

Jan. 5, 1954

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2,665,160

DOOR CONTROL MECHANISM

Filed Dec. 7, 1949

5 Sheets-Sheet 1

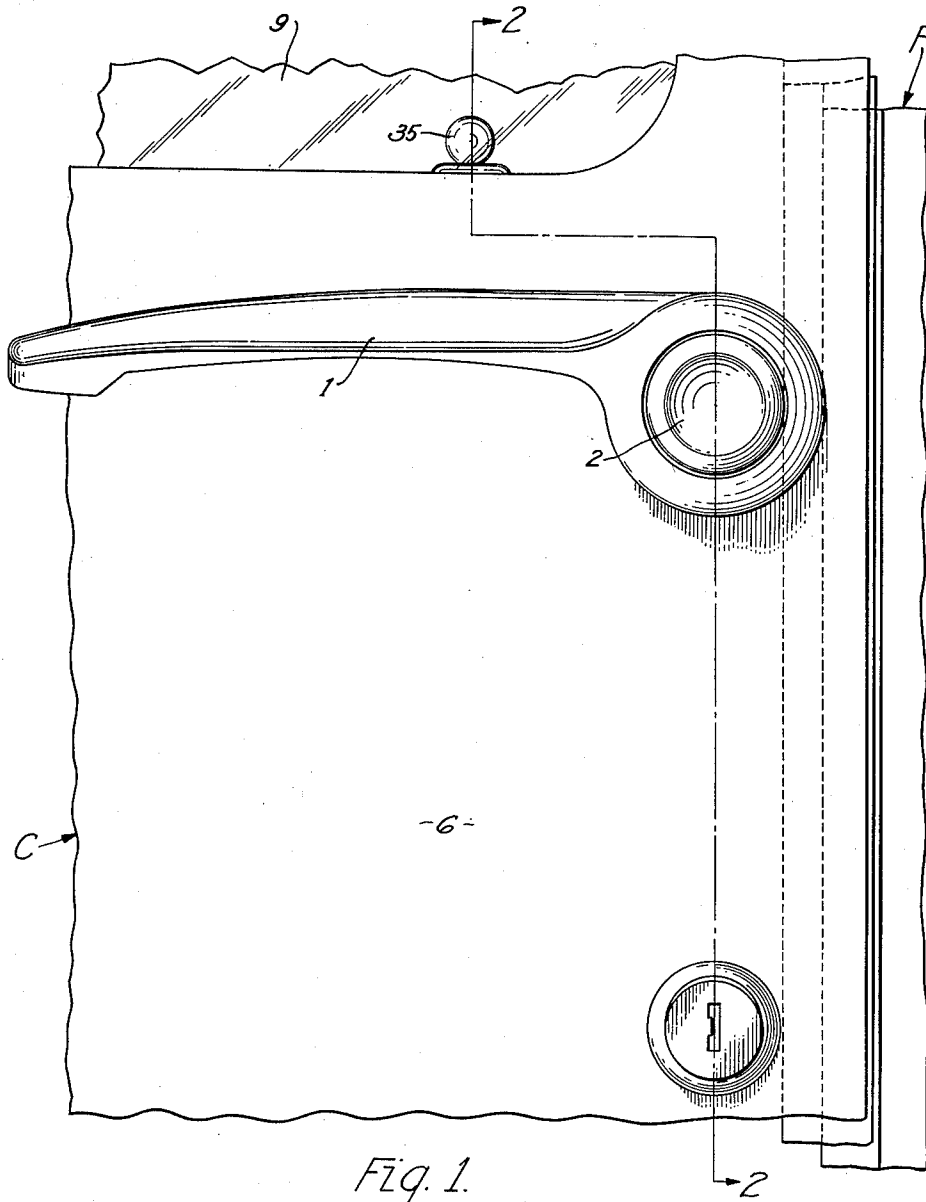


Fig. 1.

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5 Sheets-Sheet 2

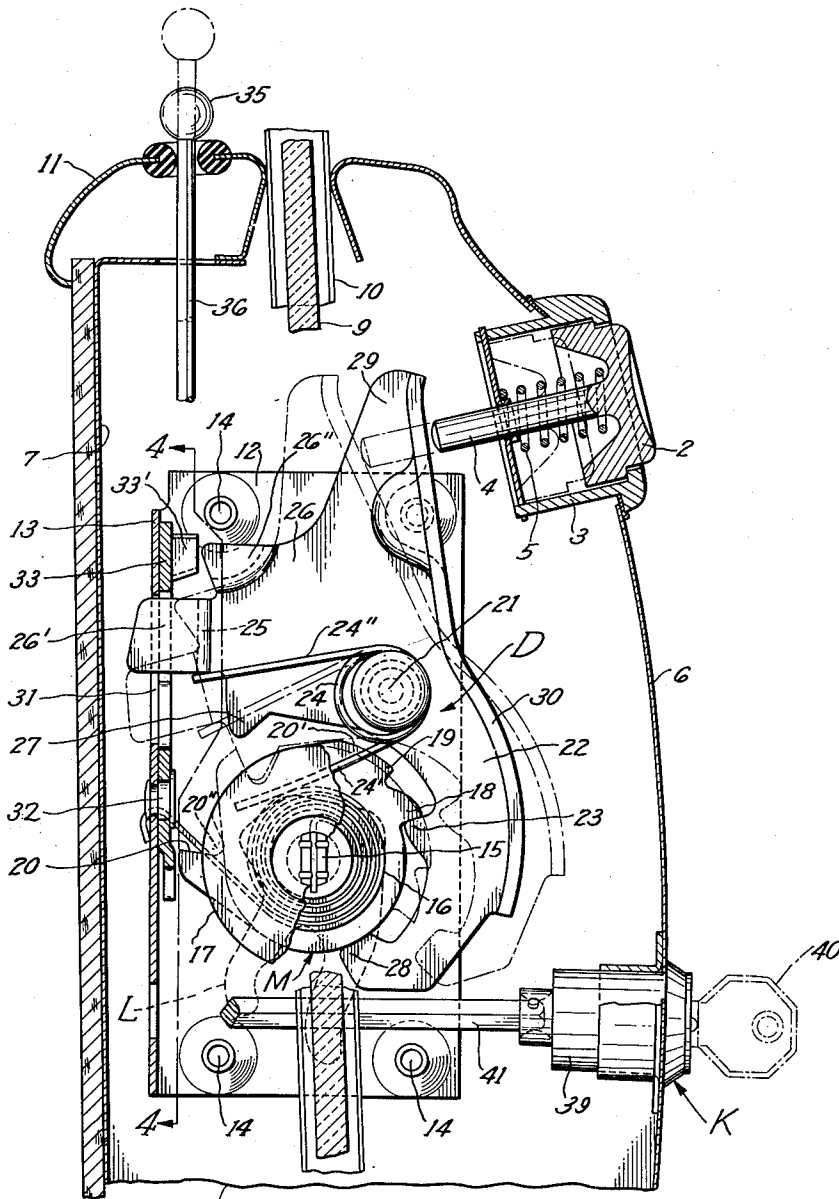


Fig. 2

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5 Sheets-Sheet 3

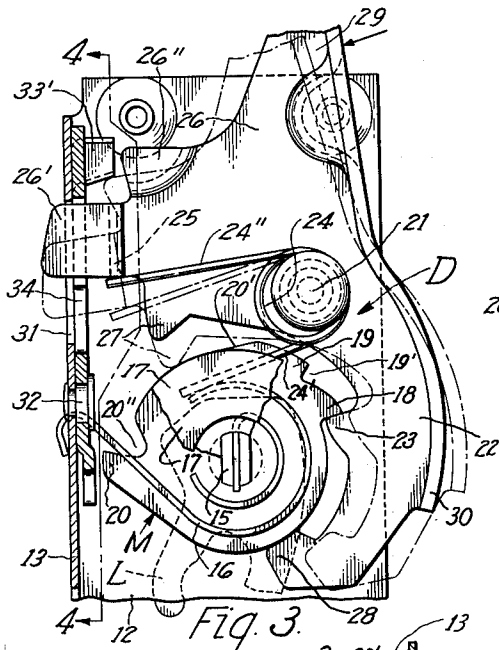


Fig. 3.

