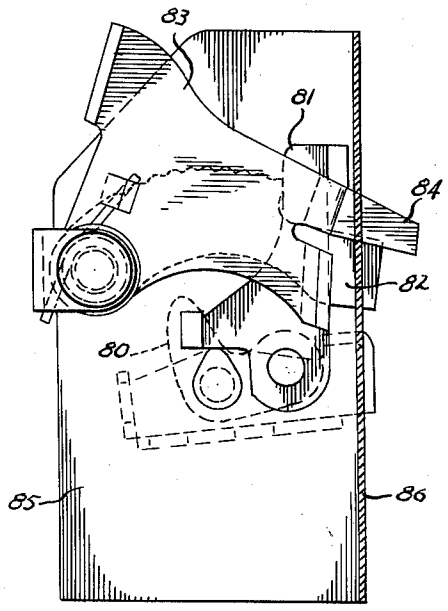


Fig. 10



Inventor
EDWARD D. DALL

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Fig. 13

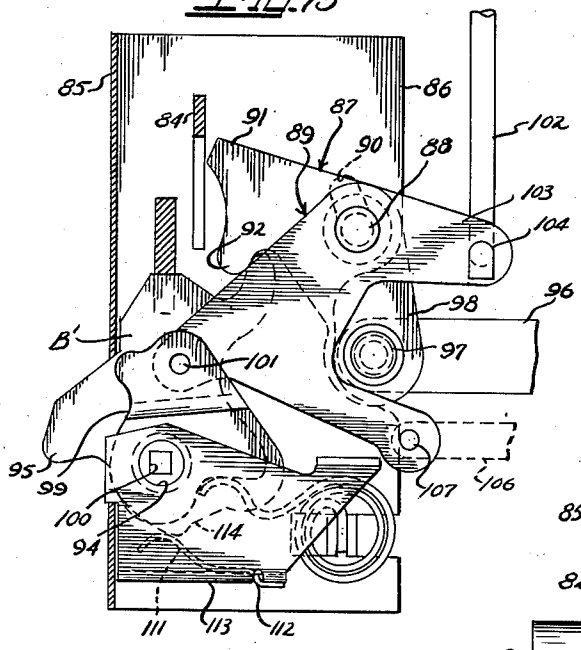


Fig. 11

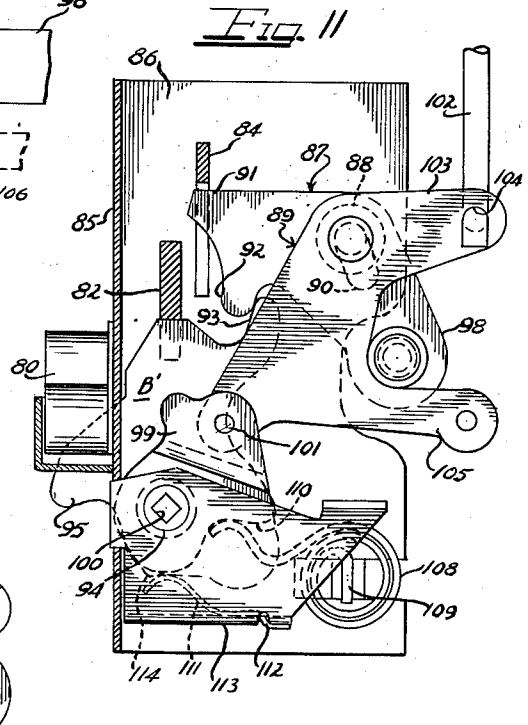
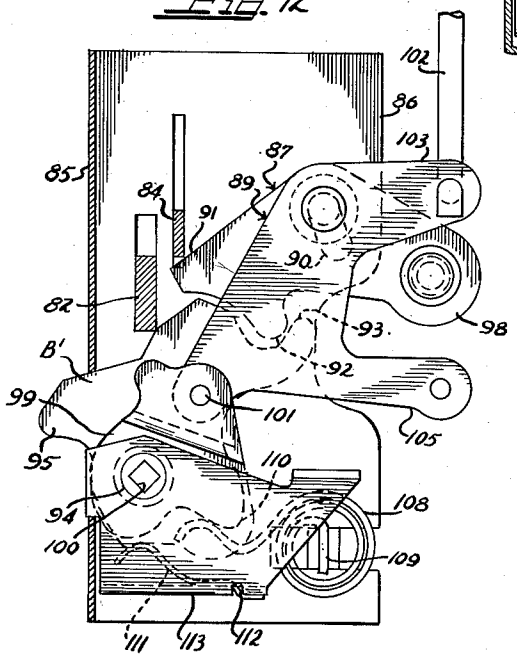


Fig. 12



Inventor
EDWARD D. DALL

By The Firm of Charlesworth Attys.

