

**2,183,672**

2 Sheets-Sheet 1



BY

ATTORNEY &

Dec. 19, 1939.

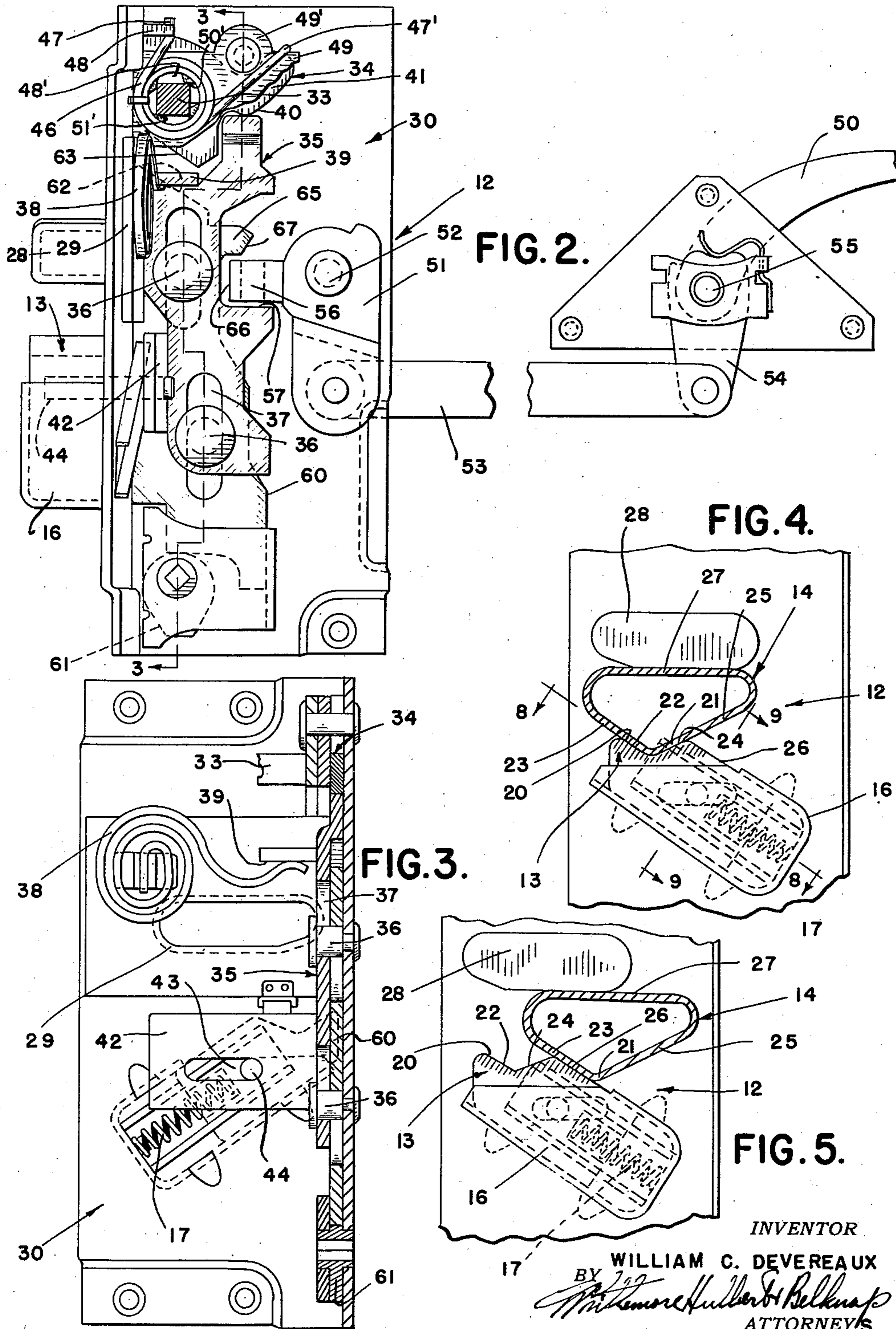
W. C. DEVEREAUX

2,183,672

LATCH MECHANISM

Filed Sept. 2, 1938

2 Sheets-Sheet 2



INVENTOR  
WILLIAM C. DEVEREAUX  
BY *William C. Devereaux*  
ATTORNEYS

## UNITED STATES PATENT OFFICE

2,183,672

## LATCH MECHANISM

William C. Devereaux, Detroit, Mich.

