Nov. 10, 1953 E. D. DALL 2,658,780

DOOR LATCH

Filed Aug. 12, 1950 4 Sheets-Sheet 1

Fig. 1

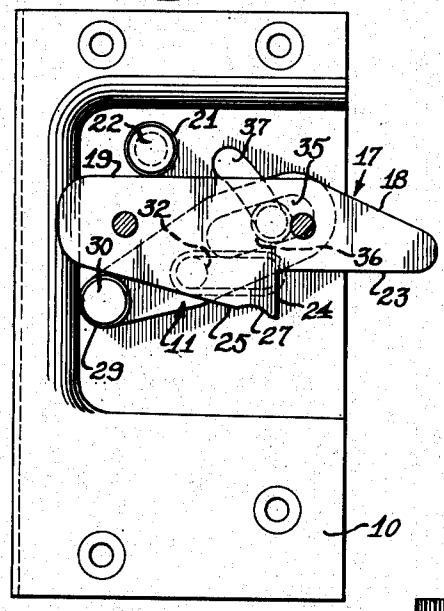


Fig. 2

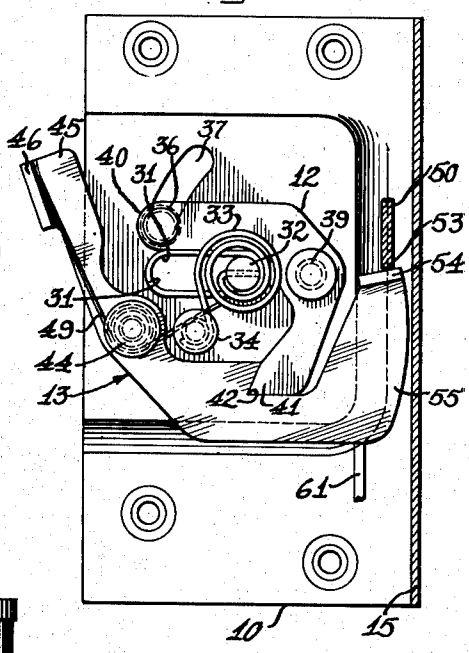
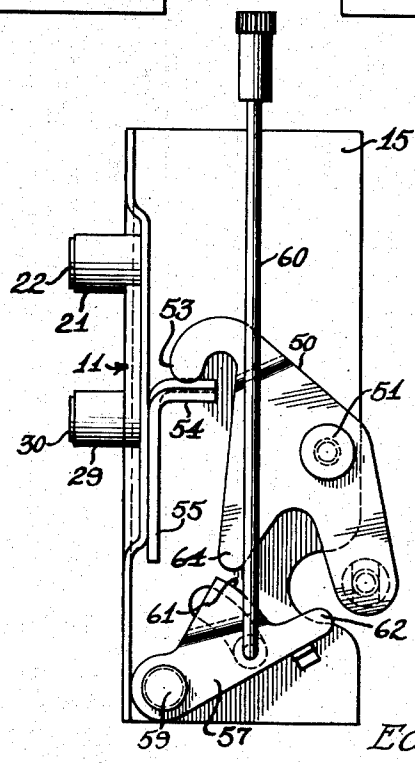


Fig. 3



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DOOR LATCH

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Fig. 4

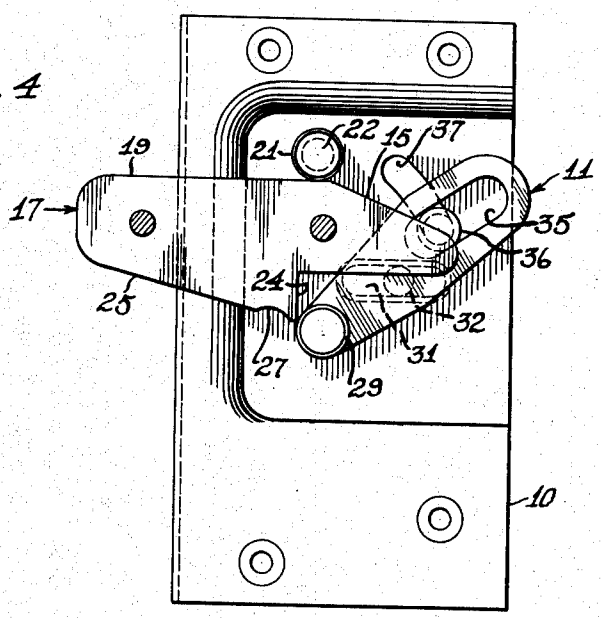
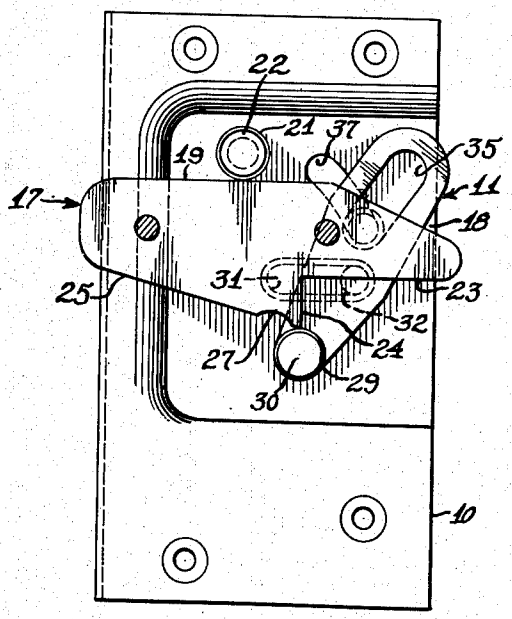