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UNITED STATES PATENT OFFICE

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DOOR LOCK

Edward D. Dall, Detroit, Mich., assignor to Houdaille-Hershey Corporation, Detroit, Mich., a corporation of Michigan

Application October 21, 1947, Serial No. 781,079

4 Claims. (Cl. 70—149)

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This invention relates to door latches, particularly for use on automobile doors.

The present invention provides a door latch structure having a latch release mechanism operable from the outside of the door and locking means for preventing release of the latch from the outside. In many types of latches such locking means interposes a positive block to the actuation of the outside handle so that the handle may not be moved at all when the door is locked. However, according to the present invention the locking means is so constructed and operates in such a manner that when the door is locked by means of a key or by some other mechanism from the inside of the door the outside handle may be moved freely without, however, having any latch releasing effect.

One advantage which is inherent in such a lock structure is that if an automobile thief should place a pipe over the outside handle to rotate it with great force in the expectation of breaking the lock, no such result will happen with the present invention as the outside handle will move freely; whereas if the outside handle were held blocked by the key operated locking mechanism, the outside handle might then be employed to exert such force upon the latch release mechanism as to break it.

Accordingly, one of the objects of the invention is to provide an automobile door latch mechanism having key controlled means for rendering the outside handle ineffective to release the latch.

Another object of the invention is to provide an automobile door latch mechanism having key controlled means for rendering the outside handle ineffective to unlatch the door but enabling the outside handle to be fully rotated, even when so rendered ineffective.

Another object is to provide inside controlled means for accomplishing a similar resultant effect on the outside handle.

Other particular objects and advantages of the invention will be mentioned hereinafter, or will become apparent from a perusal of the following specification.

In the drawings:

Figure 1 is a side elevation showing portions of the latch mechanism which are mounted on a casing plate parallel to the door edge, and omitting those parts which are perpendicular to the door edge. Figure 1 shows the position of these parts when the door is latched.

Figure 2 is a view similar to Figure 1, but showing the outside latch release mechanism operated for releasing the latch.

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Figure 3 is a view at a right angle to Figure 1 showing these parts of the latch mechanism which are mounted on a casing plate substantially parallel to the inside wall of the door, and showing the key controlled lock plate in locking position, rendering the outside handle ineffective to unlatch the door.

Figure 4 is a view similar to Figure 3, but showing the same parts in unlocked position.

Figure 5 is a view similar to Figure 4, but showing the roll back mechanism on the inside plate rotated to latch releasing position.

Figure 6 is a vertical sectional view at the edge of the door showing the rotary bolt housing about to enter the keeper.

Figure 7 is another view taken at the same position showing the position of the rotary bolt housing in safety latch position.

Figure 8 is a similar view showing the rotary bolt in latching or door holding position.

Figure 9 is a top plan view of the complete latch mechanism.

Figures 10 to 13 inclusive show a modification of my invention.

Figure 10 is an elevational view similar to Figure 2 showing the outside release member actuated to unlatch the latch mechanism, the mechanisms mounted on the roll-back plate being omitted.

Figure 11 is an elevational view of the mechanism carried on the inside roll back plate of this modified form of my invention, showing the parts in latched but unlocked position.

Figure 12 is an elevational view showing the mechanism of Figure 11 rotated to unlatching position.

Figure 13 is an elevational view showing the same parts in latched and locked position.

Figure 14 is a side elevation of the keeper employed with either form of the invention.

As shown on the drawings:

The parts of the latch mechanism are mounted on a casing which is bent to form two plate members substantially at right angles to each other, the plate member which is mounted parallel to the door edge being numbered 10, while the plate which lies substantially parallel to the inner wall of the door is numbered 11.

The plate 10 supports the rotary bolt and will be referred to hereinafter as the rotor plate, while the plate 11 supports the roll back mechanism, and will be referred to as the roll back plate.