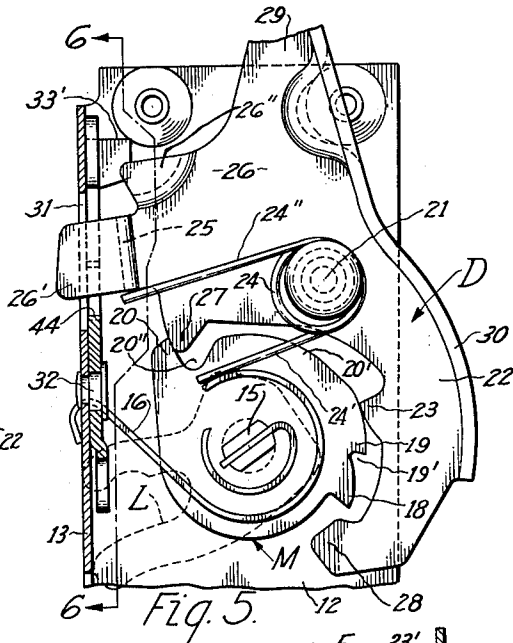


Fig. 5.

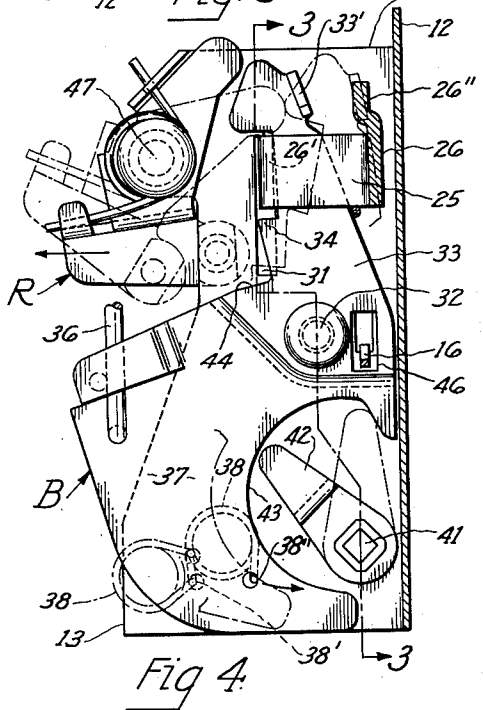


Fig. 4.

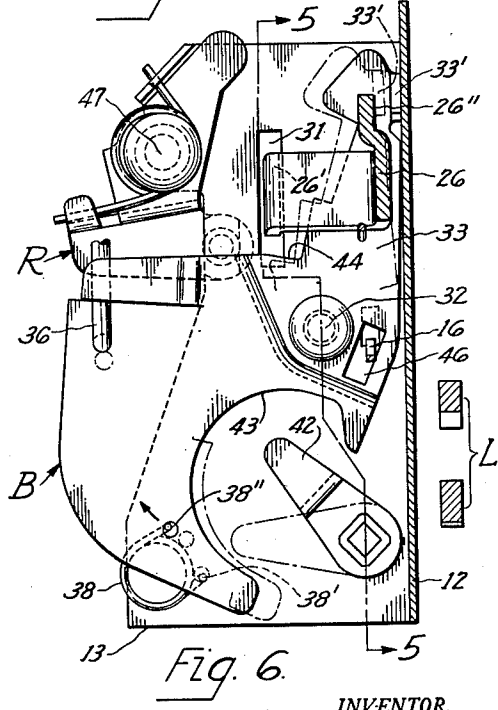


Fig. 6.