Fig. 5



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Fig. 8

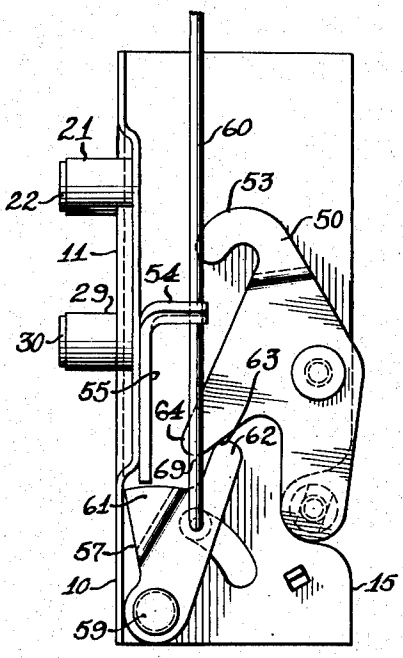


Fig. 6

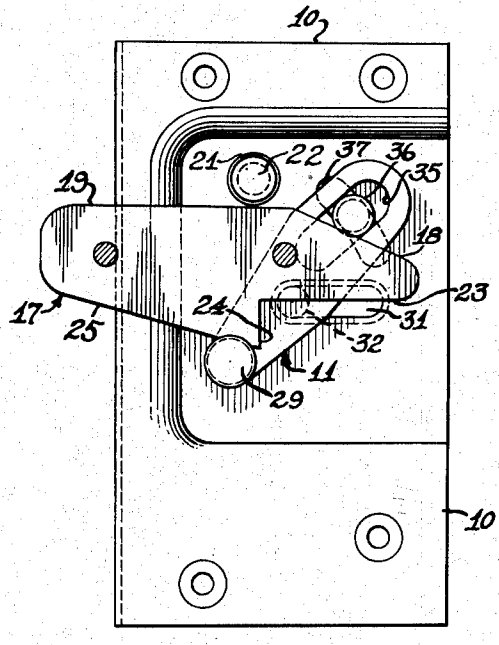
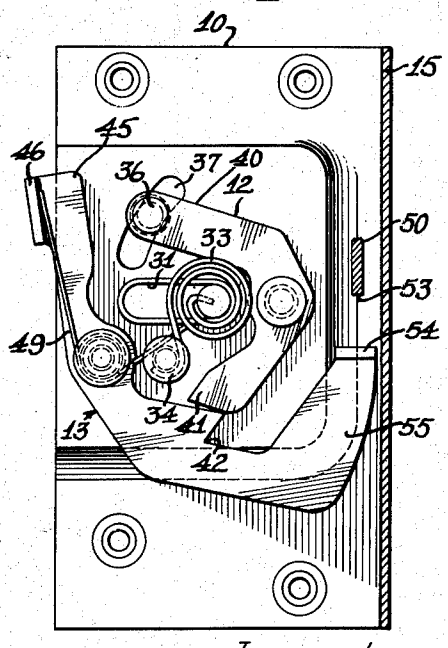


Fig. 7



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DOOR LATCH

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Fig. 9

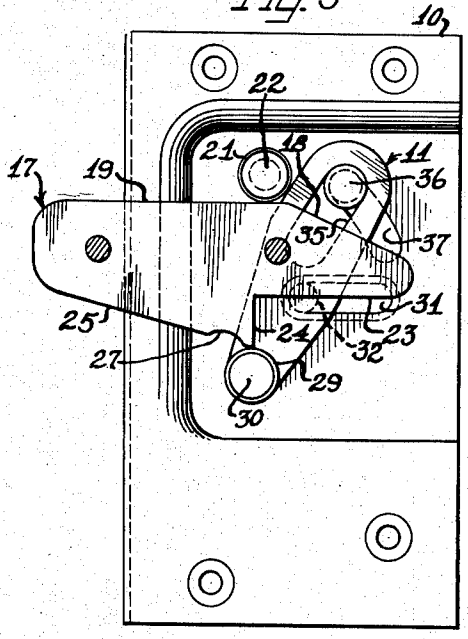


Fig. 10

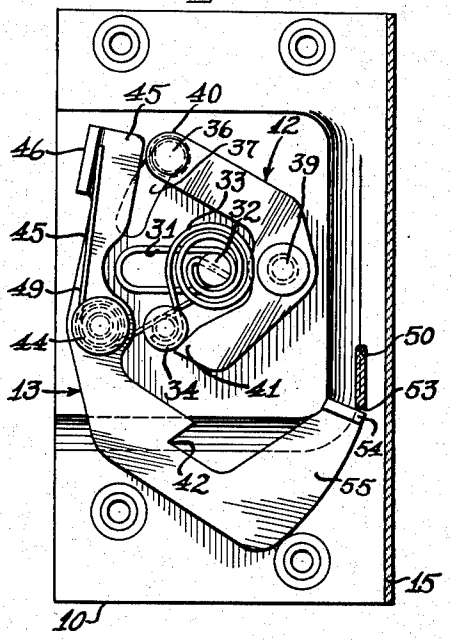
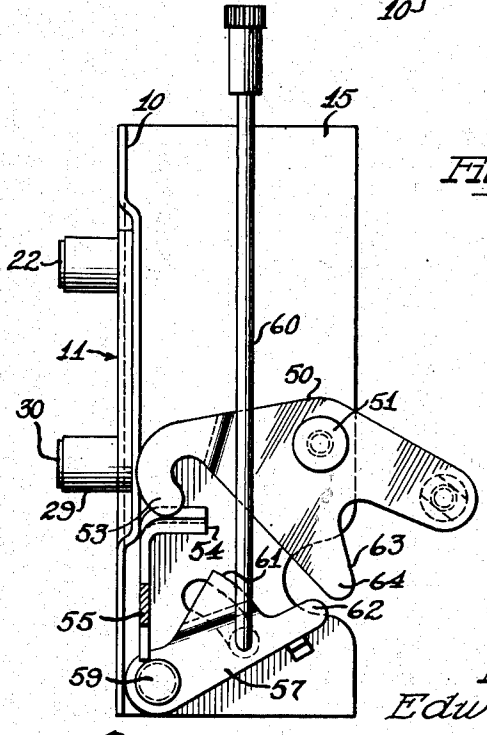


