July 18, 1944. H. M. FREDHOLM 2,354,169

AUTOMOBILE DOOR AND WINDOW LOCK

Filed March 25, 1943 2 Sheets-Sheet 1

Fig. 1

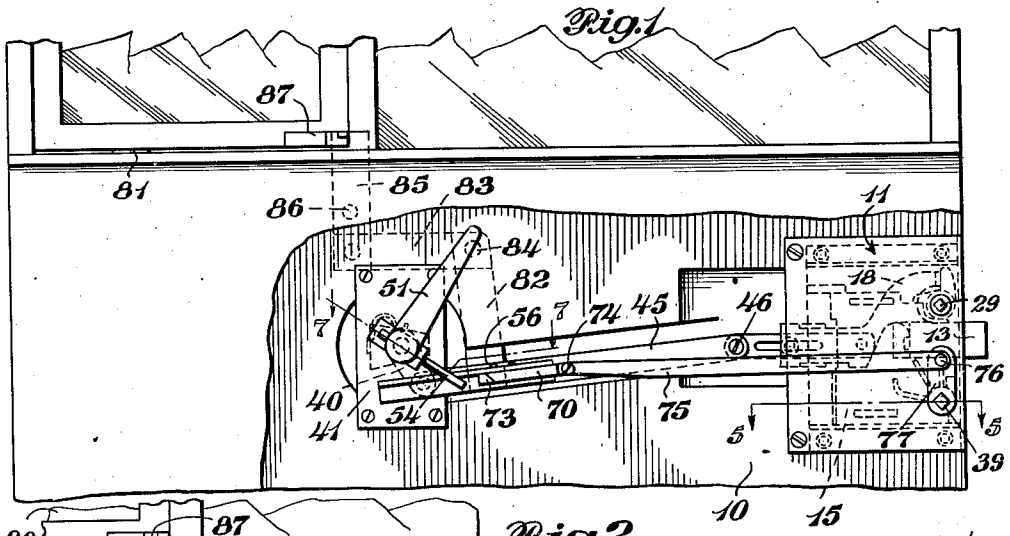


Fig. 2.

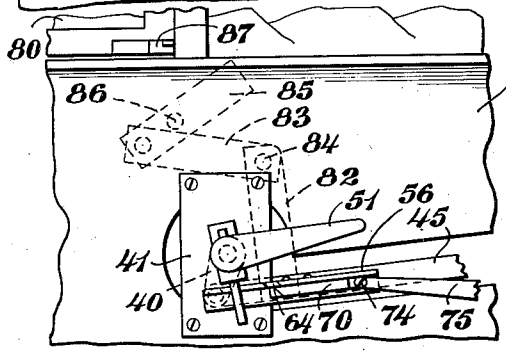
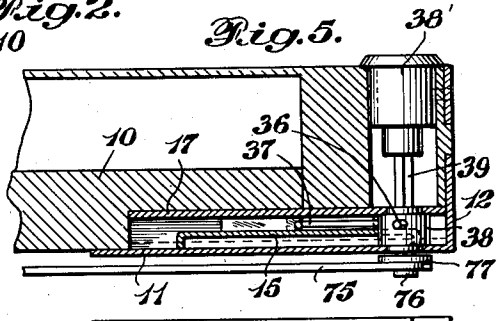


Fig. 5.



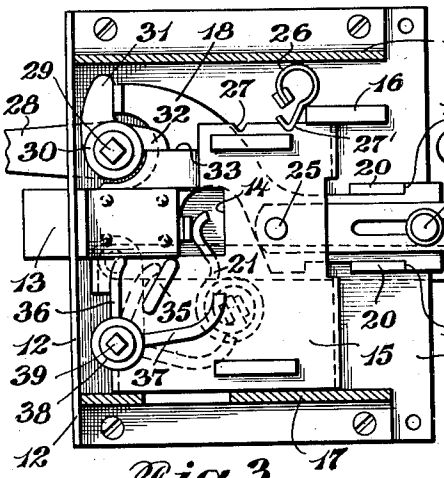


Fig. 3.