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5 Sheets-Sheet 4

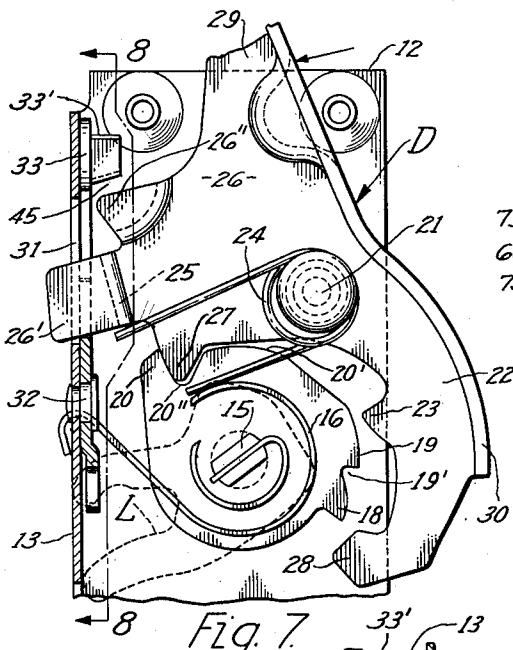


Fig. 7

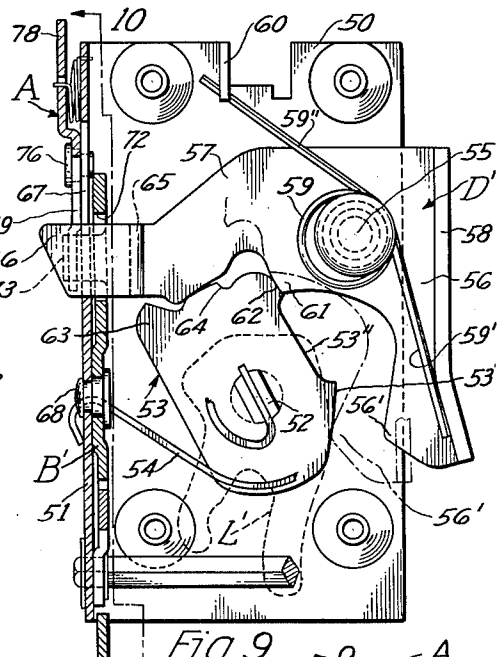


Fig. 9

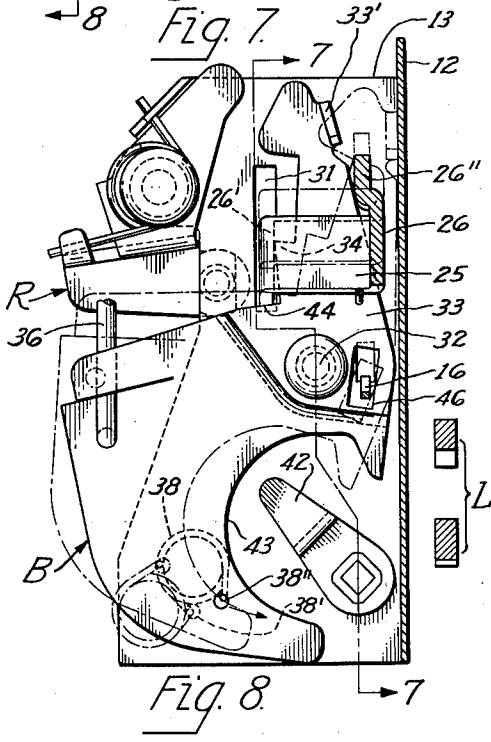


Fig. 8

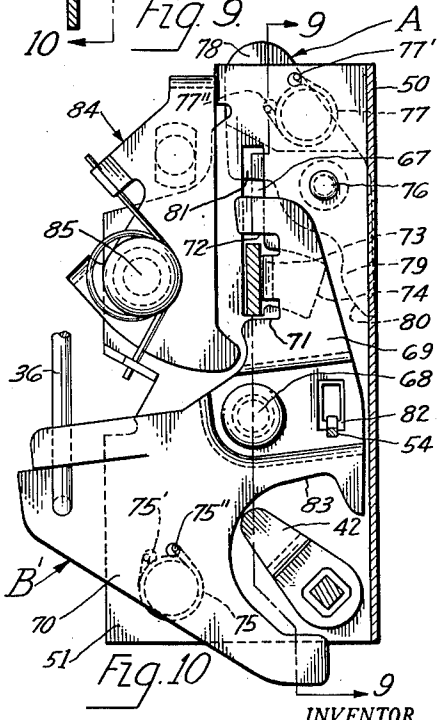


Fig. 10

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5 Sheets-Sheet 5

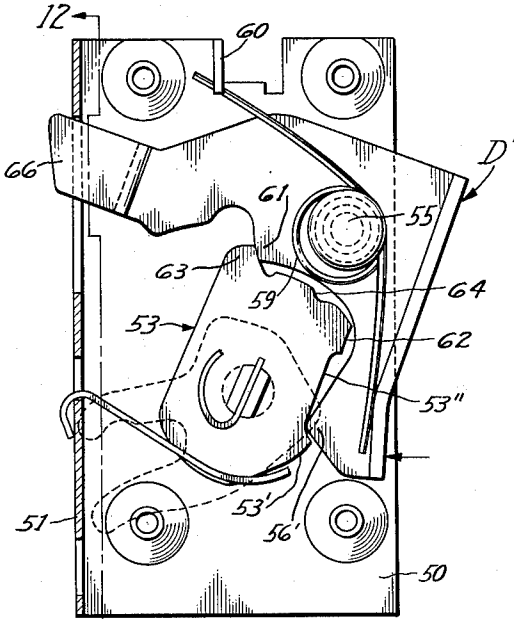


Fig. 11

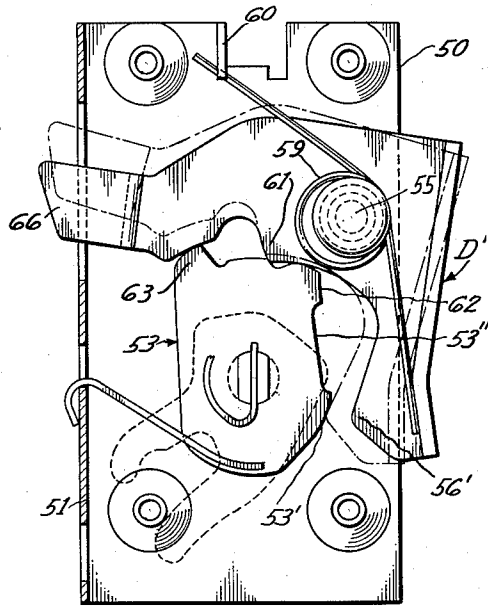


Fig. 13

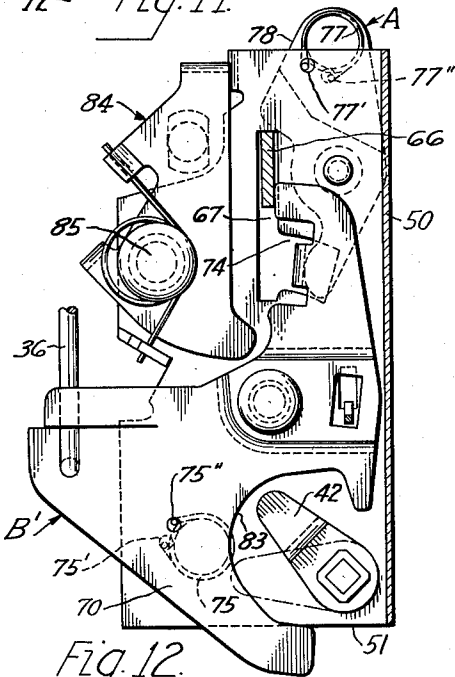


Fig. 12

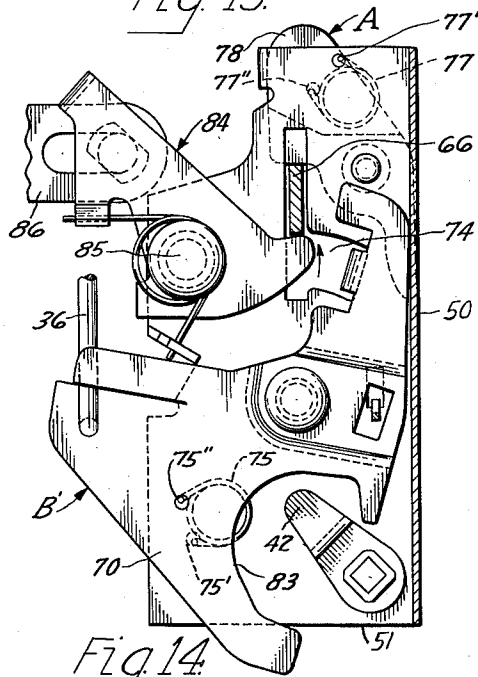


Fig. 14

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UNITED STATES PATENT OFFICE

2,665,160

DOOR CONTROL MECHANISM

Otto V. Puzik, Willoughby, Ohio, assignor, by mesne assignments, to Rudolph I. Schonitzer, Cleveland, Ohio.

Application December 7, 1949, Serial No. 131,627

10 Claims. (Cl. 292-216)

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This invention relates to door control mechanisms and more particularly to improvements in door latching and door locking apparatus especially adapted for use on the doors of automotive vehicles.

It will be understood however that although my invention is illustrated and described herein as embodied in an automobile door it may readily be utilized in connection with doors or closures of different types of structures.

In the co-pending United States patent applications of Angelo R. DeVito, Serial No. 89,540, filed April 25, 1949, and Leonard J. Wagner, Serial No. 98,001, filed June 9, 1949, certain door control mechanisms are disclosed and claimed wherein an outside operating member (such as a handle, push button, or the like) is employed not only to perform its normal latch releasing function but also, by a distinctive manipulation, to so operate the door locking mechanism as to effect automatic locking of the door, upon closing thereof, without use of a key. It is the general object of the present invention to provide a door control mechanism of this general type in which the possibility of inadvertent locking of the door is substantially eliminated.

Other objects of my invention include: the provision of means for preventing lock presetting movement of the outside actuating member of a door control mechanism except when the door is open and the latch is unlatched; and the provision of a rugged and effective blocking means for preventing locking manipulation of the outside operating member of a door control apparatus of the type disclosed in said above noted co-pending United States patent applications without increasing the cost or the number of parts of the mechanism.

The above and other objects of my invention will appear from the following description of several embodiments thereof, reference being had to the accompanying drawings in which:

Figure 1 is a fragmentary outside side elevational view of an automobile door in which my improved door control mechanism is installed, the door being shown in closed and locked position;

Figure 2 is a vertical cross-sectional view taken substantially on line 2-2 of Figure 1;

Figure 3 is a detached view of the door control mechanism of Figure 2, the parts being shown in the same positions but with the lower key-operated lock portion omitted for purposes of simplification;

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Figure 4 is a vertical cross-sectional view taken substantially on line 4-4 of Figure 3;

Figure 5 is a view similar to Figure 3 but showing the parts in their normal unlatched and unlocked positions;

Figure 6 is a vertical cross-sectional view taken substantially on line 6-6 of Figure 5, the action of the detent lock stop portion to prevent movement of the lock into preset position when the detent is in latch released position being indicated in phantom lines;

Figure 7 is a view generally similar to Figures 3 and 5 but illustrating the detent member in its locking position and the locking member in preset position;

Figure 8 is a vertical cross-sectional view taken substantially on line 8-8 of Figure 7, the lock member being shown in its preset position and the detent not yet having been released by the operator for return to its latch released position;

Figure 9 is a view generally similar to Figure 3 but illustrating my invention as incorporated in a different type of latch mechanism, the detent being in its latch holding position and the lock member being in locked position;

Figure 10 is a vertical cross-sectional view taken substantially on line 10-10 of Figure 9;

Figure 11 is a view generally similar to Figure 9 but with the lock actuating member omitted for simplification, the detent being illustrated in locking position;

Figure 12 is a vertical cross-sectional view taken substantially on line 12-12 of Figure 11, the lock actuating member being included in the view;

Figure 13 is a view generally similar to Figure 11 but illustrating the latch member in its secondary position, the phantom line position of the detent indicating that outside presetting of the lock cannot be effected when the latch is in secondary position; and

Figure 14 is a vertical cross-sectional view generally similar to Figures 10 and 12 but showing the lock member in unlocked position, and the detent in latch released position by virtue of actuation of the inside remote control mechanism.

As illustrated in Figures 1 to 8 inclusive, my invention is incorporated in a latch mechanism of the general type described and claimed in the Edwin L. Allen U. S. patent application, Serial No. 131,296, filed December 6, 1949, and further described and claimed in the said United States patent application of Leonard J. Wagner, Serial

No. 98,001, filed June 9, 1949, and cross-reference is hereby made to said co-pending applications in which certain subject matter is claimed which is illustrated and described but not claimed herein.