Fig. 11



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Patented Nov. 10, 1953

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UNITED STATES PATENT OFFICE

2,658,780

DOOR LATCH

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

Application August 12, 1950, Serial No. 179,064

17 Claims. (Cl. 292—66)

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This invention relates to a door lock and more particularly relates to a novel form of door lock which may be employed to latch the side doors of automotive vehicles.

A principal object of my invention is to provide a new and improved self take-up door lock particularly adapted for latching the side doors of automotive vehicles and the like, and arranged with a view toward utmost simplicity and efficiency in operation and construction.

Another object of my invention is to provide a new and improved form of door lock having a simplified form of automatic safety catch operable on opening and closing of the door.

A still further object of my invention is to provide a novel and efficient form of automobile door lock so constructed and arranged as to automatically take up looseness between the latch and striker and to hold the door from opening movement at any time door closing movement may be stopped after the latch has come into latching engagement with the striker.

A still further and more detailed object of my invention is to provide a main latch guided for pivotal movement in a vertical direction and for slidable movement in door opening and closing directions, together with a dogging or latch retaining means holding the latch when in a latched position against unlatching movement, but permitting further movement thereof in a latching direction to assure a positively locked door in any latched position of the latch.

Another object of my invention is to provide a latch mechanism having a main latch member cooperating with an inclined strike surface of a keeper which after being engaged in latching position is capable of automatically shifting into further latched position if there be any further subsequent relative movement of the closure member toward the keeper.

A further object of my invention is to provide a novel and improved form of door lock having a positive stopping means incorporated therewith to prevent opening of the door from the outside of the automobile together with inside door operating means releasing said stopping means when in a locked position and opening the door from the inside of the vehicle.

Still another object of my invention is to provide a slidable and pivotal type of latch bolt door locking mechanism for automobiles and the like, including a dogging member controlling the path of pivotal and slidable movement of the latch bolt and taking up on the latch bolt as the latch bolt is moving to a closed position and automatically holding the latch bolt in safety latched position during door opening and closing movements.

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These and other objects of my invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

Figure 1 is a vertical sectional view taken along the door post at the point of connection of the keeper thereto, and looking toward the keeper and door lock with the operating arm for the release member broken away, showing the latch bolt in a fully latched position in respect to the keeper;

Figure 2 is a vertical sectional view looking toward the opposite side of the latching mechanism from Figure 1;

Figure 3 is a fragmentary end view of the door latch looking toward the door panel with the dog broken away and shown in section, and the pivot pin and the biasing means therefor removed and showing the outside release lever in a normal position with the release dog in a holding position;

Figure 4 is a sectional view somewhat similar to Figure 1 but showing the latch entering the keeper;

Figure 5 is a sectional view somewhat similar to Figure 1 but showing the latch entering the safety catch notch;

Figure 6 is a vertical sectional view somewhat similar to Figure 1 and showing the latch in a safety catch position with the dogging lever in a released position, during door opening movement;

Figure 7 is a vertical sectional view looking toward the opposite side of the latch plate from Figure 6 and showing the dogging lever in an unlatched safety catch position;

Figure 8 is a fragmentary end view somewhat similar to Figure 3, but showing the key lever in a locked position;

Figure 9 is a vertical sectional view showing the latch bolt in a full released position;

Figure 10 is a vertical sectional view looking at the opposite side of the latch from Figure 9 and showing the dogging lever in a full unlatched position with the inside release lever held in a released position; and

Figure 11 is a fragmentary end view somewhat similar to Figure 3 with the dog broken away and shown in section and the pivot pin and biasing means therefor removed, but showing the inside release lever in a fully released position.

In the embodiment of my invention illustrated in the drawings, a lock casing is shown as com-

prising a lock plate 10 having a second plate or flange 15 extending at substantially right angles to said lock plate and facing the inner panel of the door. The lock plate 10 is adapted to be secured to the inner side of the jamb portion of the door and has a latch 11 slidably and pivotally mounted on its outer side, and a dogging lever 12 pivotally mounted on its inner side and operatively connected with said latch, to dog said latch into a latching position.

A striker or keeper 17 is suitably mounted on the door frame for cooperation with the latch 11. Said striker plate is of an elongated formation and the top side thereof has an inclined entering face 18 and a horizontal support face 19 extending therefrom and forming a support for a roller 21. Said roller extends outwardly from the lock plate 10 and is mounted thereon on the pin 22, which may be riveted to said lock plate. This roller slides along the upper faces 18 and 19 of the striker plate during door closing movement and supports the weight of the door on the horizontal face 19 of the striker plate when the door is closed.

