Aug. 25, 1953

E. L. SCHLAGE

DOOR LOCK

2,650,121

Filed Feb. 15, 1949

3 Sheets-Sheet 1

Fig. 1.

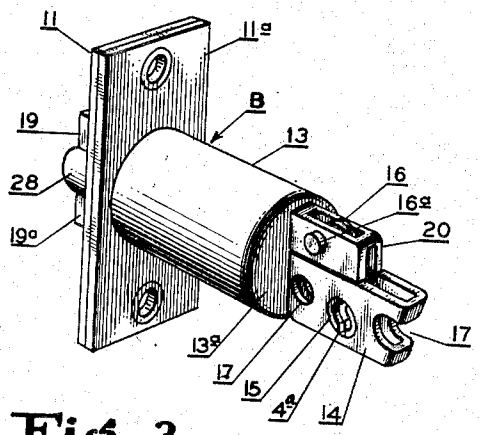


Fig. 2.

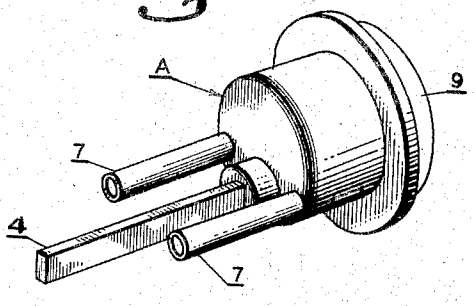


Fig. 3.

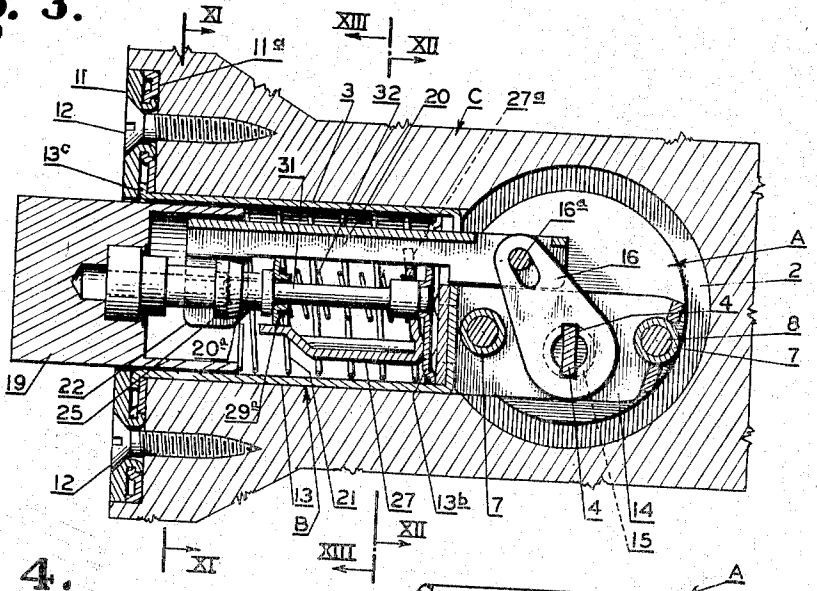
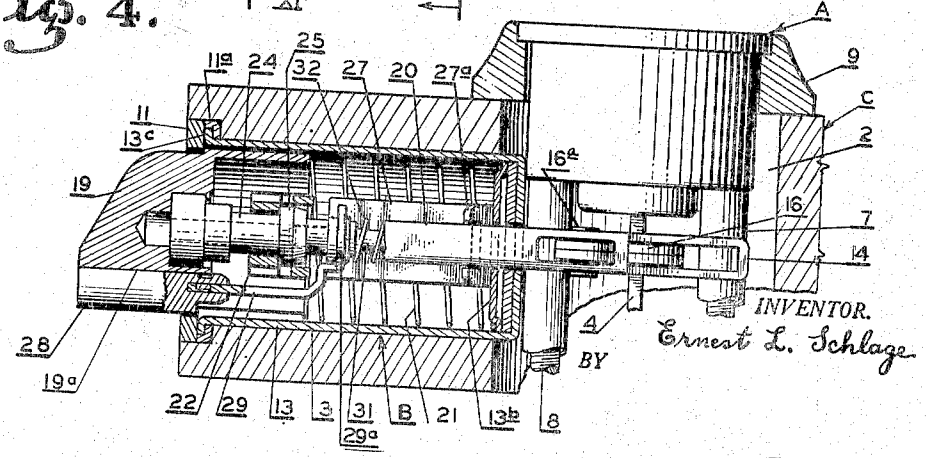


Fig. 4.



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Fig. 5.