Application September 2, 1938, Serial No. 228,202

20 Claims. (Cl. 292—169)

This invention relates generally to latch mechanism and refers more particularly to improvements in latches for use on the doors of motor vehicle bodies.

5 One of the principal objects of this invention consists in the provision of a relatively simple inexpensive door latch having provision for effectively latching a door in its closed position and having an improved safety catch operable to se-  
10 curely hold the door against opening movement relative to the jamb in the event the latch fails to catch, or in the event it is accidentally released.

15 A further advantageous feature of this invention resides in the provision of a door latch having a bolt mounted for sliding movement transversely of the swinging edge of the door in a manner to cooperate with a keeper to effectively hold the door against opening movement from a partially closed position and effective to securely fasten the door in its closed position.

Still another feature of this invention consists in the provision of latch mechanism effective to positively hold the door in both partially and fully closed positions against movement relative to the surrounding body structure. As a result, rattling or shaking of the door is prevented and the usual dovetails heretofore provided for this purpose may be eliminated.

A further object of this invention resides in the provision of a door latch having the foregoing features and, at the same time, permitting easy operation of the door to effect either closing or opening the same.

A still further object of the present invention resides in the novel means provided for normally returning the latch operating handle to and maintaining the same in its inoperative position relative to the door.

In addition to the foregoing, the present invention contemplates novel means for operating the latch bolt and for locking the latter in its latched position. The latter features, as well as the foregoing objects, will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:—

Figure 1 is a fragmentary perspective view illustrating a portion of a vehicle body equipped with latch mechanism constructed in accordance with this invention;

Figure 2 is a side elevational view, partly in section, of the latch mechanism;

Figure 3 is a sectional view taken substantially

on the plane indicated by the line 3—3 of Figure 2;

Figure 4 is a sectional view illustrating the latch bolt in one cooperative position with respect to the keeper;

Figure 5 is a similar view showing the latch bolt in another position in relation to the keeper;

Figure 6 is a fragmentary perspective view illustrating the operating means for the latch bolt;

Figure 7 is a detailed perspective view of the keeper;

Figure 8 is a sectional view taken substantially on the plane indicated by the line 8—8 of Figure 4; and

Figure 9 is a cross sectional view taken substantially on the plane indicated by the line 9—9 of Figure 4.

Referring more in detail to the drawings, it will be noted that there is illustrated in Figure 1 a vehicle body door 10 mounted in the usual manner for swinging movement relative to a jamb 11 and adapted to be latched to the jamb by means of latch mechanism, designated generally herein by the reference character 12. Briefly described, the latch mechanism 12 comprises a bolt 13 mounted on the swinging edge of the door 10 for sliding movement in opposite directions transversely, or diagonally of the swinging edge of the door. The bolt 13 is inclined upwardly toward the inboard side of the door and the upper end of the bolt is fashioned to cooperate with a keeper 14 on the door jamb 11 to effectively latch the door in partially and fully closed positions.

Upon reference to Figure 1, it will be noted that the bolt 13 is restrained to rectilinear movement in opposite directions diagonally of the free edge of the door 10 by means of a housing 16 in the form of a sheet metal stamping substantially channel-shaped in cross section and having the side walls thereof suitably secured to the swinging edge of the door. As shown in Figure 8, the housing 16 also forms a support for a suitable spring 17 positioned between the lower end of the bolt 13 and the bottom wall 18 of the housing. The upper end of the spring extends into a counterbored recess in the lower end of the bolt 13, and the lower end of the spring is positioned on a lug 19 struck inwardly from the bottom wall 18 of the housing. As a result, the spring normally urges the bolt in an upward direction relative to the housing toward the keeper 14.

Upon reference to Figures 4 and 5, it will be

noted that the upper end of the bolt 13 is formed with a substantially V-shaped recess 20 adapted to receive a correspondingly shaped portion 21 on the bottom wall of the keeper 14 when the door is swung to its partially closed position, illustrated in Figure 4. The angularly disposed surfaces of both the V-shaped recess 20 of the bolt and the bottom wall 21 of the keeper are predetermined to not only securely hold the door to the jamb when the former is in its partially closed position relative to the latter, but to also permit the door to be readily moved to its completely closed position shown in Figure 5. In detail, it will be noted from Figure 4 that the outboard surface 22 of the V-shaped recess 20 and the adjacent angularly disposed surface 23 on the keeper extend parallel to the direction of movement of the bolt 13 relative to the housing 16. As a result, any force tending to swing the door outwardly from the position thereof shown in Figure 4 is applied to the surface 22 of the bolt at right angles to the direction of sliding movement of the bolt and, since the housing 16 prevents displacement of the bolt at right angles to its path of travel, it follows that the door is securely held in its partially closed position shown in Figure 4.