The bottom surface of the striker 17 includes an advance horizontal entering face 23 affording clearance for a latch bolt 29 on the latch 11 and terminating in a vertical abutment or strike face 24. The bottom surface of the striker 17 also includes a receding inclined take-up face 25 extending angularly inwardly or upwardly from the lower side of the vertical strike face 24 to the outer end of said keeper. A safety notch 27 is formed at the entering end of the inclined take-up face to afford a catch for a latch bolt 29 projecting outwardly from the entering end of the latch 11. The safety notch 27 cooperating with the latch bolt 29 forms a safety catch upon opening and closing movement of the door until the safety catch positions have been passed by to prevent the door from freely swinging open, as will hereinafter more clearly appear as this specification proceeds.

The latch bolt 29 may be in the form of a roller mounted on a pin 30 riveted or welded to the latch 11 and projecting outwardly therefrom.

The latch 11 is pivotally and slidably mounted on the lock plate 10 in a slot 31 on a pivot pin 32. The slot 31 extends horizontally along the central portion of the latch plate 10 in the direction of door movement. The pin 32 is rigidly secured to the latch 11 intermediate its ends as by riveting or welding and extends inwardly therefrom through the slot 31 and beyond the inner side of the lock plate 10. The portion of the pin 32 on the inner side of the plate 10 is shown as being encircled by a torsion spring 33 anchored to said pin at its inner end. The free end of the spring 33 is shown as extending downwardly from the slot 31, and as being anchored to a pin 34 rigidly secured to the lock plate 10 as by riveting or welding. The torsion spring 33 urges the latch bolt 29 to rotate in a direction, which in Figure 1 is shown as being a clockwise direction and toward the flange 15 or left-hand side of the slot 31, and is compressed as the pin 32 moves toward the outer end of the plate 10, or toward the right-hand end of the slot 31.

The latch 11 is provided with a slot 35 extending therealong and spaced on the opposite side of the pin 32 from the latch bolt 29. The slot 35 is slidably engaged by a pin 36 mounted on an upper free end 40 of the dogging lever 12.

The pin 36 extends through an arcuate slot 37 formed in lock plate 10 into slidable controlling engagement with the slot 35 of the latch 11. The margins of the slot 37 extend in arcs struck about an axis coaxial with the axis of pivotal movement of the dogging lever 12. The dogging lever 12 is pivotally mounted intermediate its ends on the opposite side of the lock plate 10 from the latch 11 on a headed pin 39, secured at its inner end to the lock plate 10, as by riveting or welding. The dogging lever 12 is of a generally C shaped formation and besides having the upper horizontally extending arm 40, also has a depending lever arm 41 engaging a notched portion 42 of the dog or outside release lever 13, forming a notched abutment to hold said dogging lever rigidly except when the latch is released for door opening movement.

The dog or outside release lever 13 is pivotally mounted on the same side of the lock plate 10 as the dogging lever 12 on a headed pin 44, secured at its inner end to said lock plate as by riveting or welding. The dog 13 has an arm 45 extending upwardly from the pivot pin 44 which has a right-angled flanged engaging surface 46, which may be engaged either by operation of a push-button or a pull-out handle of the door to release the dog 12 and allow the door to be opened. A torsion spring 49 is mounted on and encircles the headed pivot pin 44. One end of this spring engages the inner side of the flange 46 while the opposite end thereof engages the pin 34 and urges or biases the dog 13 in the engaged dogging position shown in Figure 2, so as to normally hold the dogging lever 12 from pivotal movement, except on positive movement of said dog, effected either from the outside or inside of the door.

The dog 13 is released from the inside of the vehicle by means of an inside release lever 50, pivotally mounted on the inside of the right-angled flange 15, on a headed pivot pin 51, rigidly secured to the flange 15, as by riveting or welding. The inside release lever 50, as shown in Figure 3, has a downwardly curved upper engaging end portion 53 movable into position to have bearing engagement with an inwardly turned upper end portion 54 of an upright arm 55 of the dog 13. Pivotal movement of the inside release lever 50 in a direction, which in Figure 3 is a counterclockwise direction, will thus depress the arm 55 and pivot the dog 13 about the axis of the pin 44, to release the dogging lever 12 and allow the door to be opened. The inside release lever 50 may be operated by the inside door handle through the usual remote control operating mechanism (not shown).

A locking lever 57 is likewise shown as being mounted on the flange 15 adjacent the lower left-hand corner thereof on a pivot pin 59, herein shown as being a headed pin and riveted or welded to the flange 15, and extending outwardly therefrom. The locking lever 57 may be key operated from the outside of the door in a manner well known to those skilled in the art, so not herein shown or described in detail, and may be operated from the inside of the door by means of the usual button and rod 60 pivotally connected thereto at a point spaced from the pivotal axis thereof.

The locking lever 57 is herein shown as having an integrally formed outwardly spaced arcuate engaging face 61. When said locking lever is in the upright locked position shown in Figure 8 the face 61 will contact the bottom of the arm 55 of the dog 13 and will block said dog from

movement in a direction to release the dogging lever 12.

When the locking lever 57 is in a locked position, a radially projecting arm 62 thereof will come into engagement with an engaging surface 53 formed on the under side of a depending arm 64 of the inside release lever 50, and will pivot said inside release lever in a direction which in Figure 8 is a clockwise direction. This will raise the engaging end 53 of the release lever 50 a substantial distance above the inwardly turned end 54 of the arm 55 of the dog 13. Thus when the inside operating lever 50 is moved in a counterclockwise direction to release the dog 13, and the locking lever 57 is in a locked position, contact of the engaging surface 63 with the arm 62 will first move the locking lever 57 out of engagement with the under surface of the arm 55 of the dog 13 (see Figures 8 and 11). Continued movement of said inside release lever 50 will depress the arm 55, and pivot the dog 13 to release the dogging lever and the latch 11. The door may thus be opened from the inside even though it may be key locked from the outside.