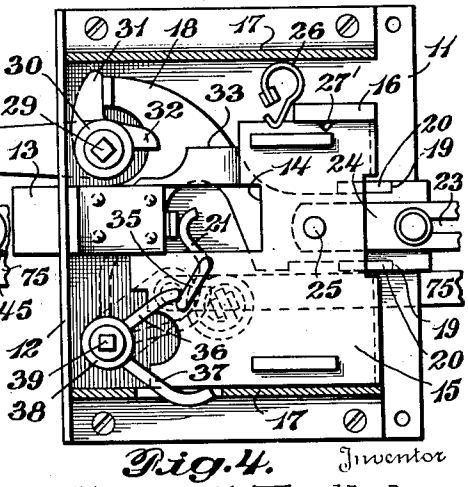


Fig. 4.

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AUTOMOBILE DOOR AND WINDOW LOCK

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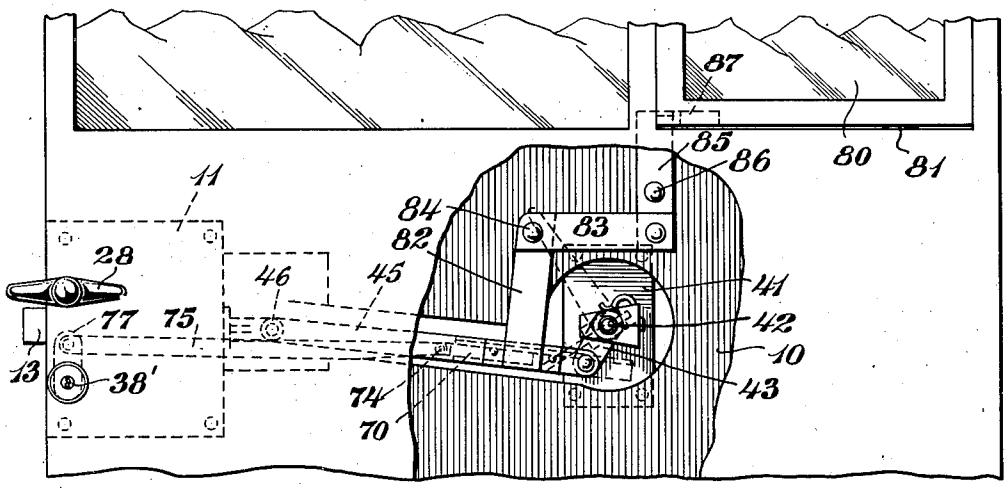


Fig. 6.

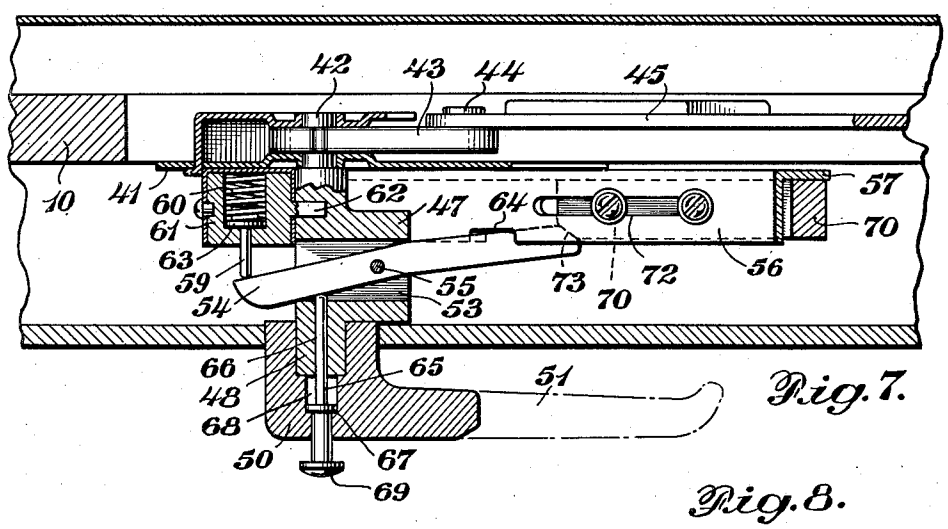
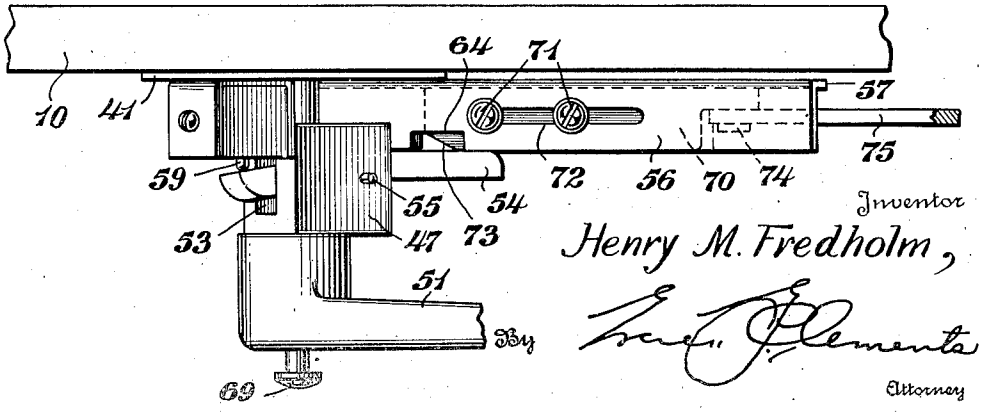