Referring now to the drawings, a fragmentary portion of what may be considered to be the left-hand front door of an automobile is indicated at C. The body pillar P carries a keeper member (not shown) which co-acts with the latch mechanism mounted within the door C. Handle 1 is fixed to the door and houses at one end an outside operating member which, as illustrated, takes the form of a push button 2 suitably supported in a tubular guide 3 and provided with an operating plunger 4. The spring 5 holds push button 2 in its normal no-operating position, seen in Figure 2, except when pressure is exerted by the operator.

It will be understood that although I have illustrated the outside operating means for the door control mechanism as a push button, a suitable lever, pull handle, turn handle, or other device might be employed to effect outside operation of the door control mechanism and accordingly the push button 2 is to be considered as being merely illustrative of one form of outside operating means.

The push button guide or housing 3 is suitably mounted on and extends through the outside panel 6 of door C. The inner door panel 7 and a door free edge wall 8 enclose the latch mechanism in usual manner. In Figure 2 the window glass is seen at 9 suitably supported in a glass-run channel 10 and the inside garnish molding is indicated at 11.

As is clearly seen in Figures 2 and 4 my latch mechanism includes a frame structure having a base plate portion 12 and a side flange portion 13. Supporting screws extend through the free edge wall 8 into the threaded holes 14 (Figure 2) to secure the latch frame structure firmly in position on the door. A bifurcated latch member L is secured on a latch shaft 15, the flattened end of which is seen in Figure 2, which is rotatably supported by a suitable bearing (not shown) carried by base plate 12. Shaft 15 extends through an aperture (also not shown) in the edge wall 8 of the door and the latch member L is mounted at its outer end on the outer side of edge wall 8 in position to coact with a keeper pin (not shown) mounted on the adjacent door frame in a well known manner and as is fully described in the Rudolph I. Schonitzer Patent No. 2,094,413 and in the Edwin L. Allen copending United States patent application Serial No. 746,521. Mounted on the shaft 15 adjacent the inner surface of base plate 12 is a latch plate member generally indicated at M. The spiral latch spring 16 has its inner end secured to the inner end of shaft 15 and its outer end anchored to the side flange 13 of the latch frame.

In common with the latches of the above-referred to Schonitzer Patent No. 2,094,413 and Allen application Serial No. 746,521, latch spring 16 at all times urges the latch member L in unlatching direction (clockwise as seen in Figure 2) and, as latch plate M is mounted on shaft 15 for movement with latch member L, it will have corresponding rotary movement. A cover plate or disc 17 for the spring 16 is also mounted on the end of shaft 15 and is shown partially broken away in Figure 2 to permit a direct view of the main latching tooth 18 and secondary latching

tooth 19 of the latch plate M. Circumferentially spaced from secondary tooth 19 on the latch plate M is an unlatching stop lug 20, the function of which will be later described. The portion of plate M indicated at 20' and extending counterclockwise from the secondary latching tooth 19 may be termed the blocking element or blocking element portion of latch plate M. It is spaced from the unlatching stop lug 20 by a relieved or cut away portion or recess indicated at 20'' and the functions of elements 20' and 20'' will also be described later.

As seen in Figures 2, 3 and 4 the parts are in door latched and door locked positions. The latch member L has its depending bifurcated legs in position to encompass the keeper pin (not shown) and hold the door in closed position. In order to maintain the latch member L in the full latched position of Figure 2 a detent member, generally indicated at D, is provided. A pin 21 carried by base plate 12 forms a pivotal support for detent D and the downwardly projecting arm portion 22 of detent D has formed thereon a latch holding portion or pawl 23. To constantly urge detent member D in latch holding direction (clockwise as seen in Figure 2) a spring 24 is provided which is supported and held in position by an enlarged head on pivot pin 21 and which has its end 24' fixed by bearing against the outer convolution of spring 16 and its free end portion 24'' engaging the offset portion 25 of the transversely extending arm 26 of detent member D to urge same in latch holding (clockwise in Figure 2) direction.

Figure 5 illustrates the door open or unlatched position of latch member L and it will be understood that, when the door is moved from open to closed position, latch member L engages the keeper on the door frame and moves in counterclockwise direction into the latched position of Figure 2. As spring 24 urges detent D in latch holding direction the latch holding pawl 23 of detent D will, during closing of the door, first drop into the notch 19' behind the secondary latching tooth 19 and then, as the door reaches full latched position, drop down into latch holding position as seen in Figure 2 in engagement with main latching tooth 18. To release the latch mechanism the detent D is actuated, in a manner to be later described, to move the lower arm portion 22 thereof in counterclockwise direction (Figures 2 and 3) until the pawl 23 clears the outer end of tooth 18 as seen in phantom lines in Figure 3. This will permit the latch member L to rotate in clockwise or unlatching direction until it reaches the unlatched position of Figure 5 in which the unlatching stop lug 20 on latch plate M is in engagement with a corresponding stop portion or lug 27 on detent D. Movement of detent D in latch holding direction is limited by engagement of a projection 28 on the end of lower arm 22 of detent D with the outer edge face of latch plate M. This engagement prevents the pawl 23 from striking the edge of latch plate M when it snaps into latch holding position under the influence of spring 24. It will be noted that the stop portion 27 on detent D projects out from the transverse arm portion 22 thereof and is adapted to limit movement of detent D in unlatching direction by its engagement with the blocking element portion 20' on latch plate M. This blocking or limiting of detent D is clearly indicated in the phantom line position of detent D in Figure 3. However, when the latch member L

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reaches its full unlatched position, the detent D may be moved beyond its unlatching position into its locking position as seen in Figure 7 and is indicated by the phantom line positions of detent D and latch plate M in Figure 2. This further locking movement of detent D is possible when the latch member and latch plate are in full unlatched positions because the stop portion 27 of detent D can enter the relieved or cut-away notch 20' in latch plate M. The objects and functions of this arrangement will be described later.

The detent D, generally speaking, lies substantially in the plane of the latch plate M and in close proximity to the base plate 12. However, an offset portion 25 of transverse arm 26 extends inwardly and the end portion 26' is disposed in generally parallel, but substantially spaced, relation to the base plate 12 to accommodate the locking mechanism as will be later described. Detent member D also includes an upwardly extending arm portion 29 and the inwardly projecting flange 30 extends from the upper end of arm 29 to the lower portion of arm 22. This flange serves to stiffen the detent structure and also provides an abutment against which the push button plunger 4 engages when the push button 2 is moved to operate the latch mechanism.

The end 26' of transverse detent arm 26 acts as a lock hold-out portion as will appear later and it extends through and is guided by an elongated slot 31 in the side flange 13 (see Figures 2, 4, etc.). As the detent member D is moved between its latch holding position seen in Figure 2 and its latch is released and locking positions, seen in Figures 5 and 7, respectively, the end 26' moves in the slot 31.

In order to lock the detent D in latch holding position (Figure 2), and thus prevent unlatching and opening of the door C, a lock member, generally indicated at B, is pivotally mounted on the side flange 13 by a suitable pin 32. The upwardly extending portion 33 of lock member B has a detent restraining projection 34 which, when the lock member B is in locked position, as seen in Figures 3 and 4, is disposed across the slot 31 below the lower edge of end 26' of detent arm 26. It will be observed that when in this position the detent D cannot be moved in unlatching direction sufficiently to permit pawl 23 to clear tooth 18 to release the latch member L for door opening movement.

When the detent member D is in latch holding position (Figures 2, 3 and 4) the lock member B may be moved at will into and out of locked position. The unlocked position of lock member B is clearly seen in Figure 6. This locking and unlocking movement may be effected by the inside lock knob 35 mounted on the operating rod 36, which is secured at its lower end to the lower portion 37 of lock member B, or by the outside key operated mechanism to be later described. Rod 36 extends up through the garnish molding 11 of the door in well known manner. When knob 35 is in its lower position, seen in full lines in Figure 2, the lock member B is in locked position and when the knob 35 is lifted into its upper position, seen in phantom lines in Figure 2, the accompanying upward movement of rod 36 will move lock member B from the locked position of Figures 2, 3 and 4 into the unlocked position of Figure 6. It will be understood that the knob 35 is illustrative of only one of various inside lock operating means which can be used. For example, the lock member

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B can be connected to be operated from locations other than on the garnish molding or by suitable movement of the usual remote control handle.