Referring now to the operation of the lock, when the door is open and the latch is in its fully released position, the latch 11 is inclined at a relatively flat angle and is in substantially the position shown in Figure 1, which figure shows the latch 11 and latch bolt 29 at the end of its take-up when the door is closed. The pivot pin 32 of the latch is toward the flange 15 or the left-hand end of the slot 25. The latch 11 is held in this position by the spring 33 shown in Figure 2, and the dogging lever 12 is rigidly held in dogging position by the dog 13.

As the door is closed, the latch bolt 29 will ride along the surface 23 of the striker 17 until it strikes the upright face 24 of the striker 17. This will force the latch bolt and pin 32 toward the right-hand end of the slot 31 as in Figure 4, showing the position of the latch as it enters the striker and the latch bolt 29 has come into engagement with the upright abutment face 24 of the striker. Engagement of the latch bolt 29 with the abutment face 24 will also turn the latch in a counterclockwise direction about the pin 32 under control of the stationary pin 36 of the dogging lever 12. This will pivot the latch bolt 11 to the extreme position shown in Figure 5, showing the latch bolt 29 entering the safety catch notch 27.

As the pin 32 of the latch is moved along the slot 31 toward the right-hand end thereof, effected by engagement of the latch bolt with the abutment surface of the striker 17, the spring 33 will be compressed. After the latch bolt 29 has cleared the lower end of the striker, as shown in Figure 5, the spring 33 will tend to move the latch bolt 11 and pin 32 toward the left-hand end of the slot 31 and will also tend to turn the latch 11 in a clockwise direction. Further inward movement of the door will allow the latch bolt 29 to enter the safety catch notch 27 of the keeper 17. The spring 33 urging the latch in a clockwise direction will hold said latch bolt in engagement with the notch 27 in the safety catch position. In this position, the pin 32 will already have moved part way along the slot 31 toward the left-hand end thereof.

Upon further door closing movement, the latch bolt 29 will start to move along the angular surface 25 of the strike plate 17, and the pin 32 will continue to move along the slot 31. This is the beginning of the take-up. Continued movement of the door will cause the latch bolt 29 to move still further along the angular surface 25, taking up slack as it moves until the pin 32 is at the end of the slot 31. This is the end of the take-up and the latch bolt 29 and pin 32 will be in the latched position shown in Figure 1.

It will here be noted that since the dogging lever 12 and pin 36 are rigidly held during door closing movement and react with the pin 32 to hold the latch bolt 11 from movement in a counterclockwise direction, and since the spring 33 moves the latch bolt in a clockwise direction as it moves the pin 32 along the slot 31 to the left, that the door will be held from opening movement in any position after the latch bolt 29 engages the safety catch notch 27, until the dogging lever 12 is released. The reason for this is that the pin 36 is rigidly held when the dogging lever 12 is in a dogging position, while the pin 32 can slide along the slot 31. Therefore, when there is pressure on the door in a direction to open it, pressure will be exerted by the pin 36 on the dogging lever against the bottom edge of the slot 35. Where the pin 32 has not reached the end of the slot 31 and there is clearance between said pin and the end of said slot, pressure will be exerted by the pin 36 against the slot 35 in a clockwise direction as the door tends to swing open. This will press the latch bolt 29 against the inclined face 25 of the striker 17 with increased pressure as the door tends to swing or is attempted to be pulled in opening direction, so that the more pressure placed on the door in a direction to open it, the tighter the latch will become.

When opening the door, the dogging lever 12 is released from the outside by pressure on the lever arm 45 of the dog 13, moving said arm toward the flange 15, or by depression of the arm 55 of said dog by operation of the inside operating lever 50. This will allow the latch 11 and latch bolt 29 to rotate in a counterclockwise direction against the resistance of spring 33, said spring holding the pin 32 in an extreme position at the left-hand end of the slot 31. After the dogging lever 12 has been released as just described, the door can be opened until the latch bolt 29 enters the safety catch notch 27 of the striker, as shown in Figure 6. At this time, further opening movement of the door will apply pressure against the pin 32 of the latch bolt 11 at the end of the slot 31, as in Figure 6. Since the roller 21 is resting on the horizontal top surface 18 of the striker, this roller will hold the door from any tendency to move downward or sag. Also when in the position of door opening movement shown in Figure 6, a clamping action will be applied on the latch 11 and latch bolt 29 in the notch 27, temporarily holding the latch bolt in this position and holding the door from opening movement. To release the door for further opening movement, upon further operation of the dog 13 in a clockwise direction of rotation by continued pressure on the end thereof, the upper end 45 of said dog will engage the dogging lever 12 at 49 and will cam said dogging lever in a clockwise direction of rotation, as shown in Figure 10. The pin 36 engaging the latch 11 will pivot the latch in a counterclockwise direction until the latch bolt 29 is out of engagement with the safety notch 27 of the striker 17, as shown in Figure 9. The door then may be freely opened.

It may thus be seen that a safety catch is provided on closing the door and that a safety catch is also provided on opening movement of the

door, to prevent the door from swinging open when partially opened and the hand is removed from the door handle, or when a person is pushed or bumps against the inside of the door or due to jarring of the vehicle when in motion.