The rotary bolt, which is generally designated as A, is mounted on the rotor plate at the edge of the door in the following manner. A box shaped

housing for the rotary bolt having a bottom wall 12, end walls 13 and 14 and a side wall 15 is secured to the outside surface of the rotor plate in any appropriate manner. A pivot post 16 for the rotary bolt has one end supported in the outside wall 15 and its inner end is supported on the rotor plate, extending therethrough and carrying on its inner end a cam shaped collar 17, whose function will be described later.

The rotary bolt has a striker arm 18 and latching arm 19. Secured in the arm 19 is a post 20 which extends through a curved slot 21 in the rotor plate. The inner end of the post 20 is provided with a kerf in which is crimped one end of a spring 22. The post 20 serves also as a pivotal mounting for a take up arm 23 having a laterally extending portion 24 and a flange 25 extending therefrom over which is laid the other end of the spring 22, whereby the spring tends to rotate the arm 23 about the post 20. In the unlatched position of the mechanism as illustrated in Figure 2, the projection 24 of the take up arm will rest upon the cam shaped collar 17.

The take up arm 23 cooperates with a rotor lever 26 which is pivotally mounted on a post 27, one end of which is supported on the rotor plate 10 and the other on a U-shaped bracket 28 secured to the rotor plate. The movable end 29 of lever 26 extends through a vertical guide slot in the roll back plate 11. When the door is open, or when it is closed and latched, the free end 29 of the rotor lever is supported on a horizontal shoulder 30 of a safety latch plate generally designated as B which is pivotally mounted on a post 31 supported on the roll back plate 11.

The safety latch plate has a projection 32 serving as a safety latch bolt which is normally projected through a vertical slot in the rotor plate and through a horizontal slot in the bottom wall 12 of the rotary bolt housing by the action of a spring 32' anchored as shown on the rotor plate 11. The spring 32' serves as a restoring spring for the safety latch plate B. Hence, following the opening of the door, the safety latch plate is restored to normal by its spring and will raise the rotor lever 29 back to its normal position as shown in Figures 1 and 3.

When the door is closed and the rotary bolt occupies a position such as that shown in Figure 8 in latching engagement with the keeper, the rotation of the rotary bolt from unlatched position shown in Figure 6 to latched position shown in Figure 8 will have carried the take up arm 23 along with it and cause the head 34 of the take up arm to ride upon and firmly engage the wavy or serrated surface 35 of the rotor lever 26. In such a position the spring 22 holds the take up arm head firmly engaged with the rotor lever, which prevents the rotary bolt from unlatching due to any pressure tending to open the door. At such a time, the force exerted by the head of the take up arm on the rotor lever will be in a downward direction toward the pivot of the take up arm, as can be readily perceived by observing Figures 1 and 8 simultaneously.

It should be noted that a rotary bolt constructed in accordance with this invention is not under the pressure of any spring tending to rotate it either to latched or to unlatched position. It is moved only by engagement with the keeper as the door closes or opens.

After the rotary bolt becomes latched and is held in latched position by the take up arm, the free end of which is supported on the safety latch bolt, the only way in which the rotary bolt may

be released for unlatching movement is by rotating the safety latch plate out from underneath the end of the rotor lever 26.

The mechanism for retracting the safety latch bolt and simultaneously releasing the take up mechanism which holds the rotary bolt latched is mounted in part on the roll back plate 11.

An inside release lever 36 is pivotally mounted on the roll back plate 11 by means of a post 37 whose enlarged head 38 is employed also for retaining on the post a lock operating lever 39. An operating finger 40 on the inside release lever is engaged with an operating finger 41 on the safety latch plate. One arm 42 of the inside release lever extends past a slot 43 in which is guided the end 44 of a rockable outside release lever 45 pivoted on post 27 (see Fig. 1). A lateral flange 46 is provided on this outside release member and when the lock is installed in a door the flange 46 will be located near the outer surface of the door to be operated upon either by a push button or by some mechanism connected with a pivoted handle (not shown) whereby pressure applied against this flange will cause the outside release lever 45 to pivot about its supporting post 27 which will cause the inner end 44 of the outside release lever to press downwardly on the arm 42 of the inside release lever, causing through the cooperation of the operating fingers 40 and 41, the safety latch plate to be rotated about its pivot 31 and thereby be rotated from underneath the free end 29 of the rotor lever 26. Thus, the take up mechanism holding the rotary bolt in latched position can be released from the outside of the door, simultaneously with the retraction of the safety latch bolt 32.