Fig. 7.

Fig. 8.



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2,354,169

AUTOMOBILE DOOR AND WINDOW LOCK

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Application March 25, 1943, Serial No. 480,538

20 Claims. (Cl. 70—147)

This invention relates to automobile door locks.

More particularly my invention is concerned with improvements in an automobile door latching mechanism and means for operating the same to lock and unlock the mechanism from the inside of the door so as to prevent accidental or unauthorized opening of the door, as disclosed in my Patent No. 2,298,559, issued October 13, 1942, and embodies structural changes therein and means in combination therewith whereby certain unsatisfactory operating conditions thereof are overcome as well as new and highly desirable results produced.

The latching or locking mechanism and structure according to said patent generally embody a spring projected bolt, inside and outside handles on the door both of which are operable under normal downward movement thereof for individually retracting the bolt, the inside handle being further operative upon limited upward movement thereof to dog the door latching bolt and thus prevent operation thereof by the outside handle, and automatic latching means associated with the inside handle and operated upon the upward limited movement of that handle for locking and thus retaining the same in position to dog the bolt and prevent normal movements thereof, the automatic latching means being manually retractable only by initial pressure on an operative part thereof at right angles to the plane of movement of the inside handle.

The mechanism according to said patent further provides means for preventing accidental and also unauthorized movement of the inside handle from its upwardly moved and latched or dogged position of the bolt, as by forcing the same downwardly by a wire inserted through the window from outside the door, in as much as two simultaneously applied operating pressures, exerted at right angles to each other, are required in order to move the inside handle from the latched position, and due to the operative arrangement of these parts this is possible only by hand and thumb operation from the inside of the door. Hence all of the doors of an automobile could not heretofore be equipped with a latching mechanism having these desirable features as at least one door must be capable of being locked and unlocked from the outside thereof regardless of the latched condition of the inside handles.

An object of my invention is therefore to provide a latching mechanism for all of the doors of an automobile, having inside and outside handles for retracting or releasing the latching bolt thereof, wherein one of the handles may be operated from both the inside and the outside of the door to lock the bolt against operation by the other handle and to effect locking of the said one handle against accidental operation when the bolt is locked.

A further object of my invention is to provide a door locking mechanism of the character disclosed in my said patent with key operated means operable from the outside of the door for moving the inside handle to and from latched position in which latter position the door locking mechanism is dogged, whereby the locking mechanism may be employed on all of the doors of an automobile for like, authorized operation from the interior or exterior thereof.

Another object of the invention is the provision of automobile door latching means, the bolt of which is capable of being dogged from the inside of the door with provision for retraction of the bolt upon slamming the door to closed position, and which locking means is also capable of being operated to dog the bolt from the outside of the door and to undog the bolt from the outside whether or not it had been locked from the inside or outside.

A still further object of the invention is the provision of an automobile door lock including the bolt retracting means on both the inside and outside of the door, the inside bolt retracting means being capable of rendering the outside bolt retracting means inoperative and being latched in position when the outside bolt retracting means is thus rendered inoperative, and the inside bolt retracting means being capable of being unlatched from the outside of the door and to render the outside bolt retracting means operative.