It may further be seen that an automatic take-up has been provided which will take up looseness between the latch and keeper and will hold the door from opening movement when it is once partially closed and the lock bolt 29 is in engagement with the inclined surface of the keeper 17 and that the harder the door is pulled in an opening direction when the dogging lever 12 is held rigid the tighter will be the engagement between the latch bolt and keeper.

It may still further be seen that a single dog pivoted to the lock plate intermediate its ends on an axis disposed to one side of the pivotal axis of the dogging lever, and operated from either side of the dogging lever, holds the dogging lever rigid and that this dog may be released either from the inside or the outside of the car, and that the door may be opened from the inside when locked from the outside.

It may still further be seen that the lock may be locked when the door is open and that the door may then be closed with the dogging lever 12 held in a rigid position during the door closing and locking operation.

It will be understood that modifications and variations may be effected in the present invention without departing from the scope of the novel concepts thereof.

I claim as my invention:

1. In a door lock structure, a lock plate having a guide slot extending therealong in the general direction of door closing movement, a latch mounted in said slot for movement therealong and for pivotal movement with respect to said lock plate and having a latch bolt projecting laterally therefrom for engagement with a keeper, a spring operatively connected between said lock plate and said latch and urging said latch to move along said slot in a direction toward the keeper, and also urging said latch to pivot into clamping engagement with the keeper, a dogging lever pivotally mounted on said lock plate and having controlling slidable engagement with said latch and controlling movement thereof during the latching operation and holding said latch from movement in an unlatching direction, and a dog pivotally mounted on said latch plate to one side of the pivotal axis of said dogging lever and having an outside operating arm disposed on one side of said dogging lever and an inside operating arm disposed on the opposite side of said dogging lever, said dog being operable to engage and hold said dogging lever in a rigid dogging position during door closing movement and when the door is closed.

2. In a door lock structure, a lock plate, a latch mounted on one side of said lock plate for slidable movement therealong and for pivotal movement with respect thereto and having a latch bolt projecting from one end thereof for cooperation with a keeper, a dogging lever pivotally mounted on the opposite side of said lock plate from said latch, a pin on one end of said dogging lever and slidably guided in said lock plate and having slidable controlling engagement with the opposite end of said latch from said latch bolt, a dog pivotally mounted on said lock plate on the same side thereof as said dogging lever for engagement with the opposite end of said dogging lever from said controlling pin to hold said dogging lever in a rigid dogging position during door closing movement and when the latch is locked.

3. In a door lock structure, a lock plate, a guide slot extending along said plate in the general direction of door movement, a latch on one side of said plate, a guide member disposed intermediate the ends of said latch and guiding said latch in said slot for movement therealong and for pivotal movement with respect thereto, a spring on the opposite side of said lock plate from said latch and connected between said lock plate and said guide member and urging said latch to move along said slot in a direction toward the keeper and also urging said latch to pivot in a direction to take up on the keeper, a dogging lever pivotally mounted on the opposite side of said lock plate from said latch, a slot in said lock plate, a control pin on said dogging lever extending through said slot and having slidable controlling engagement with said latch, and a dog pivotally mounted on the same side of said latch plate as said dogging lever and having releasable engagement with said dogging lever to hold said dogging lever in a stationary dogging position.

4. A latch mechanism comprising two angularly disposed plates, one of which forms a lock plate, a latch carried by said lock plate for pivotal movement with respect thereto and for slidable movement therealong in the directions of door movement, a dogging lever pivotally mounted on said lock plate, a slidable controlling connection between said dogging lever and said latch operable to control pivotal movement thereof and to hold said latch in a dogging position, a dog pivotally mounted on said lock plate intermediate its ends and having a recessed abutment surface on one side of the pivotal axis thereof engageable with said dogging lever to positively hold said dogging lever rigid and also having an engaging end extending from the opposite side of the pivotal axis of said dog from said recessed abutment surface for releasing said dogging lever from the outside of the door, and said dog having an inside releasing extension spaced beyond said recessed abutment surface on the same side of the pivotal axis of said dog as said abutment surface, whereby said dog may be pivoted to depress and disengage said recessed abutment surface from said dogging lever from the inside or outside of the door.

5. A latch mechanism comprising two angularly disposed plates, one of which forms a lock plate, a latch slidably mounted on said lock plate and for pivotal movement with respect thereto in a vertical plane, a spring operatively connected with said latch and urging said latch to pivot in a direction to engage a keeper and also urging said latch to slidably move along said latch plate in a direction toward the keeper, a dogging lever pivotally mounted on said casing, a slidable controlling connection between said dogging lever and said latch, a dog pivotally mounted on said lock plate intermediate its ends and having a recessed abutment surface on one side of its pivotal axis engageable with said dogging lever to positively hold said dogging lever in a dogging position, said dog also having a lever arm spaced from its pivotal axis in an opposite direction from said abutment surface for releasing said dog from the outside, and also having an inside releasing extension extending in the same general direction as said abutment surface and spaced therebeyond, an inside release lever piv-

otally mounted on the other of said plates for engagement with said extension, and linkage means operable from the inside to move said release lever to a released position.