Referring again to Figure 4 of the drawings, it will be noted that the angular surface 24 on the bolt 13, facing the inboard side of the door, and the adjacent angular surface 25 on the keeper extend transversely to the path of travel of the bolt 13 in the housing 16. As a result, the surface 25 on the keeper 14 cooperates with the surface 24 to move the bolt 13 downwardly against the action of the spring 17 until the parts assume the position thereof shown in Figure 5. When in this latter position, the door is in its completely closed position and the top surface 26 on the bolt abuts the angularly disposed surface 23 on the keeper. Inasmuch as the surface 26 on the bolt is parallel to the surface 23 and in view of the fact that this latter surface is parallel to the path of travel of the bolt, it follows that the door is also securely held against opening movement from the position thereof shown in Figure 5. It may be pointed out at this time that when the latch mechanism is in the position shown in Figure 5, the spring 17 is still under compression and, as a consequence, is effective to maintain the surface 26 on the bolt in frictional engagement with the surface 23 on the keeper. With this arrangement, the swinging edge of the door is effectively supported and rattling of the door is prevented.

The top surface 27 of the keeper is substantially flat and is adapted to slidably engage the bottom surface of a suitable guide member 28 projecting outwardly from the swinging edge of the door. The construction is such as to support the swinging edge of the door in both of the positions shown in Figures 4 and 5. The projection 28 is preferably in the form of a sheet metal stamping projecting through a suitable slot formed in the free edge of the door and having a marginal flange 29 welded or otherwise suitably secured to the inner surface of the free edge of the door. In actual practice, the projection 28 and bolt assembly 13 are mounted on an L-shaped supporting plate 30 secured to the free edge of the door by means of the fastener elements 31.

The keeper 14 is also in the form of a sheet metal stamping comprising a plate 31 having the central portion embossed to form the keeper previously described. The plate 31 is secured to

the jamb in any suitable manner and the keeper 14 projects laterally from the jamb into the door opening.

In accordance with the present invention, provision is made herein for retracting the bolt from either the two positions shown in Figures 4 and 5 to permit the door to be swung to its open position. As shown in Figure 6, the bolt may be retracted from a point exteriorly of the door by means of a handle 32 secured to the outer end of a shank 33 supported in any suitable manner in the door for rotation and having a cam or roll-back 34 secured to the inner end thereof. The cam 34 is operatively connected to the bolt 13 by means of a slide or a yoke 35 attached to the lock plate 30 by suitable pins 36. The pins 36 extend through vertically elongated slots 37 in the yoke in order to permit sliding movement of the yoke relative to the plate 30. Upon reference to Figure 3, it will be noted that downward movement of the yoke relative to the plate 30 is resisted by means of a coil leaf spring 38 having one end anchored to the lock plate and having the free end abutting the underside of a shoulder 39 formed by bending a portion of the yoke laterally. In actual practice, the spring 38 maintains the upper end of the yoke in frictional contact with a cam surface 40 formed on the underside of an extension 41 of the cam 34. The arrangement is such that rotation of the operating handle 32 in one direction causes the yoke 35 to move downwardly against the action of the spring 38.