It is accordingly a primary object of this invention to provide a door locking mechanism of the character disclosed in my said patent with key operated means for moving the inside handle to and from latched outside handle and window locking position whereby the locking mechanism may be similarly operated from both the inside and outside of the door.

With the above objects in view, together with others that will become apparent in the course of the following disclosure, reference will now be had to the accompanying drawings, forming a part of same, and wherein:

Fig. 1 is a partial inside elevation of an automobile door showing the application thereto of the present invention in accordance with a preferred embodiment thereof, the door latch and window securing means being shown in locked positions

with the inside handle latched in upwardly moved position.

Fig. 2 is a view similar to that shown in Fig. 1 but limited to that portion thereof which illustrates the mechanism for unlocking the window when the inner handle is moved downwardly to unlatched position.

Fig. 3 is an inside elevational view of the portion of the door latching and locking mechanism adjacent the outside door handle with a part of the casing in section.

Fig. 4 is a view similar to Fig. 3 but showing the operative parts in positions different from that of Fig. 3.

Fig. 5 is a fragmentary, transverse section taken on line 5—5 of Fig. 1 and looking down through the latching mechanism to show the relationship of the key locking means thereto.

Fig. 6 is a partial outside elevation of an automobile door partly broken away to show the inside handle operating mechanism and its mounting with relation to the window locking mechanism the parts being substantially in reverse of that shown in Fig. 1.

Fig. 7 is an enlarged partial sectional view taken on the angularly disposed lines 7—7 in Fig. 1 showing the latching mechanism for deadlocking the inner door handle and the means for operating and releasing the same, and

Fig. 8 is a plan view of the mechanism shown in Fig. 7 but with the handle latching means disengaged by the releasing means.

Referring now in detail to the drawings by the use of reference numerals, 10 designates an automobile door a panel of which is suitably recessed for accommodating the lock mechanism about to be described. A housing base plate 11, is secured to the inside of the door over a recess therein and includes a right angular flange 12 secured to the front edge of the door and which flange is apertured for reception of a latching bolt 13. The bolt 13 is movably disposed within a recess 14 in a locking plate 15 which plate is slidably retained on the housing plate 11 by means of a guide lug 16 and an angularly bent edge of the housing cover plate 17. As shown, particularly in Figs. 3 and 4, the locking bolt 13 is carried by a bolt plate 18 having shoulders 19 at its rear end which are normally yieldably maintained against stop lugs 20 on the housing base plate 11, by means of a spring 21 engaging the locking bolt 13.

A stud 22 is carried by the bolt plate 18 and projects through an elongated slot 23 in a link 24, one end of which is connected to the locking plate 15 at 25. A lost motion connection is thus provided between the bolt 13 and the operating link 24 which link is also connected with another bolt later to be described. The locking plate 15 is movable with the link 24 to outside handle dogging position, as shown in Fig. 3, and to undogged position as indicated in Fig. 4, there being means provided to retain the plate 15 in each of these extreme positions comprising a yieldable lug or spring member 26 alternately engageable in recesses 27 and 27' in the upper edge of the locking plate.

The outside door handle 28 supports on the squared shaft 29 thereof, a roll-back 30 having projections 31 and 32 which are disposed at substantially right angles to each other. The projection 31 is engageable with the bolt plate 18 for retracting the bolt 13 upon downward movement of the outside handle 28, and the projection 32 engages a shoulder 33 on the locking plate 15 when that plate is in its forwardly moved position as illustrated in Fig. 3, occasioned by upward movement of the inside handle which shifts the link 24 for deadlocking the roll-back against movement and thereby locking the handle 28. When the plate 15 is shifted to the rearward position of Fig. 4 however the normal bolt retracting movement of the roll-back 30 is permitted.

The locking plate 15 is moved to either of the positions of Figs. 3 and 4 by up and down movements of the inner handle or by similar movements of an outside operated key mechanism. Hence, for moving the plate 15 by the key mechanism an elongated obliquely positioned lug 35 is disposed on the plate 15 so that its opposite faces are alternately engageable by fingers 36 and 37 carried by the key operated tumbler lock spindle part 38 having a squared operating shaft 39, all as will be hereinafter more fully described in relation to the door latching mechanism and its operating parts.