6. A latch mechanism comprising two angularly disposed plates one of which forms a lock plate, a latch mounted on said lock plate for horizontal slidable movement therealong and for pivotal movement with respect thereto in a vertical direction, a dogging lever pivotally mounted on said lock plate, a slidable controlling connection between said dogging lever and said latch controlling door closing movement of said latch and holding said latch in a latching position, a dog pivotally mounted on said lock plate intermediate its ends and having an abutment surface on one side of its pivotal axis movable into engagement with said dogging lever to hold said dogging lever in a dogging position, said dog being engageable on the opposite side of its pivotal axis from said abutment surface to release said dog from the outside of the door, and having an inside releasing extension spaced beyond said abutment surface, an inside release lever pivotally mounted on the other of said plates and having an engaging end portion engageable with the top of said releasing extension, linkage means operating with said release lever, locking mechanism locking said dog in a dogging position including a locking lever pivoted on the other of said plates and movable into position to engage the underside of said releasing extension, and an engaging connection between said inside release lever and said locking lever, holding said inside release lever out of engagement with said releasing extension of said dog when said locking lever is in a locked position and moving said locking lever to a released position on operation of said inside release lever.

7. In a door lock structure, two angularly disposed plates, one of which forms a lock plate, a latch slidably mounted on the outer side of said lock plate for movement therealong in the direction of door movement and for pivotal movement in a vertical plane, a dogging lever pivotally mounted on the inner side of said lock plate and having slidable controlling engagement with said latch, a dog pivotally mounted on the inside of said lock plate intermediate its ends and having an abutment surface on one side of its pivotal axis, engageable with said dogging lever and holding said dogging lever in a dogging position, spring means urging said abutment surface into engagement with said dogging lever, said dog being engageable at one of its ends from the outside for releasing said dogging lever, and means operable from the inside of the door engaging the opposite end of said dog for releasing said dogging lever from the inside, including an inside operating lever pivotally mounted on the other of said plates and having operative engagement with said dog for depressing said dog to a released position from the inside of the door.

8. In a door lock structure, a latch casing comprising two angularly disposed plates, one of which forms a lock plate, a latch slidably mounted on one side of said lock plate for movement therealong and for pivotal movement with respect thereto in a vertical plane, a dogging lever pivotally mounted on the opposite side of said lock plate from said latch and having slidable controlling connection with said latch, guiding said latch during latching movement thereof and holding said latch in a latched position, a dog, means pivotally mounting said dog on the same side of said casing as said dogging lever for pivotal movement about an axis disposed intermediate its ends, said dog having an abutment surface engaging said dogging lever and holding said dogging lever in a rigid dogging position and being engageable at one of its ends from the outside of the door for releasing said abutment surface from said dogging lever, means engaging the opposite end of said dog for releasing said abutment surface from said dogging lever from the inside of the door including an inside release lever pivotally mounted on the other of said plates and having an engaging end portion engageable with said dog to move said dog to a released position upon depressible movement of said engaging end portion, mechanism for locking said dog and dogging lever from movement including a locking lever pivoted to the other of said plates and movable into position to engage a lower surface of said dog, and an engaging connection between said inside release lever and said locking lever, moving said locking lever to a released position upon operation of said inside release lever.

9. In a door lock structure, a lock plate, a rotary latch, means mounting said latch on said lock plate for movement about a pivot extending transversely of said latch and lock plate and for slidable movement along said lock plate, a dogging lever held rigidly during door closing movement and during locking of the door, other means pivotally mounting said dogging lever on said lock plate, said dogging lever having slidable controlling engagement with said latch at a point spaced from its pivot, and a dog pivotally mounted on said lock plate to engage and hold said dogging lever in a dogging position.

10. In a door lock structure, a lock plate, a rotary latch, a pivot pin mounting said latch on said lock plate for slidable movement along said lock plate and for pivotal movement with respect thereto, said latch having a latch bolt projecting outwardly therefrom out of the plane thereof for cooperation with a keeper, a dogging lever pivotally mounted on said lock plate, a dog pivotally mounted on said lock plate to one side of the pivotal axis of said dogging lever and having releasable engagement with said dogging lever for holding said dogging lever rigidly during the closing of the door and the latching and locking thereof, said dogging lever having slidable controlling engagement with said latch and controlling slidable and pivotal movement of said latch, and spring means biasing said dog into engagement with said dogging lever, to hold said dogging lever rigidly until positive release thereof upon operation of said dog, in a direction to release said dogging lever.

11. In a door lock structure, a lock plate, a rotary latch, means mounting said latch on said lock plate for slidable and pivotal movement with respect thereto, said latch having a latch bolt projecting laterally from one end thereof for cooperation with a keeper, a spring connected between said latch and lock plate and biasing said latch along said lock plate in one direction and pivoting said latch in a direction to engage said latch bolt with the keeper, a dogging lever pivotally mounted on said lock plate and having slidable engagement with said latch adjacent the end thereof opposite from said latch bolt and controlling movement of said latch during the door latching operation, a dog pivotally mounted on

said lock plate for releasable engagement with said dogging lever and having an engaging end portion engageable with said dog to hold said dog rigidly, and spring means biasing said dog into engagement with said dogging lever.

12. In a door locking mechanism, a keeper adapted to be mounted on a door frame, a lock plate adapted to be mounted on a cooperating door, a rotary latch mounted on said lock plate for cooperation with said keeper, said latch being slidably and pivotally mounted on said lock plate and said lock plate guiding said latch for movement therealong toward and from the keeper and for pivotal movement about an axis disposed transversely of said lock plate and intermediate the ends of said latch, spring means connected between said latch and lock plate and biasing said latch along said lock plate toward said keeper, said keeper having a vertical strike face, facing said latch upon the initial door closing movement, and an angular take-up surface leading from said vertical strike face in a direction away from said latch when the door is open, and inclined in a receding direction toward the longitudinal center of said keeper, a dogging lever pivoted on said lock plate and having slidable controlling engagement with said latch, maintaining said latch in engagement with said keeper, and a dog pivoted on said lock plate and operable to releasably hold said dogging lever in a rigid dogging position.