A snap-over spring 38 has one end 38' fixed to the side flange 13 of the frame structure and its other movable end 38'' connected to the lower portion 37 of lock member B. As the ends of this spring 38 are constantly urged apart the lock member B will be urged in locking direction (counterclockwise, as indicated by the arrow in Figure 4) when in locked position and in unlocking direction (clockwise as seen in Figure 6) when in unlocked position. The action of the spring 38 changes or snaps over when the movable end 38'' thereof crosses the common center line drawn between center of the pivot pin 32 and the fixed end 38' of spring 38. As will be again referred to later, this snap-over action occurs at a predetermined point before the outer corner of detent restraining portion 34 of lock member B has reached, when moving in locking direction, its intermediate or preset position seen in Figure 8. Thus, when lock member B is in its intermediate or preset position, the function of which will be later described, spring 38 urges it in locking direction.

In Figure 4 the upper and lower ends of lock member B, and the snap-over spring 38, are shown in phantom lines in an intermediate position during movement of lock member B, as by operation of knob 35, from locked to unlocked position. In the phantom positions the corner of detent restraining portion 34 of upper end 33 of lock member B has moved away from locked position sufficiently so that the corresponding clockwise movement of the lower end portion 37 of lock member B has moved the free end 38'' of snap-over spring 38 across the common center line of pivot pin 32 and fixed end 38' of spring 38. As seen in phantom position in Figure 4 spring 38 is urging the lock member B in clockwise or unlocked direction and will continue to move the lock member B until it reaches its final unlocked position as seen in Figure 6. As will be explained later, movement of lock member B from its locked (full line) position of Figure 4 into the intermediate (phantom line) position of Figure 4 may be effected by the upper end of the remote control bell crank upon operation thereof to release the latch.

As noted above, and as is evident from Figures 3 and 4, lock member B may be moved into and out of locked position at will by means of the rod 36 and knob 35 when the detent D is in latch holding position. The same locking and unlocking movement of member B may also be effected, when the detent D is in latch holding position, by means of the outside key actuated mechanism generally indicated at K in Figure 2.

This key controlled lock operating means is substantially identical with that disclosed and claimed in the copending United States patent application of Edwin L. Allen, Serial No. 76,023, filed February 12, 1949, and will be only briefly described here. A cylinder lock 39 of suitable type is adapted to be operated by a key 40 and the connecting shaft 41 operates the rotatable finger 42 (Figure 4) which is supported by the side flange 13 and operates within a generally C-shaped recess 43 in the lower portion 37 of lock member B. As seen in Figures 4 and 6 of the drawings the finger 42 is in a mid or neutral position. Rotation of finger 42 through a predetermined arc in either direction from its mid-position may be effected by proper turning of the key

40. Cylinder lock 39 is of the type wherein the key cannot be removed except when the lock is in its neutral or mid-position and thus finger 42 must always be returned to mid-position to permit the operator to remove the key. This arrangement permits lock member B to be moved into and out of locked position, when the latch member is held in door fully latched and locked position (Figures 3 and 4) by detent D, either by the inside knob 35 or the outside key mechanism K regardless of the position the lock member B may be in.

In order to stop or block movement of lock member B, when in its unlocked position of Figure 6, against movement in locking direction sufficient to cause snap-over spring 38 to change its action and urge lock member B in locking direction, I provide an inwardly bent lug or tang portion 33' at the top of the upper end portion 33 of lock member B. A coaxing lock stop portion 26'' projects from the transversely extending arm 26 of detent D. As seen in Figures 5 and 6 the lock stop portion 26'' of detent D is disposed in the path of movement of tang 33', the detent D being in latch released position. The phantom lines on Figure 6 indicate that if an attempt is made to move lock member B in locking direction, when the latch is unlatched and detent D is in latch released position, lock member B can only be moved a short distance until tang 33' engages lock stop member 26'' as shown by the phantom lines. As spring 38 in this position is still urging lock member B in unlocking direction it will return lock member B to full unlocked position upon release of pressure on knob 35 or key 40. Thus, when the door is unlatched and open the lock member B cannot be moved into the preset position of Figure 8 by either the knob 35 or the key 40.

The operation of the above described mechanism to effect locking of the door by suitable distinctive manipulation of the outside operating means (push button 2) will now be described.

Assuming that the door is open and the parts are in their normal unlatched positions of Figures 5 and 6, the push button 2 being in its normal non-operating position as seen in Figure 2, when the operator pushes inwardly sufficiently to move push button 2 beyond its normal latch releasing position the detent D will be moved in counterclockwise direction beyond its latch released position of Figures 5 and 6 into its locking position of Figures 7 and 8. During this locking movement of detent D the stop portion 27 will enter the relieved portion or recess 20'' and the end portion 26' (the lower edge of which may be referred to as the lock operating portion of the detent) will move downwardly in guide slot 31 until it has direct engagement with the operating edge face 44 of lock member B. As seen in Figure 6, this edge face 44 extends across slot 31, when lock member B is in unlocked position, and is disposed in the path of movement of the lock operating portion of detent D from latch released position (Figure 6) to locking position (Figure 8). The downward movement of the lock operating portion (the bottom edge of end 26' of detent D) from its latch released position seen in Figures 5 and 6 into the locking position seen in Figures 7 and 8 will, through engagement with edge face 44, move lock member B in locking (counterclockwise as seen in Figure 6) direction sufficiently to cause the free end 38'' of snap-over spring 38 to cross the common center line between pivot pin 32 and fixed end 38' of spring 38. When this cross-over occurs the action of the spring 38 is

reversed and it then urges lock member B in counterclockwise or locking direction and will move it into the preset position seen in Figure 8. When in this preset position lock member B is held against further movement in locking direction by engagement with the side face of the end portion 25' of detent D, which may conveniently be termed the lock hold-out portion of detent D as it serves to hold the lock member out of locked position and maintain it in preset position until the operator closes the door. Upon full closing and latching of the door the detent D will move into its latch holding position seen in Figure 3 in which the lock hold-out portion 26' has been moved upwardly in slot 31 to clear the corner of detent restraining portion 34 of lock member B and permit the lock member to move on into locked position as seen in Figure 4. When this occurs the door is automatically locked and cannot be unlocked from outside except by use of the key 40. Lock member B cannot move beyond the locked position of Figure 4 because of engagement of the upper end 33 thereof with the lock stop portion 26' of detent D.

It will be clear from the above description that when the door is open and unlatched the lock member B cannot be preset or locked by means of the inside knob 35 or the outside key 40. However, it can be preset by a suitable distinctive manipulation of the outside operating member (push button 2) from its normal non-operating position beyond its latch releasing position into a locking position in which it moves the detent D into the locking position seen in Figure 7. When the operator releases the outside operating member after this manipulation the lock member B has been moved into its preset position of Figure 8 and the detent D will return to its normal latch released position of Figure 5. It should be noted at this point that when the lock member B is unlocked and the detent D is in latch released position the lug or tang 33' on lock member B is disposed between the lock stop member 26'' and the base plate 12 (as clearly seen in Figure 6) but that, after the above described lock presetting operation has been completed, the lock stop member 26'' of detent D will be disposed between the tang 33' and base plate 12 (see Figure 8). During movement of lock member B from the unlocked position of Figure 6 into the preset position of Figure 8 the lock stop portion 26'' of detent D is withdrawn out of the path of movement of tang 33', the clearance between these parts in this situation being indicated at 45 in Figure 7.