To the inside of the door rearwardly and laterally of the housing plate 11 is secured a mounting plate 41 in which plate is journalled the inside handle actuated shaft 42 which carries a lever 43 to the free end of which is pivotally connected, as at 44, one end of an operating rod or link 45. The opposite end of the rod 45 is pivotally connected at 46 to the link 24, whereby the locking plate 15 is selectively movable to the positions of Figs. 3 and 4, upon the movements of the inside handle above referred to.

Rigid with the shaft 42 is a block 47 having an extension 48 on which is secured the hub 50 of the inside locking and bolt operating handle 51 which upon movement in an upward direction moves the plate 15 to a forward roll-back locking position through shaft 42, lever 43 and links 45 and 24 and which upon downward movement shifts the plate 15 to a rear or roll-back unlocking position, the handle upon further downward movement moving link 24 rearwardly until the stud 22 engages the forward end of the slot 23 whereupon the bolt plate 18 and its latching bolt 13 are retracted.

The lock according to the present invention, in common with that of my patent, employs means for latching the inside handle 51 in deadlocking position and therefore includes the following mechanism:

The block 47 is provided with an aperture 53 extending transversely to the shaft 42 and through which aperture extends a swinging bolt 54. The bolt 54 is pivotally mounted intermediate its ends, as at 55, within the aperture 53 and with its opposite ends projecting beyond the aperture, as best shown in Fig. 7. One end of the swinging bolt 54 is yieldably maintained against the keeper flange 56 of an angle plate 57 carried by the base plate 41, by means of a plunger 58 which is urged against the other end of the swinging bolt by means of a coiled spring 60 disposed within a housing 61 secured at 62 to the block 47. The yielding plunger 59 is provided with an annular flange 63 against which one end of the coiled spring 60 bears and which flange serves to retain the plunger in position against one end of the swinging bolt 54.

The keeper flange 56 is provided with a bolt receiving recess or keeper 64 having opposed side walls at an angle to the sides of the flange and into which recess the adjacent end of the swinging bolt snaps under the action of the spring pressed plunger 59 and upon movement of the inner handle 51 to upward locking position to

thus latch the handle in such position for preventing operation of the latching bolt 13.

In order to retract the swinging bolt 54 from latched engagement within the keeper or recess 64 to permit downward movement of the inner handle 51, means are provided in the form of a plunger 65 extending through a bore 66 in the extension 48 of block 47 having a collar 67 engageable with a shoulder provided by the outer end of the recess 68 in the hub 50 of the handle 51. The plunger 65 is provided with a rounded head 69 for thumb contact therewith to force the plunger inwardly to retract the swinging bolt 54 from within the latching recess 64 in the flange 56 when the inner handle 51 is grasped to swing the same downwardly.

Thus it will be seen that as in the case of my patented structure, herein referred to, two movements of the parts just described, at right angles to each other, are necessary in order to move the inner handle 51 from latched position.

An essential part of the present invention includes means which has operative connection with the key operated tumbler lock shaft 39 for releasing the swinging bolt 54 from latching engagement with the keeper flange 56. Such means comprises a cam bar 70 guidingly and slidably positioned beneath the keeper flange 56 in advance of the recess 64 by supporting means such as the machine screws 71 extending through a slot 72 in the flange for directing the movement of the bar 70 toward and from the keeper recess. The cam bar 70 is preferably of a thickness equal to the width of the flange 56 and is provided at its forward end with a wedge or cam-shaped nose 73 operative to move under the adjacent end of the pivoted bolt 54 and raise the same out of the keeper recess 64 upon movement of the cam bar toward the recess as shown in Figs. 7 and 8.

The cam bar 70, at its end opposite the cam nose 73, is pivotally connected as at 74, to one end of a rod or link 75 whose opposite end is pivotally connected at 76 to a lever 77 secured to the key operated tumbler lock shaft 39. The arrangement of parts just described is such that the swinging bolt 54 is disengaged from the keeper recess 64 by the lifting action of the cam nose 73 under the bolt in opposition to the action of the spring 60 against the opposite end of the bolt at the time the finger 36 has moved to a position to engage the oblique lug 35 on the locking plate 15, as shown in dotted lines in Fig. 3, whereupon further rotation of the key operated tumbler lock shaft 39 will then shift the plate 15 and therewith the links 24 and 45 as shown in full lines in Fig. 4, thereby rocking lever 43 and rotating shaft 42 and its handle 51 downwardly to neutral or unlatched position. By the movement of the parts just described in response to turning the key operated tumbler shaft 39 to unlatch the inner handle 51, it will be noted that the shoulder 33 on the locking plate 15 has been withdrawn from beneath the projection 32 on the roll-back 30 so that the outside door handle 28 may thereafter be moved or rotated to retract the door latching bolt 13.