For releasing the take up mechanism from the inside of the door, I provide a remote control link 47 which is connectable with an inside door handle in any well known manner and provide this link with a slot 48 which is engageable with a laterally extending post 49 carried by the lower arm or the downwardly extending arm 50 of the inside release lever. Thus, in an obvious manner, when the link 47 is pulled a sufficient distance to the right, as Figure 4 is viewed, the inside release lever 36 may be rocked to cause the safety latch plate to be retracted and thus release the take up mechanism.

Whenever either the inside or outside handle mechanism is employed for rocking the safety latch plate, the latching nose 32 of that plate will be withdrawn into the rotary bolt housing, and as is apparent from Figures 5 and 7, this safety latch bolt will therefore clear the lower latching projection in the keeper when the door is being opened.

A spring 27' wound about post 27, having one end abutting bracket 28 and its other end abutting an ear 45' struck out from lever 45 functions to restore that lever to its normal position shown in Figure 1.

For the latch mechanism shown in Figures 1 to 9, inclusive, I provide several mechanisms for establishing a locked condition which will prevent unlatching of the door from the outside. These mechanisms will now be described.

A lock plate 51 is pivotally mounted about the hollow post 31 and a square aperture 52 formed therein serves to receive a shank from a key controlled lock of ordinary construction with which automobile doors are customarily equipped. The square shank on such a lock can be employed to rotate the locking plate 51 to and from locking position. The plate 51 is provided with

two arms 53 and 54 and with a projection 55 upon its lower edge which cooperates with a spring 56 anchored as shown in the cover plate 57 to releasably hold the lock plate in either of its two positions. If the key be employed to rotate the lock plate from unlocked position shown in Figure 4 to locked position shown in Figure 3, the arm 54 of the lock plate will engage a flange 58 on the arm 50 of the inside release lever and rotate that lever into the position shown in Figure 3. In this position, the arm 42 of the inside release lever has been moved out from under the free end 44 of the outside release lever. Therefore, if anyone, from outside of the door rocks the outside release lever 45 downwardly about its pivot post 27 it will have no effect upon the inside release lever 36, and the door will remain latched. This type of lock mechanism therefore serves to render a portion of the latch releasing mechanism ineffective for actuation by the outside release mechanism.

When a key is employed from the outside to return the lock plate 51 back to its unlocked position the arm 53 of the lock plate will engage the flange 58 on the inside release lever and cause that latter lever to be rotated counterclockwise, as Figure 3 is viewed, and again place the arm 42 underneath the end 44 of the outside release lever. When the mechanism is restored to this normal condition, the door may then be unlatched from the outside.

The lock plate 51 also may be rotated from locked position by means of the inside handle controlled link 47 which, acting upon the post 49, may be employed to directly rock the inside release lever 36 back to normal position and through cooperation of the flange 58 and the arms 53 and 54 move the lock plate to unlocked position. Further movement of the inside handle in the same direction would, of course, unlatch the door.

Locking or unlocking of this door lock mechanism may also be accomplished by means of a conventional button which usually is located in the selvage of the door adjacent the window. For this purpose I provide the bell crank 39 which is pivotally connected to the push rod 59 which may be raised or lowered by means of the push button, mentioned, but not shown. A pin 60 extending laterally from the arm 53 of the lock plate engages a slot 61 in the bell crank 39 whereby rocking of the bell crank 39 may be utilized in an obvious manner to rotate the lock plate to and from locked position, and this oscillation of the lock plate 51 will, through the action of its two arms 53 and 54 on the flange 58 of the inside release lever 36, rock that latter lever either under or out from under the extremity 44 of the outside release lever. Thus, the push rod 59 may be employed to render the outside release mechanism effective or ineffective for unlatching the door.

The keeper which is preferably employed with the latch mechanism herein described and shown in Figures 6 to 8, inclusive, and Figure 14 may be formed from a plate having a flange portion 62 for securing to the door post and a recessed portion generally indicated at 63 for admitting the rotary bolt when the door is being closed. A shoulder 64 serves as the strike surface for the striker arm 18 of the rotary bolt, whereas the shoulder 65 serves as the latching shoulder against which the latching arm 19 rests when the door is latched. The bottom of the latch bolt housing will rest upon the projection 66 when the door is closed and latched, and the shoulder 67 will serve

as the safety latch projection to cooperate with the nose 32 of the safety latch plate.