When the operator releases the pressure on the outside operating means 2 and then closes the door, the latch mechanism being in the preset position shown in Figure 8, the pawl 23 of detent D will first drop into its secondary latched position in notch 19' on latch plate M. If the door is not pushed shut with sufficient force for full latching the pawl 23 will stop in notch 19' in engagement with secondary latch tooth 19 and the latch member L, and the door, will be held in secondary latched position. However, such movement of detent D into its secondary latched position will not lift the lock hold-out portion 26' thereof far enough above its normal latch released position, seen in Figures 5 and 6, to permit the detent restraining portion 34 of lock member B to move into locked position beneath end portion 26'. Thus the mechanism will not become automatically locked in secondary latched position. Of course, as described above, when the door reaches full latched position of Figure 3, the end portion 26' will move up to the latched

position of Figures 3 and 4, above the detent restraining portion 34 of lock member B, permitting the snap-over spring 38 to move the lock member B into locked position (Figure 4). In the United States Patent No. 2,480,688 of Edwin L. Allen there is described and claimed automatic lock mechanism by which automatic locking may be effected upon closing the door and reference is made thereto.

When the door is closed and latched and it is desired to open same from outside, the operator pushes on the outside actuating member (push button 2) to move the detent D from its latch holding position of Figure 2 into its latch released position (seen in phantom lines in Figure 3) in which the pawl 23 clears the tooth 18. In order to prevent the operator from inadvertently moving the detent D on into its lock presetting position, and thus presetting the lock mechanism when he desires merely to open the door, with consequent possible accidental locking of the vehicle with the keys inside, I provide the blocking element 20' on the latch plate M and the cooperating stop portion 27 on the detent D. This blocking element, as illustrated, consists of a portion of the latch plate M formed on a radius from the center of rotation thereof and extending from a point adjacent the secondary tooth 19 to the relieved portion 20'. As is clearly seen in Figure 3, when the detent D is moved from its full line latch holding position into its phantom line latch released position it is blocked from further movement toward presetting position by engagement of the stop portion 27 of the detent with the edge face of blocking element 20'. In normal operation of the apparatus, as soon as the pawl 23 clears the tooth 18 the latch plate M and latch member L start to rotate in unlatching direction (clockwise as seen in Figure 3). However, as the blocking element 20' extends circumferentially of the latch plate M a substantial distance as seen in Figure 3, the operator, even though he continues to exert force on the outside actuating member 2 momentarily after the latch member starts its unlatching movement, he still cannot move the detent D into its lock presetting position because the blocking action of element 20' on the detent continues until the latch plate M and latch member L substantially reach their unlatched positions of Figure 5. When this occurs the door is open and the operator has released the outside actuating member. If he now desires to preset the mechanism for automatic locking he can do so, as has previously been described, because the detent D can freely move into presetting position by virtue of the relieved or cut away portion 20' of the latch plate M. This feature of my apparatus is effective in preventing accidental presetting of the lock due to inadvertent excessive movement of the outside operating member when it is desired merely to unlatch and open the door. Although the blocking element is illustrated as forming a part of the latch plate M it will be understood that other blocking means for holding the lock presetting member out of presetting position except when the latch is substantially in full unlatched position might be employed. It should also be noted that the form of the blocking element 20' is such that if the latch plate M and detent D are in their secondary latched positions the blocking element 20' will be in position to engage and block the stop member 27 of detent D against movement into presetting position. Thus when the door is in its

secondary latched position, as well as when in full latched position, a positive stop is provided against inadvertent presetting of the lock due to excessive movement of the outside operating member.

Figures 4 and 6 illustrate how the latch spring 16 extends through a rectangular hole 46 in lock member B to permit the necessary movement of the lock member without interference from spring 16.

In addition to means for operating the latch mechanism from outside the door it is of course necessary to provide mechanism for releasing the latch from inside the door. Such a mechanism is illustrated as incorporated in the apparatus shown in Figures 1 to 8 inclusive, but need not be described in detail here as it forms no part of the present invention and is fully described in the said co-pending United States patent application of Leonard J. Wagner, Serial No. 98,001, filed June 9, 1949. It will suffice for purposes of the present disclosure to point out that the inside remote control mechanism includes a bell crank member R pivotally mounted on side flange 13 by a pin 47. This bell crank is operated by a strap or other means extending to the usual inside operating push button or handle. This remote control mechanism is so arranged that it cannot be operated to effect presetting of the lock mechanism for automatic locking of the door. It is also arranged so that, if the door is closed and locked, operation of the inside remote control means will first unlock and then unlatch the door.

The operator can only preset the lock mechanism for automatic locking upon closing the door when the latch member L is substantially in its unlatched position. He cannot, due to the blocking action of the blocking element 20', preset the lock mechanism when the latch mechanism is in latch or secondary latched positions. The combination of means for presetting the lock for automatic locking by a distinctive manipulation of the outside operating means with means for preventing locking movement of the outside operating means except when the latch is in unlatched position provides a most convenient, effective, and foolproof arrangement.

In Figures 9 to 14 inclusive, I have illustrated my improved outside operating member blocking mechanism as incorporated in a door control apparatus of a different type than that shown in Figures 1 to 8 inclusive. The general arrangement of the latch mechanism of Figures 9 to 14 inclusive is like that described and claimed in the Edwin L. Allen co-pending United States patent application Serial No. 76,023, filed February 12, 1949, and as further described and claimed in the co-pending United States patent application of Angelo R. DeVito, Serial No. 89,540, filed April 25, 1949, and cross-reference is made thereto.

The frame structure includes a base plate 50 and a side flange 51. Latch member L' is supported on a shaft 52 which also carries the latch plate member 53. Latch spring 54 urges shaft 52, latch member L', and latch plate 53 in unlatching (clockwise as seen in Figure 9) direction.

In order to hold the latch L' in latched position a detent member D' is pivotally mounted on a suitable pin 55 carried by base plate 50. Detent member D' includes a downwardly extending arm portion 56 and a transversely extending arm portion 57. The inwardly projecting detent flange 58 is engaged at its lower end by suitable outside

operating means, such as a push button of the type illustrated in Figure 2, and also acts as an abutment for the lower end 59' of detent spring 59. The upper end 59'' of spring 59 is anchored by a lug 60 struck out from base plate 50 and the spring urges detent D' in latch holding direction (counterclockwise as seen in Figure 9).

When in latched position (Figure 9) the latch holding portion 61 of detent D' is disposed in abutting latch holding engagement with main or full latch stop portion 62 of latch plate 53. To release the latch and permit opening of the door, detent D' is rotated in latch releasing direction (clockwise as seen in Figure 9) to lift the transverse arm 57 sufficiently to move latch holding portion 61 out of engagement with the stop portion 62 of latch plate 53. This permits the latch plate 53 and latch member L' to rotate in unlatching direction (clockwise as seen in Figures 9 and 11) into unlatched position as seen in Figure 11 with the stop lug 63 of latch plate 53 abutting the latch holding portion 61 of detent D' and blocked against further movement in unlatching direction thereby. A secondary latch stop portion 64 is preferably also provided on the latch plate 53.

This particular arrangement of latch plate and detent is advantageous in installations where it is desired to have the outside operating push button or handle disposed substantially at the horizontal level of the latch member L' while the embodiment illustrated in Figures 1 to 8 inclusive is particularly useful in installations where the outside operating member is to be positioned substantially above the latch member.

The transverse arm 57 of detent D' has an offset portion 65, generally similar to offset portion 25 in Figures 1 to 3, and an outer end portion 66 which extends through and is guided by a slot 67 in the side flange 51 of the frame structure and which serves to block the lock member B' in preset position and also to actuate the lock actuating member A as will later appear.

In Figures 9 to 14 the lock member B' is pivotally supported by a pin 68 carried by side flange 51 and has an upwardly extending arm portion 69 and a lower portion 70. A lower shoulder 71 and an upper detent restraining shoulder 72 are formed on the upper arm 69 and the operating flange 73 is bent outwardly from upper arm portion 69 between shoulders 71 and 72 and projects out beyond side flange 51 through a cut-out or slot 74 therein. This cut-out or slot 74 joins the lower end of slot 67. In order to give the desired action to lock member B' a snap-over spring 75 has one end 75' anchored to the side flange 51 and the other movable end 75'' connected to the lower portion 70 of lock member B'. When in latched and locked position, seen in Figures 9 and 10, spring 75 urges lock member B' in locking direction (counterclockwise in Figure 10) and holds it in locked position. When lock member B' is in unlocked position, as seen in Figure 14, spring 75 urges lock member B' in unlocking direction (clockwise as seen in Figure 14) and holds it in unlocked position. If the lock member B' is moved only into its preset or blocked positions (seen in Figure 12) by means of the rod 35 and the inside knob 35, the detent member being in secondary latched position or in latch released position, the spring 75 will be still effective to urge member B' in unlocking direction (clockwise as seen in Figure 12) and will return lock member B' to its unlocked position (as seen in Figure 14) when pressure on knob 35 is released.