13. In a door locking mechanism, a keeper adapted to be mounted on a door frame, a lock plate adapted to be mounted on a cooperating door, a rotary latch movably mounted on said lock plate for cooperation with said keeper and having a latch bolt projecting laterally from one of its ends for engagement with said keeper, means guiding said latch for slidable movement along said lock plate and for pivotal movement with respect thereto about a transverse axis disposed intermediate its ends, spring means connected between said lock plate and latch and biasing said latch to slidably and pivotally move along said lock plate in a direction toward said keeper, a dogging lever pivoted on said lock plate and having slidable guiding engagement with the opposite end of said latch from said latch bolt, a dog pivotally mounted on said lock plate and releasably holding said dogging lever in a rigid dogging position, said keeper having a vertical strike face facing said latch bolt upon initial door closing movement, and also having an angular take-up face leading from the outer extremity of said vertical strike face and inclined from said strike face in a receding direction with respect thereto toward the horizontal axis of said keeper, and a safety notch on the end of said angular take-up face adjacent said strike face and engageable with said latch bolt upon door opening and closing, to form a safety catch upon door opening and closing movement.

14. In a door locking mechanism, a keeper adapted to be mounted on a door frame, a lock plate adapted to be mounted on a cooperating door, a latch shiftably mounted on said lock plate for cooperation with said keeper and having a latch bolt projecting laterally from one of its ends for engagement with said keeper, means slidably and pivotally mounting said latch on said lock plate for slidable movement toward and from said keeper and for pivotal movement about a transverse axis disposed intermediate its ends, spring means connected between said lock plate and latch and biasing said latch to slidably and pivotally move toward said keeper, a dogging lever pivoted on said lock plate and having slidable engagement with the opposite end of said latch from said latch bolt, a dog pivotally mounted on said lock plate and releasably holding said dogging lever in a dogging position, and said keeper having a vertical strike surface facing said latch bolt upon closing of the door and an angular take-up surface leading from the outer end of said strike surface in an angular direction toward the horizontal axis of said keeper, and the point of guiding engagement between said dogging lever and said latch being so spaced with respect to the pivotal axis of said latch as to cause said dogging lever to increase the engaging force of said latch bolt with said take-up surface of said keeper when said dogging lever is held in a dogging position, and upon attempts to open the door when latched.

15. In a door locking mechanism, a keeper adapted to be mounted on a door frame, a lock plate adapted to be mounted on a cooperating door, a latch shiftably mounted on said lock plate and having a latch bolt projecting laterally from one of its ends for engagement with said keeper, means mounting said latch on said lock plate for slidable movement in a direction toward and from said keeper and for pivotal movement about a transverse axis disposed intermediate its ends, spring means connected between said lock plate and latch biasing said latch toward said keeper, a dogging lever pivoted on said lock plate and having slidable guiding engagement with the opposite ends of said latch from said latch bolt, a dog pivotally mounted on said lock plate and releasably holding said dogging lever in a dogging position, said keeper having a vertical strike surface adapted to be engaged by said latch bolt upon closing of the door, and also having an angular take-up surface leading from the outer end of said strike surface and inclined in a receding direction with respect to said strike surface toward the horizontal center of said keeper, a safety notch on the end of said angular take-up surface adjacent said vertical strike surface and engageable with said latch bolt, to form a safety catch upon door opening and closing movements, and said dog having an operating arm also engageable with said dogging lever upon operation of said arm to move said latch bolt out of said safety catch position upon the initial door opening movement by camming engagement with said dogging lever.

16. In a door locking mechanism, a keeper adapted to be mounted on a door frame, a lock plate adapted to be mounted on a cooperating door, a rotary latch, means mounting said latch on said lock plate for slidable movement along said lock plate in directions toward and from said keeper and for pivotal movement about a transverse axis disposed intermediate its ends, a dogging lever pivoted on said lock plate and having slidable controlling engagement with the end of said latch opposite said keeper, a dog pivoted on said lock plate and operable to releasably hold said dogging lever in a rigid dogging position, spring means connected between said lock plate and latch and biasing said latch into position to engage said keeper upon door closing movement, said keeper having a vertical strike surface facing said latch upon door closing movement, and engageable thereby and an angular take-up surface extending rearwardly from the lower end of said vertical strike surface and inclined upwardly toward the longitudinal center of said keeper and

cooperating with said latch to take-up on the lock.

17. In a door locking mechanism, a keeper adapted to be mounted on a door frame, a lock plate adapted to be mounted on a cooperating door, a latch on said lock plate for cooperative engagement with said keeper, means mounting said latch on said lock plate for slidable movement in directions toward and from said keeper and for pivotal movement about a transverse axis disposed intermediate its ends, a dogging lever pivoted on said lock plate and having slidable controlling engagement with the opposite end of said latch from said keeper, a dog pivoted on said lock plate and operable to releasably hold said dogging lever in a rigid dogging position, a spring connected between said lock plate and latch and biasing said latch into position to engage said keeper upon door closing movement, said keeper having a top horizontal supporting surface and said lock plate having a roller thereon slidably

engaging and supported on said supporting surface during closing movement thereof, and said keeper also having a vertical strike face in depending relation with respect to said horizontal supporting surface and an angular take-up surface leading therefrom and inclined upwardly in receding direction with respect to the lower end of said strike face toward the plane of said horizontal supporting surface of said keeper.

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