The yoke 35 is operatively connected to the bolt 13 in a manner such that when the yoke is moved downwardly, the bolt 13 is retracted or moved away from the keeper 14. As shown in Figure 6, the yoke is provided with a lateral projection 42 extending adjacent the inner surface of the free edge of the door 10 and having an elongated slot 43 therethrough for receiving a pin 44 extending from the bolt 13. The slot 43 extends at right angles to the path of travel of the yoke 35 and the pin 43 is normally maintained into engagement with the inboard end of the slot by means of the spring 17. The arrangement is such that as soon as the yoke 35 is moved downwardly by the cam 34, the inboard end of the slot abuts the pin 44 and effects a movement of the bolt 13 in a direction away from the keeper 14. It will, of course, be understood that as soon as the operating handle is released, the yoke 35 is returned to its uppermost position by means of the spring 38 and the bolt is moved to its normal position shown in Figure 1 by the spring 17. In this connection, attention is directed to the fact that the operating handle 32 and cam 34 are returned from their operative position by means of a spring 46 having one end 47 engaging a lug 48 on the cam and having the other end 47' anchored in any suitable manner. In the present instance, the end 47' of the spring abuts a shoulder 49 on a spacer 49' fixed against movement with the cam 34 and having an opening 48' therethrough for receiving the squared shank 33 of the operating handle 32. The opening 48' is shaped in the manner illustrated in Figure 2 to provide shoulders 50' and 51' which form stops to respectively position the handle in its normal inoperative position and to limit swinging movement of the handle to its operative position.

The bolt 13 may also be retracted from a handle 50 located at the inner side of the door, and this is accomplished in the manner illustrated in

Figure 2. In detail, a link 51 is pivotally supported at its upper end on the plate 30 by means of a pin 52 and the lower end thereof is pivotally connected to a second link 53 which, in turn, is pivotally connected to the free end of an operating lever 54 secured to the shank 55 of the operating handle 50. Referring again to Figure 2, it will be noted that the link 51 is provided with a projection 56 at the upper end thereof adapted to assume a position directly above a shoulder 57 formed on the yoke 35. The arrangement is such that rotation of the operating handle 50 in one direction causes the link 51 to swing about the pivot 52 in a direction to engage the projection 56 with the shoulder 57 on the yoke 35. Continued movement of the operating handle in the same direction transmits a downward movement to the yoke 35 and, through the pin 44, retracts the bolt 13 from the keeper 14.

It will be observed from Figures 2 and 3 that that provision is also made herein for locking the bolt against retracting movement by the outside door handle. Slidably mounted on the pins 36 in juxtaposition to the yoke 35 is a locking slide 60 having the lower end engageable by a key operated cam 61 and having an inclined surface 62 at the upper end engageable with a correspondingly inclined surface 63 on the cam 34. In the present instance, when the cam 61 is rotated 180° from the position thereof shown in Figure 2, the slide 60 is moved upwardly to a position wherein the surface 62 thereon abuts the surface 63 on the cam and rotation of the cam to operate the bolt retracting yoke 35 is positively prevented. It will also be apparent from Figure 2 that the bolt may be locked against retracting movement independently of the cam 61 by movement of the inside door handle 50 in a direction opposite the direction of movement of this handle to retract the bolt. As shown in Figure 2, the locking slide is provided with a lateral projection 65 extending over the projection 56 on the link 51 and engageable with this projection when the latter is swung in an upward direction by the link 51. It will, of course, be understood that swinging the link 51 by the handle 50 in a direction to move the projection 56 upwardly effects a lifting movement of the lock plate 60 to the extent required to engage the surface 62 on the upper end of the lock plate with the corresponding surface 63 on the cam 34. It may further be pointed out at this time that when the link 51 is in its locked position, the free edge 66 of the projection 56 engages a tapered surface 67 on the free end of the extension 65. By virtue of this construction, any force applied to the locking plate by the cam 34 is transmitted directly against the pin 52 through the link 51 with the result that operation of the cam 34 to retract the bolt is positively prevented.

Thus, from the foregoing, it will be observed that I have provided a relatively simple, inexpensive latch mechanism embodying improved means for positively holding the door in partially and fully closed positions against movement relative to the surrounding body structure. It also follows from the above that the latch is so constructed that it also acts as a dovetail to support the door and, as a result, offers the possibility of eliminating the dovetail. In addition, it will be noted that the several parts of the latch mechanism required for accomplishing the desired results are of such a nature as to lend themselves to ready manufacture and easy assembly.

What I claim as my invention is:

1. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted on the swinging edge face of a door for sliding movement in a plane parallel to the swinging edge face of the door and in a direction extending generally transversely of the plane of the door, means on the swinging edge face of the door restraining sliding movement of the bolt in directions extending generally transversely of the plane of the door, and means on the bolt cooperating with a keeper to positively hold the door in a partially closed position.

2. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted on the swinging edge face of the door for sliding movement in opposite directions in a plane parallel to the swinging edge face of the door and in a direction extending generally transversely of the swinging plane of the door and cooperating with a keeper to latch the door in a partially closed position.

3. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted for sliding movement in a plane parallel to the plane of the swinging edge face of the door and in a direction extending generally transversely of the plane of the door, said bolt having angularly disposed surfaces engageable with correspondingly angularly disposed surfaces on a keeper upon movement of the door toward its closed position to effectively latch the door against movement in the opposite direction.

4. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted for sliding movement in a plane parallel to the swinging edge face of the door and having a substantially V-shaped recess adapted to receive a correspondingly shaped portion of a keeper upon swinging the door toward its closed position to latch said door against opening movement, and means on the swinging edge face of the door cooperating with the keeper and bolt to positively hold the door in its closed position against shifting movement in a plane substantially parallel to the plane of the door.

5. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted for sliding movement in a plane parallel to the swinging edge face of the door and in a direction extending generally transversely of the plane of the door and having angularly disposed surfaces respectively facing the inboard and outboard sides of the door and engageable with correspondingly angularly disposed surfaces on a keeper, the surface on the bolt facing the outboard side of the door and the adjacent surface on the keeper extending substantially parallel to the path of travel of the bolt to prevent outward swinging movement of the door, and the surface on the bolt facing the inboard side of the door and the adjacent surface of the keeper extending transversely to the path of travel of the bolt to effect movement of said bolt in a direction away from the keeper upon continued movement of the door in a direction toward its closed position, and spring means resisting movement of the bolt away from the keeper.

6. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt projecting beyond the swinging edge face of a door for sliding movement in a plane parallel to the plane of the swinging edge face of the door and in a direction extending generally transversely of the plane of the door and having a substantially V-

shaped recess adapted to receive a correspondingly shaped portion on a keeper upon swinging movement of the door in a direction toward its closed position, the side of the V-shaped recess facing the outboard side of the door and the adjacent surface of the keeper extending substantially parallel to the path of sliding movement of the bolt to prevent movement of the door in a direction toward its open position, the other side of the V extending transversely to the path of travel of the bolt and engaged by the adjacent surface of the keeper to retract the bolt upon continued movement of the door toward its closed position, and spring means resisting retracting movement of the bolt.

7. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted for sliding movement in a plane parallel to the plane of the swinging edge face of the door and in a direction extending generally transversely of the plane of the door and having surfaces spaced from each other transversely of the path of movement of the bolt and extending substantially parallel to the path of travel of the bolt, said surfaces successively engageable with a correspondingly extending surface of a keeper upon swinging the door to its fully closed position, means restraining the bolt to a rectilinear path of travel in opposite directions extending transversely of the door toward and away from the keeper, and yieldable means normally urging the bolt in a direction toward the keeper.

8. In a latch mechanism for a door hinged at one edge for swinging movement, the combination of a keeper having a bottom wall provided with a substantially V-shaped surface, a bolt mounted for sliding movement toward and away from the keeper in a plane parallel to the plane of the swinging edge face of the door and in a direction extending generally transversely of the plane of the door and having vertically spaced surfaces parallel to the path of travel of the bolt connected by a surface extending transversely to the path of travel of the bolt, the parallel surfaces on the bolt successively engageable with the side of the V facing the inboard side of the door and the transverse surface on the bolt being engageable with the opposite side of the V to effect retraction of the bolt when the door is moved to its closed position, and yieldable means normally resisting retracting movement of the bolt.

9. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted for sliding movement in a plane parallel to the plane of the swinging edge face of the door and extending in a direction generally transversely of the plane of the door, said bolt having surfaces spaced from each other transversely of the path of travel of the bolt and being substantially parallel to the path of travel of the bolt, said parallel surfaces successively engageable with a correspondingly inclined surface on a keeper as the door is swung to its fully closed position, yieldable means normally urging the bolt toward the keeper, and means for retracting the bolt against the action of said yieldable means.

10. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted for sliding movement in a plane parallel to the plane of the swinging edge face of the door and in a direction extending generally transversely of the plane of the door and cooperating with a keeper to latch the door in a closed position, means yieldably urging the bolt toward the

keeper, and means under the control of the operator for retracting the bolt in a direction away from the keeper.

11. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted on the swinging edge face of the door for sliding movement in opposite directions extending generally transversely of the plane of the door and in a plane substantially parallel to the plane of the swinging edge face of the door, said bolt having a portion cooperating with a keeper to latch the door in a closed position, and means on the swinging edge face of the door cooperating with both the keeper and bolt to positively hold the door in said closed position against shifting movement in a plane substantially parallel to the plane of the door.

12. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted on the swinging edge face of the door for sliding movement between the inboard and outboard sides of the door in a plane parallel to the plane of the swinging edge face of the door and in a direction extending generally transversely of the plane of the door and cooperating with a keeper to latch the door in a closed position, and means under the control of the operator for retracting the bolt in a direction away from the keeper.

13. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted on the swinging edge face of the door for sliding movement between the inboard and outboard sides of the door in a plane parallel to the swinging edge face of the door and in a direction extending generally transversely of the plane of the door, a yoke mounted for sliding movement in a plane substantially parallel to the plane of the swinging edge face of the door, and means connecting the yoke to the bolt effective to retract the bolt upon movement of the yoke in one direction.

14. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted on the swinging edge face of the door for sliding movement between the inboard and outboard sides of the door in a plane substantially parallel to the plane of the swinging edge face of the door and in a direction extending generally transversely of the plane of the door, means on said bolt cooperating with a keeper to latch the door in a closed position, yieldable means normally urging the bolt toward the keeper, a cam supported for rocking movement under the control of the operator, and means operatively connecting the cam to the bolt for retracting the bolt against the action of the yieldable means.

15. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted on the swinging edge face of the door for sliding movement between the inboard and outboard sides of the door in a plane parallel to the plane of the swinging edge face of the door and in a direction extending generally transversely of the plane of the door, means on the bolt cooperating with a keeper to latch the door in its closed position, a member mounted for rocking movement under the control of the operator, a second member operatively connecting the first member to the bolt for retracting the latter upon rocking said first member in one direction, and means engageable with one of said members to prevent rocking movement of the first member in a direction to retract said bolt.

16. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted

on the swinging edge face of the door for sliding movement between the inboard and outboard sides of the door in a plane parallel to the plane of the swinging edge face of the door and at an angle to the plane of the door and in a direction extending generally transversely of the plane of the door, means on the bolt cooperating with a keeper to latch the door in a closed position, a cam mounted for rocking movement under the control of the operator, and a yoke operatively connecting the cam to the bolt and effective upon rocking movement of the cam in one direction to retract the bolt.

17. In a latch mechanism for a door hinged at one edge for swinging movement, a bolt mounted on the swinging edge face of the door for sliding movement between the inboard and outboard sides of the door in a plane parallel to the plane of the swinging edge face of the door and in a direction extending generally transversely of the plane of the door, said bolt having a surface extending substantially parallel to the path of movement of the bolt and engageable with a correspondingly extending surface on a keeper to latch the door in its closed position, and yieldable means normally urging the bolt in a direction to frictionally engage the surface aforesaid on the bolt with the corresponding surface on the keeper.

18. In a latch mechanism for a swinging closure, a bolt mounted for sliding movement in a plane parallel to the plane of the swinging edge face of the closure along a path inclined with respect to the plane of the closure and having a

portion projecting beyond the swinging edge face of the closure cooperating with a keeper to latch the closure in a closed position, and means for actuating the bolt.

19. In a latch mechanism for a swinging closure, a latch plate secured to the swinging edge of the closure with a portion thereof extending in a plane parallel to the swinging edge face of the closure and having an elongated slot there-through inclined with respect to the plane of the closure, a bolt slidably mounted on the portion aforesaid of the latch plate and having a part extending through the slot and guiding the bolt along a path of travel parallel to the slot, and means mounted on the latch plate and engageable with a portion of the bolt projecting through the slot for actuating said bolt.

20. In a combined latch mechanism and dovetail for a door hinged at one edge on frame structure surrounding the door, a bolt mounted on the swinging edge face of the door for sliding movement in a plane parallel to the swinging edge face of the door and in a direction extending generally transversely of the plane of the door toward and away from an abutment projecting toward the free edge of the door from the adjacent frame structure, said bolt cooperating with a keeper insertable between the bolt and abutment in engagement with both of the latter to latch the door in a closed position relative to the surrounding frame structure and to hold the door against shifting movement with respect to the surrounding frame structure.

WILLIAM C. DEVEREAUX.