Thus the lock cannot be preset by use of the inside lock operating knob 35. It can, however, be moved into and out of full locked position by the inside knob 35 and rod 36 when the latch member is latched and the detent D' is in latch holding position as seen in Figures 9 and 10.

In order to effect presetting of the lock mechanism by means of a suitable distinctive manipulation of the outside operating member I provide a lock actuating member A which is pivotally supported on the outer face of side flange 51 by a pivot pin 76. A lock actuating member snap-over spring 77 has one end 77' anchored to the side flange 51 and its other movable end 77'' secured to the upper end portion 78 of lock actuating member A. This snap-over spring 77 is so arranged relative to the pivot 76 of lock actuating member A that, when the lock actuating member is in its idle or retracted position as seen in Figure 10, it urges the lock actuating member in counterclockwise direction (Figure 10) and holds the upper end portion 78 thereof against a bent out tang on side flange 51. At a point in the movement of lock actuating member A from the idle position of Figure 10 into the preset position of Figure 12 the free end 77'' crosses the common center line of pivot 76 and fixed end 77' and thereupon the spring 77 reverses its action and urges lock actuating member A in clockwise direction (Figure 12) toward its preset and its locked positions.

As is clearly seen in Figures 9, 10 and 14, the edge face 80 of lower end 79 of lock actuating member A is disposed to engage the outwardly projecting operating flange 73 on lock member B'. In order to effect the desired operation of lock actuating member A by the end portion 66 of detent D', a shoulder 81 is formed on the upper end portion 78 of lock actuating member A and this shoulder extends across the slot 67 when actuating member A is in its retracted or idle position (see Figure 12). A hole 82 in lock member B' permits the end of latch spring 54 to extend therethrough without interfering with the required movement of member B', and the outside key lock operated finger 42 cooperates with a generally C shaped cutout 83 in the lower end portion 70 of lock member B' to effect locking and unlocking from outside the vehicle by means of a key in the manner previously described.

When the door control mechanism is in door closed and latched position the latch member L', latch plate 53, and detent D' are disposed as shown in full lines in Figure 9. Assuming that the mechanism is unlocked, if the operator desires to release the latch for door opening he operates the outside actuating member (such as push button 2) to move the detent D' from its latch holding position (seen in full lines in Figure 9) into its latch released position (partially indicated in phantom lines in Figure 9) in which the latch holding portion 61 of detent D' clears the latch stop portion 62 of latch plate 53. This permits latch member L' and latch plate 53 to rotate into unlatched position as seen in Figure 11. A blocking element 53' forms a part of latch plate 53 and coacts with the stop portion 56' on the lower arm 56 of detent D'. Between the blocking element 53' and the latch stop portion 62 of latch plate 53 is a relieved or cut away portion 53''. As is clearly seen in Figure 9, when detent D' is moved from its full line latch holding position into its phantom line latch released position it is blocked from further movement toward lock presetting position by engagement of the stop

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portion 56' of the detent with the edge face of blocking element 53'. Thus the operator cannot inadvertently move the detent D' into lock presetting position when he desires merely to release the latch. Furthermore, even though he continues to exert excessive pressure on the outside operating member after the latch member L' has been released and has started to rotate in unlatching direction, he still cannot move detent D' into lock presetting position because the blocking action of element 53' on the detent D' continues until the latch plate 53 and latch member L' substantially reach their unlatched positions of Figure 11. By the time this occurs the operator has released the outside actuating member and the door opens. If he now desires to preset the mechanism for automatic locking he can do so because the detent D' and particularly the stop portion 56' thereof, can freely move into lock presetting position by virtue of the relieved or cut-away portion 53'' which is now disposed in the path of movement of detent stop portion 56' (see Figure 11).

As in the embodiment illustrated in Figures 1 to 8 inclusive, this means for preventing presetting of the lock mechanism, by actuation of the outside actuating means, when the latch member is out of unlatched position prevents accidental locking of the door when it is desired merely to unlatch and open same. In Figure 13 the detent D' is seen in its secondary latched position in full lines and in latch released position in phantom lines. It will be observed that the blocking element 53', by engagement with the stop portion 56' of detent D', effectively prevents lock presetting during release of the latch member from secondary latched position and thus, regardless of whether the door is in its full latched position or in its secondary latched position, effective means are provided for preventing inadvertent presetting of the lock due to excessive movement of the outside operating member.

In the apparatus of Figures 9 to 14 inclusive, there is included means for operating the latch mechanism from inside the door. The elements and mode of operation of the inside remote control mechanism will not be described here in detail as they do not form a part of the present invention and are fully described in the co-pending United States patent application of Angelo R. DeVito, Serial No. 89,540, filed April 25, 1949, to which cross-reference has been made. For present purposes it will be sufficient to point out that the remote control mechanism includes a bell crank member 84 pivotally mounted on the side flange 51 at 85 and connected to a suitable handle or the like (not shown) as by a strap 86 (Figure 14). As in the previously described embodiment of this invention, the remote control mechanism is so arranged that it cannot be operated to effect presetting of the lock mechanism for automatic locking of the door and, as illustrated, is further so arranged that, if the door is closed and locked, operation of the inside remote control means will first unlock and then unlatch the door.

Assuming that the door is open, the latch mechanism is unlatched, and the operator desires that the door be locked when he swings it into fully closed and latched position, the necessary manipulation and operation of the mechanisms of Figures 9 to 14 will now be described. With the door open the outside operating member, such as push button 2 of Figure 2, will be in its normal non-operating position. The operator

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will manipulate the outside member to move it against the resistance imposed by its own spring means (as for example spring 5 in Figure 2) and the detent spring 59 until the detent D' reaches latch released position (Figure 14). He will continue to move the outside operating member on beyond its latch releasing position to its locking position and it will be noted that this continued movement is permitted because stop portion 56' of detent D' can enter relieved portion 53'' of latch plate 53. During this further movement an additional resistance will be imposed which can be felt by the operator. This added resistance is due to the end portion 66 of detent D' engaging shoulder 84 on lock actuating member A and starting to move it against the force of snap-over spring 77. Before the outside actuating member A and detent D' reach their maximum lock presetting positions seen in Figure 20 snap-over spring 77 will reverse its action and the added resistance to movement of the outside actuating member will be removed.

When the lock actuating member A is moved from its idle position of Figure 14 toward its lock preset position of Figure 12 the edge 80 of the lower end 79 thereof engages the outwardly projecting operating flange 73 on lock member B' and moves lock member B' from its unlocked position of Figure 14 in locking direction. When snap-over spring 77 reverses its action, as described above, the lock actuating member A will move under the influence of spring 77 into the preset position of Figure 12 and carry with it lock member B'. The lock actuating member A and snap-over spring 77 is of such strength, and the parts are so proportioned and arranged, that spring 77 will hold the lock member B' in preset position even though the snap-over spring 75 is still urging lock member B' in unlocking direction and will positively move it on into locked position when the lock holdout portion 66 of detent D' is withdrawn.

When the door is fully closed and detent D' moves into its full latched position of Figure 9 lock member B' will be moved on into its full locked position of Figure 10 because of the action of spring 77 and because the lock hold-out portion 66 of detent D' has been moved out of lock hold-out position in which it blocks the upper end of lock member B' out of locked position.

Thus with the apparatus of Figures 9 to 14 inclusive, as with the embodiment illustrated in Figures 1 to 8 inclusive, the operator may effect automatic locking of the door without use of the key by a distinctive manipulation of the outside operating member followed by closing of the door. Due to my automatic blocking mechanism the outside operating member cannot be manipulated to preset the lock for automatic locking except when the latch is substantially in its unlatched position and thus inadvertent presetting of the lock during normal unlatching of the door is prevented.