In this connection it will be understood that the latching bolt 13 may also be withdrawn upon further rotation or downward movement of the inner handle 51 through engagement of the stud 22 with the forward end of the slot 23 as the link 24 is drawn rearwardly by the rod or link 45.

The reverse of these operations can also be performed by key rotation of the tumbler lock shaft 39 in the opposite direction from that above described to effect forward movement of the locking plate 15, from the position shown in Fig. 4, by engagement of the finger 37 with the oblique lug 35 whereupon the roll-back projection 32 is locked by the shoulder 33 and at the same time the inside handle 51 is swung upwardly by the forward movement of links 24 and 45 and the lever 43 connected to the inner handle rock shaft 42.

When the inner handle is thus moved to its extreme upper position by rotation of the key operated tumbler lock shaft 39, the rocking or swinging bolt 54 will snap into the keeper recess 64 to latch the handle 51 against further movement about the axis of its supporting shaft 42. In this reverse movement of the parts by the key operated tumbler lock shaft the cam bar 70 will be moved forwardly along the slot in the flange 56 and away from the keeper recess 64, as shown in Fig. 7.

As in my patent referred to, the present locking mechanism preferably includes means for locking a window 80 pivotally mounted in the door as at 81. Such locking means comprises a lever 82 secured to the link 45 adjacent shaft 42, a second lever 83 pivotally connected to lever 82 at 84 and a third lever 85 pivotally connected to lever 33 and further pivotally connected to the door intermediate its ends as at 86. The lever 85 provides a laterally swingable bolt for engagement with and disengagement from a keeper 87 secured to the inside of the window 80 adjacent its lower front corner as shown in Figs. 1, 2 and 6.

Thus it will be seen that the window is also locked from the inside thereof simultaneously with the locking of the outside handle 28 and the latching of the inside handle 51, either from the inside of the door by direct upward movement of the inner handle 51 to latched position or indirectly by action of the key operated lock shaft 39, which as shown in Fig. 5 includes the lock housing and barrel 38' from which the key may be removed.

It will be particularly noted from an inspection of Figs. 3 and 4 that sufficient lost motion is provided between the operating surfaces of the fingers 36 and 37 and the cooperating oblique faces of the lug 35 for the return of the key operated lock shaft 39 to key retracting position from both the locked and unlocked positions of the mechanism as shown. It will also be noted by reference particularly to Fig. 3 that the recess 14 in the locking plate 15 is of such length that even when the roll-back 30 is dogged by the locking plate that the space at the rear of the latching bolt 13 is at least equal to the normal projection of the bolt at the front edge of the door thereby permitting closing of the door even though the locking mechanism has been set by either of the means above described.

From the foregoing disclosure it will be appreciated that an improved automobile door lock is provided which in its construction embodies an outside locking bolt retracting handle, an inside handle operative to retract the locking bolt upon movement thereof in one direction and operative upon movement in the opposite direction to lock the outside handle against locking bolt retracting movement, other locking means automatically operative upon movement of the inside handle to secure same against movement to unlocking position, and removable key operable means accessible from the outside of a door, provided with the improved lock, for locking the outside handle against bolt retracting movement and also operable to release the inside and outside handles from deadlocking positions for movement to retract the door locking bolt from door latching position.

With this improved lock any or all doors on an automobile may be provided with same upon pro-

vision of right and left lock arrangements for opposite sides of the automobile whereby access may be had through any door regardless of which ones may have been locked by means of the inside handle or the outside key operated means.

Changes may be made in details of construction without departing from the scope of the invention as defined in the subjoined claims.

What I claim and desire to secure by United States Letters Patent is:

1. An automobile door lock comprising a latching bolt, an outside door handle, and an inside door handle, means operative upon movement of the outside door handle for retracting the bolt, means operative upon movement of the inside handle for locking the outside handle against bolt retracting movement, means operative to latch the inside handle in outside handle locking position, and key operable means accessible from the outside of the door for releasing said latching means.