Another feature of the lock mechanism shown in Figures 1 to 9, inclusive, which may be noted here is that if the lock plate 51 be rotated into its locking position by either of the two methods heretofore described at a time when the door is open, the subsequent closing of the door will reset this lock plate back to unlocked position. As the door is being closed, under these circumstances, the safety latch bolt 32 will ride up on the inclined surface 68 of the striker plate rocking the safety latch plate to fully unlatched position. During this movement, the operating finger 41 of the safety latch plate will strike the flange 58 of the inside release member 36 and simultaneously rotate lever 36 back to its normal position where it is again effective for unlatching operation and at the same time, by reason of the engagement of the flange 58 with the lock plate arm 54, will move the lock plate itself back to its unlocked position. Thus, a door equipped with the latch mechanism just described cannot be placed in a locked position with the door open and remain in that condition upon slamming, thus locking the driver out of the car when his keys might happen to be in the ignition switch.

A modified form of the invention is shown in Figures 10 to 13, inclusive. In this modified form, I employ the same rotary bolt construction, take up mechanism and outside release mechanism which I have shown and described in connection with Figures 1 to 9, inclusive, hence those portions of the mechanism will not be described as in as great detail as they have already been described. It will suffice to note the location of a rotary bolt 80, a take up arm 81 pivotally mounted on the rotary bolt, the rotor lever 82 and the outside release lever 83 whose inner free end 84 is employed for actuating the inside release mechanism to cause a retraction of the safety latch plate B', shown in Figures 11 to 13, inclusive. This safety latch plate B' is identical with the similar plate B heretofore described.

The difference between the modified form of the invention and the first described form resides in the inside release mechanism and the locking system, all of which are mounted upon the roll back plate portion of the lock mechanism.

In this form the rotor plate 85 supports the rotary bolt and outside release lever, while the roll back plate 86 supports the inside release mechanism, which includes an inside release lever 87 pivotally mounted on a post 88, together with an intermediate lever 89 which likewise is pivotally mounted on the post 88. This post, in addition to furnishing pivotal support for the two levers just mentioned, extends through a slot 90 in the roll back plate 86 for sliding movement therein. When this latch mechanism is in normal locked position, as shown in Figure 11, the post 88 is in the upper end of the slot 90, and if the outside release lever 83 then be rotated for the purpose of unlatching the safety latch plate B' the inner end 84 of the outside release lever will bear downwardly upon the arm 91 of the inside release lever to cause the operating finger 92 thereof to bear against the operating finger 93 on the safety latch plate B' and cause the latter to rock about its pivotal support at 94. This action not only retracts the safety latch bolt nose 95 but also removes the safety latch bolt from its supporting position underneath the free end of the rotor lever 82, thus releasing the take up mechanism, as will be understood from the

description of the first described form of this invention.

The safety latch bolt may also be retracted by means of an inside remote control link 96 pivotally connected by means of a post 97 to the arm 98 of the inside release lever.

For locking the latch mechanism from the outside of the door by means of a key, I provide a key lever 99 pivotally mounted at 94 and having a squared aperture 100 therein for the reception of the customary square shank on a key operated door lock of the type commonly used on automobile doors. This aperture 100 may therefore be used to bring about the rotation of the key lever 99 in either direction between the unlocked position shown in Figure 11 and the locked position shown in Figure 13. When the key lever is rocked in a counterclockwise direction from the position shown in Figure 11 the intermediate lever 89, which is pivotally connected by means of a post 101 to the key lever, will rotate in a clockwise direction and its supporting post 88 will slide downwardly in the inclined notch 90 and this movement of the post 88 will cause the inside release lever 87, which has a pivotal contact with the safety latch plate where the operating fingers 92 and 93 touch each other, to likewise rotate in a clockwise direction, causing the arm 91 of the inside release lever to move as shown in Figure 13 out of the path of the outside release lever 83, should the latter be operated for the purpose of unlatching the door. Consequently, the door cannot then be unlatched from the outside by means of the outside door handle or push button.

Return of the key lever to its position as shown in Figure 11 will, of course, reverse the operation just described and enable the door to be unlatched from the outside.

While the key lever is in the door locking position, the door may nevertheless be unlatched from the inside by means of the remote control link 96, as a retractive movement on that link acting through pin 97 will actuate the inside release lever 87 to retract the safety latch bolt and cause the post 88 to slide upwardly in the inclined notch 90, resulting from pressure between fingers 92 and 93. This action restores the key lever to unlocked position.