Although I have described the illustrated embodiments of my invention in considerable detail it will be understood by those skilled in the art that variations and modifications may be made in the form and in the arrangement of the parts which achieve my improved results without departing from the spirit of my invention. It will also be understood that my improved lock control means may be incorporated in types of latch units different from those herein illustrated and accordingly I do not wish to be limited to the specific mechanisms herein shown and described but

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claim as my invention all embodiments thereof coming within the scope of the appended claims.

I claim:

1. Door control mechanism including a latch member having door latched and door unlatched positions, an outside operating member supported for movement in one direction from a normal non-operating position to a latch releasing position to a lock operating position in that order, lock means for preventing unlatching of said latch member, means, operable by movement of said outside operating member from said latch releasing position to said lock operating position, for moving said lock means in locking direction, and an operating member blocking element movable with said latch member and having blocking and non-blocking positions, said operating member blocking element being disposed to block movement of said outside operating member from latch releasing position to lock operating position when said latch member is in latched position, and said blocking element having movement with said latch member during movement thereof from door latched to door unlatched position whereby said blocking element reaches its said non-blocking position when said latch member substantially reaches unlatched position.

2. Door control mechanism including latch means for holding a door in closed position, means, including an outside operating member, for actuating said latch means to permit opening of said door, lock means adapted when in locked position to prevent actuation of said latch means by said outside operating member to permit opening of said door, means operable by movement of said outside operating member for moving said lock means toward said locked position, and an operating member blocking element movable with said latch means between a blocking position and a free position, said blocking element being in said blocking position when said latch means is in door closed position and being disposed to block such movement of said outside operating member as would effect said movement of said lock means toward locked position, and said blocking element being in said free position when said latch means is in position to permit opening of the door and being disposed to permit said outside operating member to move said lock means toward said locked position.

3. Door control mechanism including a latch member supported for movement between a door latched position and a door unlatched position, a lock member supported for movement between an unlocked position, a preset position and a locked position, means for presetting said lock member for automatic movement thereof from said preset position into locked position upon the latch member reaching said latched position after said lock member has been placed in said preset position, means for holding said lock member in preset position when said latch member is out of said latched position, means for moving said lock member from its preset position into locked position, said presetting means including an outside operating member supported for movement between a normal non-operating position, a latch releasing position, and a lock presetting position, means operable by said outside operating member for presetting said lock member upon movement of said outside operating member from said latch releasing position to said lock presetting position, and a blocking element, movable with said latch member, for blocking said outside operating member against

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movement from said latch releasing position to said lock presetting position when said latch member is in door latched position.

4. Door control mechanism including a latch member supported for movement between full latched, secondary latched and unlatched positions and adapted when in full latched position to coact with a keeper member to hold a door in full closed position, a lock member supported for movement between locked, preset, and unlocked positions, means, including an outside operating member, for effecting release of said latch member from said full or secondary latched positions, said outside operating member being movable in one direction from a normal non-operating position through a latch releasing position into a lock presetting position, means, operable by movement of said outside operating member from said latch releasing position to said lock presetting position, for moving said lock member from unlocked position to preset position, means for stopping movement of said lock member in locking direction beyond said preset position when said latch member is out of said full latched position and permitting such movement of said lock member when said latch member is in said full latched position, spring means for holding said lock member in said preset position and moving same from said preset position into said locked position upon said latch member reaching said full latched position, and a blocking element, movable with said latch member, for blocking said outside operating member against movement from said latch releasing position to said lock presetting position when said latch member is in said secondary latched position or said full latched position.

5. Door control mechanism including a latch member, an outside operating member supported for movement between a normal non-operating position, a latch releasing position, and a locking position, lock means for preventing unlatching of said latch member, means, operable by movement of said outside operating member from said latch releasing position to said locking position, for moving said lock means in locking direction, means for imposing additional resistance to movement of said outside operating member during at least a portion of its said movement from latch releasing position to locking position, and a blocking element movable with said latch member, said blocking element being disposed to block said outside operating member against movement from said latch releasing position to said locking position when said latch element is out of unlatched position.

6. Door control mechanism including a movable latch member, a latch plate supported for movement with said latch member and having a blocking element portion and a relieved portion adjacent thereto, a detent member supported for movement between latch holding, latch released, and locking position, said detent member having a stop portion positioned to engage said blocking element portion of said latch plate if said detent member is moved from said latch holding position beyond said latch released position when said latch member is in latched position and during unlatching movement thereof until said latch member substantially reaches unlatched position whereby movement of said detent from latch released to locking position is prevented, said relieved portion of said latch plate being disposed, when said latch member reaches unlatched position, to permit movement of said detent from said latch released to said locking position, a lock

member supported for movement between locked and unlocked positions and adapted when in locked position to prevent unlatching of said latch member, means for urging said lock member in unlocking direction during an initial part of its movement from unlocked to locked position and in locking direction during a final part of its said movement between unlocked and locked positions, said detent member having a lock operating portion adapted to move said lock member in locking direction, if said lock member is in unlocked position, during at least a part of the movement of said detent from latch released position to locking position, and lock hold-out means movable with said detent and adapted to block said lock member in said final part of its movement from unlocked to locked position when said detent is out of its said latch holding position.

7. Door control mechanism including a movable latch member having latched and unlatched positions, a blocking element having a relieved portion adjacent thereto and supported for movement with said latch member, a detent member supported for movement between latch holding, latch released, and locking positions, said detent member having a stop portion positioned to engage said blocking element if said detent member is moved beyond said latch released position toward said locking position when said latch member is in latched position and during unlatching movement thereof until said latch member substantially reaches unlatched position whereby movement of said detent from latch released to locking position is prevented, said relieved portion being disposed, when said latch member reaches unlatched position, to permit movement of said detent from said latch released position to said locking position, a lock member supported for movement between door locked and door unlocked positions, means for urging said lock member in unlocking direction during an initial part of its movement from unlocked to locked position and in locking direction during a final part of its said movement between unlocked and locked positions, said detent member having a lock operating portion adapted to engage and move said lock member beyond said initial part of its movement when said detent member is moved from said latch released position to said locking position, and lock hold-out means adapted to block said lock member in said final part of its movement from unlocked to locked position when said latch member is out of its said latched position.

8. In a door control mechanism having a latch member movable between door latched and door unlatched positions, a lock member movable between unlocked and locked positions, and an outside operating member movable from a non-operating position to a latch releasing position to a locking position in that order, the combination with said outside operating member of a blocking element movable with said latch member and disposed to block movement of said outside operating member from said latch releasing position to said locking position when said latch member is out of said door unlatched position.

9. Door control mechanism including a latch member supported for movement between a door latched position and a door unlatched position, an outside latch operating member supported for movement in latch releasing direction from a normal non-operating position to a latch releasing position and beyond, lock means for preventing movement of said latch member from door latched to door unlatched position and having unlocked, preset, and locked positions, means for holding said lock member out of locked position when in said preset position, means, operable only by movement of said outside operating member in latch releasing direction from said normal non-operating position to a point beyond said latch releasing position, for moving said lock means in locking direction into said preset position, spring means for moving said lock member into locked position from said preset position, and an operating member blocking element supported for movement with said latch member, said operating member blocking element being positioned, when said latch member is in said latched position, to block said outside operating member against such movement in latch releasing direction beyond said latch releasing position as would effect movement of said locking member into said preset position, said operating member blocking element also being positioned, when said latch member is in said unlatched position, to permit such movement of said outside operating member.

10. Door control mechanism including a latch member supported for movement between door latched and door unlatched positions, a detent member supported for movement between a latch holding position, a latch released position, and a lock operating position, movement of said detent from said latch released position to said lock operating position being in the same direction as movement thereof from said latch holding position to said latch released position, a lock member supported for movement between locked and unlocked positions, means operable by movement of said detent member from said latch released position into said lock operating position for moving said lock member from said unlocked position toward said locked position, a detent member blocking element movable with said latch member, and cooperating means on said detent member for engaging said blocking element and blocking said detent member against movement from said latch released position into said lock operating position except when said latch member is substantially in said door unlatched position, said detent member blocking element being disposed out of the path of said cooperating portion of said detent member when said latch member is in said door unlatched position whereby said detent member may be moved from said latch released position into said lock operating position.

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References Cited in the file of this patent
UNITED STATES PATENTS

Number	Name	Date
2,480,688	Allen	Aug. 30, 1949