2. An automobile door lock comprising a latching bolt, an outside door handle, and an inside door handle, means operative upon movement of the inside handle in one direction for retracting the bolt and in another direction for locking the outside handle against bolt retracting movement, means operative to latch the inside handle in outside handle locking position, and key operable means for releasing said latching means.

3. An automobile door lock comprising a locking bolt having a plate extension, an outer handle connected with a roll-back for engaging the bolt plate extension to retract said locking bolt, a slidably mounted roll-back locking plate having a recess in which said locking bolt is slidably disposed, an extension on said roll-back engageable by a shoulder on said locking plate when in one position to lock said roll-back and outer handle against movement, an inner handle, link connections between said inner handle and said locking plate for moving same to and from said roll-back locking position upon predetermined movement of the inner handle, and a lost motion connection between said link connections and the bolt plate extension for retracting said locking bolt upon further movement of said inner handle after moving said locking plate from roll-back locking position.

4. An automobile door lock according to claim 3 together with key operable means for moving said locking plate to and from roll-back locking position irrespective of the position in which the locking plate may have been moved by the inner handle.

5. An automobile door lock according to claim 3 together with means operative to latch said inner handle in roll-back locking position, and key operable means for releasing said latch means and for moving said locking plate together with the inner handle to roll-back unlocking position.

6. An automobile door lock comprising a slidably mounted locking bolt, a pivotally mounted outer handle, a pivotally mounted inner handle, means operable by movement of the outer handle for retracting the locking bolt, means operable upon movement of the inner handle in one direction for locking said first means and outer handle against operative movement, means operative upon said movement of the inner handle for latching same in said locking position, key operable means accessible from the outside of the door for releasing said latching means and for moving the inner handle in an opposite direction to a position for unlocking said first means and outer handle, and a lost motion connection between said second means and said locking bolt for retraction of the latter upon further movement of the inner handle in the last mentioned direction.

7. An automobile door lock comprising a slidably mounted locking bolt having a plate extension, a locking plate slidably mounted at one side of the plate extension, an outer pivotally mounted handle, a roll-back connected with the handle and having a pair of spaced projections, one of which is engageable with said plate extension for retracting the locking bolt upon swinging movement of the outer handle, a shoulder on the locking plate for engagement by the other projection upon forward movement of the locking plate for locking the roll-back against locking bolt retracting movement, an inner pivotally mounted handle having a link connection with the locking plate for movement thereof to said locking position upon swinging movement of the inner handle in one direction, means operative for latching said inner handle in said locking position, key operable means accessible from the outside of the door for retracting said latching means and for moving said locking plate in a rearward direction for unlocking said roll-back and for moving said inner handle in the opposite direction, and a lost motion connection between said plate extension and said link conection for retracting said locking bolt upon further movement of said inner handle in the last mentioned direction.

8. An automobile door lock according to claim 7 wherein said key operable means comprises a key rotatable spindle, spaced fingers on the spindle, and a lug on the locking plate intermediate said fingers for engagement with one or the other of said fingers for moving said locking plate in said rearward direction or to a forward roll-back locking position.

9. An automobile door lock according to claim 7 wherein said locking plate is provided with an elongated recess in which said locking bolt is slidable, said recess being of a length to permit retraction of said locking bolt for closing of the door when the locking plate is in roll-back locking position.

10. An automobile door lock according to claim 7 wherein said key operable means for retracting said latching means comprises a key actuated rotatable spindle, a lever on the spindle, a latching means releasing cam plate bar, and a link connection between the lever and cam plate bar.

11. An automobile door lock comprising a locking bolt, inner and outer door handles pivotally mounted on opposite sides of the door for independent operation of said bolt, means providing an operative connection between the inner handle and said bolt when the inner handle is swung on its pivotal mounting in one direction to retract the bolt, said means being operative when said inner handle is swung in the opposite direction to prevent operation of said bolt by said outer handle, manually releasable interlocking means on said door and inner handle and engageable upon movement of the inner handle into said last named position to secure the inner door handle against movement in a direction to release the outer handle, and key operated means accessible from the outside of the door for moving said inner handle to and from said last named position.