The lock mechanism may also be placed in condition to prevent latch release from the outside by means of a push rod 102 connected to the arm 103 of the intermediate lever 89. By means of the rod 102, which is pivotally connected at 104 to the arm 103, the intermediate lever 89 may be rotated clockwise causing the key lever 99 to rotate counterclockwise, causing the post 88 to move downwardly into slot 90, and raising the arm 91 of the inside release lever out of the path of the outside release lever.

The arm 105 which is also integral with the intermediate lever, is provided for optional use in the event that it is desired to locate the inside push button at a point on the door remote from the latch mechanism. In such case, a remote control link 106, indicated in dotted lines in Figure 13, would be pivotally connected at 107 to the intermediate lever and extended away from the latch mechanism and connected by a suitable bell crank to a vertically extending rod similar to 102 and equipped with a push button.

The spring 108 anchored to casing plate 86 at 109 and pressing against the under side of shoulder 110 on the safety latch plate keeps the latch bolt portion 95 thereof normally projected and holds the latch plate steady during shifting movements of the lock plate. The spring 111 anchored at 112 to the cover plate 113 and acting on either side of projection 114 on the lock plate assists in frictionally retaining the lock plate either in locked or unlocked position. The restoring spring 108 not only restores the latch plate from rotated position shown in Figure 12 to normal position shown in Figure 11, but also enables the latch plate in the same movement to lift the lever 82 back to normal and rotate release lever 87 from the position shown in Figure 13 back to its normal position shown in Figure 11.

It will be noted that in either form of the invention as described herein, the operation of conditioning the latch mechanism so that it cannot be retracted from the outside, consists of rotating the inside release lever out of the path of the outside release lever.

While I have shown and described in detail a preferred form of the invention, it should be understood that various details and construction thereof may be modified considerably without departing from the spirit and scope of the invention defined in the appended claims.

I claim as my invention:

1. In a door latch mechanism, a pivotally mounted bolt, a bolt retracting member and a shiftable pivotal mounting therefor, outside handle actuated means for actuating said bolt retracting member, key operated locking means rotatable to and from locking position, and a lever pivotally connected with said locking means and pivotally mounted on said shiftable pivot mounting effective upon rotation of the locking means into locking position for shifting said pivotal mounting and simultaneously rocking said bolt retracting member out of the path of movement of said outside handle operated actuating means.

2. In a door latch mechanism, a pivoted latch, a retracting member having a finger engageable with said latch for retracting said latch, a shiftable pivot for said retracting member, pivotally mounted actuating means engageable with said retracting member for actuating said retracting member to retract the latch, a pivotally mounted key operated locking member rotatable by a key between locking and unlocking positions, a lever pivotally mounted on said shiftable pivot and pivotally connected with said key operated locking member, whereby rotation of said locking member into locking position pivots and translationally moves said retracting member on said shiftable pivot out of the path of movement of said actuating member, to render said actuating member ineffective to actuate said retracting member.

3. In a door latch mechanism, a latch casing having one casing plate mountable parallel to the door edge and a second casing plate for mounting parallel to the inside door wall, a latch pivotally mounted on said second casing plate, a slot in said second casing plate, a pivot pin movable along said slot, a latch retracting member pivotally mounted on said pin and having an operating finger engageable with said latch, for moving said latch into retracted position, an actuating member movably mounted on said first mounting plate and having operative engagement with said latch retracting member, for moving said retracting member in a direction to retract the latch, a key operated member pivotally mounted on the second plate for rotation to and from locking position by a key, and means con-

necting said key operated locking member with said movable pivot pin to move said retracting member along said slot and simultaneously rotate said retracting member by its reaction against said latch out of the path of movement of said actuating member upon rotation of the key operated locking means into locking position, to render said actuating member ineffective for retracting the bolt.

4. In a door latch mechanism, a pivoted latch, a latch retracting member engageable with said latch, a shiftable pivot therefor, outside handle operated actuating means engageable with said retracting member for actuating the same to retract the latch, a lever pivotally mounted on said shiftable pivot, a pivotally mounted key operated locking lever spaced from said shiftable pivot, means pivotally connecting said key operated locking lever with said lever, and an inside operated link pivotally connected with said lever for rotating said lever in one direction and said key operated locking lever in an opposite direction and translationally and rotatably moving said retracting member on said movable pivot out of the path of movement of said actuating means, to render said actuating means ineffective to unlatch the door.

EDWARD D. DALL.

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