12. An automobile door and window lock comprising two relatively movable bolts, inner and

outer handles pivotally mounted on opposite sides of said door for independent operation of said bolts, means providing an operative connection between one handle and one bolt to retract said one bolt when said one handle is swung on its mounting in one direction, said means being operative when said one handle is swung in the opposite direction to move the other bolt to locking position and to prevent operation of the other handle, interlocking means on said one handle and door engageable upon movement of said one handle into said last named position to secure said one handle against movement to release said other handle, and key operated means accessible from the outside of the door for operating said one handle and its interlocking means.

13. In a lock for an automobile door having a relatively movable sash, bolt means for securing both said door and sash in closed positions, handles pivotally mounted on oppoiste sides of said door, the outer handle having a connection with said bolt means for normally releasing said door, said bolt means including a connection with the inner handle for operation thereby to also release the door upon swinging movement of said inner handle in one direction, said last mentioned connection being operative upon swinging movement of said inner handle in the opposite direction to move said bolt means to lock said sash and prevent further operation of said means by the outer handle and key operated means accessible from the outside of the door for moving said inner handle in said opposite directions.

14. In a lock for automobile doors, the combination of a latch bolt, outside and inside means for retracting the same, deadlocking means for the outside retracting means operative from the inside of the door, latching means also operative from the inside of the door to latch the inside retracting means, and key operated means operative from the outside of the door for moving both the latching means and deadlocking means to and from operative positions.

15. An automobile door lock comprising a cover plate in spaced parallel relation to the base plate, a bolt plate and a locking plate disposed between said base and cover plates, the locking plate being slidably disposed between an angular edge of the cover plate and a lug on the base plate, the locking plate having an elongated recess, the bolt plate having a locking bolt slidably disposed in said recess and having shoulders normally engaged by lugs on the base plate by means of a spring engaged with said lock bolt, an outer handle connected with a roll-back having angularly spaced projections, a shoulder on said locking plate engageable by one of said projections to lock said roll-back against rotation, the other projection engageable with said bolt plate for retracting said bolt against the action of said spring upon retraction of said locking plate for clearance by said first projection of said shoulder, an inner handle, and operative connections between said inner handle and said locking plate and bolt plate for retracting same in succession.

16. An automobile door lock according to claim 15 wherein said locking plate is provided with a pair of spaced recesses, and a spring member successively engageable in said recess upon movement of the locking plate for holding same in roll-back locking and unlocking position.

17. In a lock for automobile doors and the like, the combination of a spring projected bolt, outside and inside handles on the door, means connecting the handles and bolt for retracting the bolt by either handle, deadlocking means associated with each of the handles, operating connections between said inside handle and deadlocking means operative when said inside handle is in normal inoperative position to free both handles for operation of the bolt, and being operative when said inside handle is moved in one direction from said inoperative position to lock both handles, and key operated means operable from the outside of the door and associated with said deadlocking means to free or lock both of said handles.

18. In a lock for an automobile door having a relatively movable sash, independently movable bolts for securing the door and sash in closed positions, operating means on the outside and the inside of the door for controlling the movements of the bolts, a link connected to one of the operating means and providing a lost motion connection between the bolts, deadlocking means for the other operating means associated with said link for operation by said link, latching means also associated with said link for securing same in one of its positions of movement, and key operative means accessible from the outside of the door and having connections with said latching means and deadlocking means for moving same to and from their securing positions.

19. A combined automobile door and window lock, comprising a pair of bolts independently mounted in the door for securing the door and window in closed positions, operating means mounted on opposite sides of the door for actuating said bolts, linkage connecting the operating means on one side of the door with said bolts and movable in one direction to retract one of said bolts, said linkage being movable in the opposite direction to move the other bolt to securing position and to dog the operating means on the opposite side of the door, latching means associated with said linkage and operable to secure the linkage in one of its positions of movement, and key operated means on said opposite side of the door and having connections for actuating said latching means and moving said linkage means in said opposite direction.

20. In a lock for automobile doors, the combination of a bolt movably mounted in the door, separate operating means connected to said bolt and operable one from the outside and the other from the inside of the door for moving said bolt in its mounting, deadlocking means for one of the bolt moving means operative by the other bolt moving means, other locking means associated with said last mentioned bolt moving means for securing same in deadlocking position, and key operated means operative from the outside of the door and associated with said other locking means and with said deadlocking means for moving same to and from their locking positions.

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