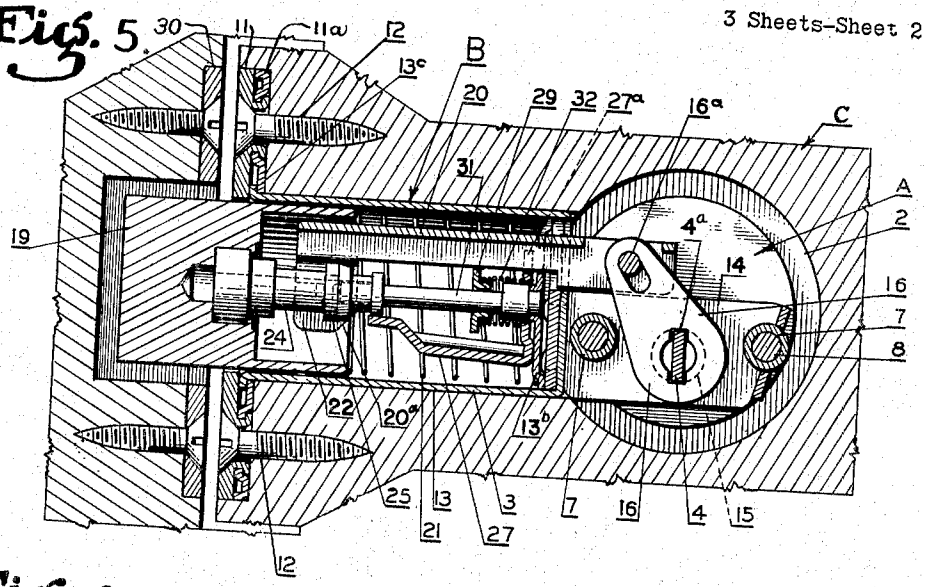


Fig. 6.

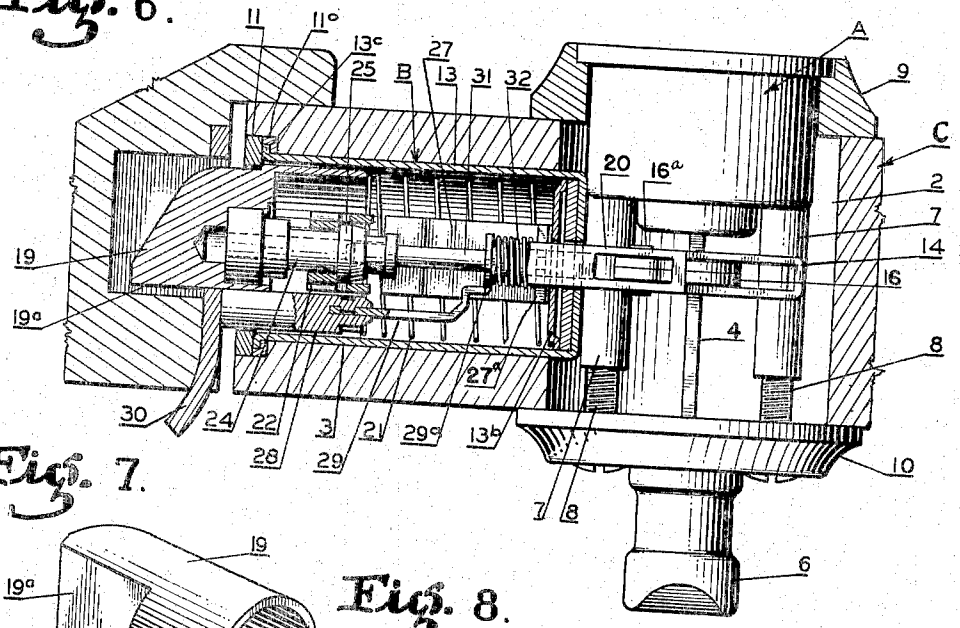


Fig. 7.

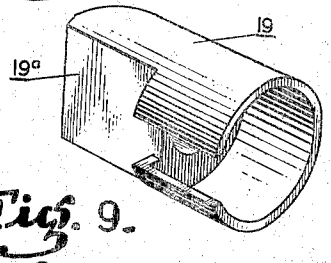


Fig. 8.

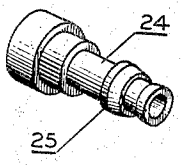


Fig. 10.

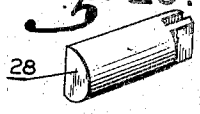
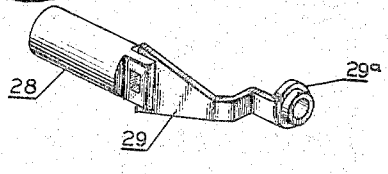


Fig. 9.



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Fig. 11.

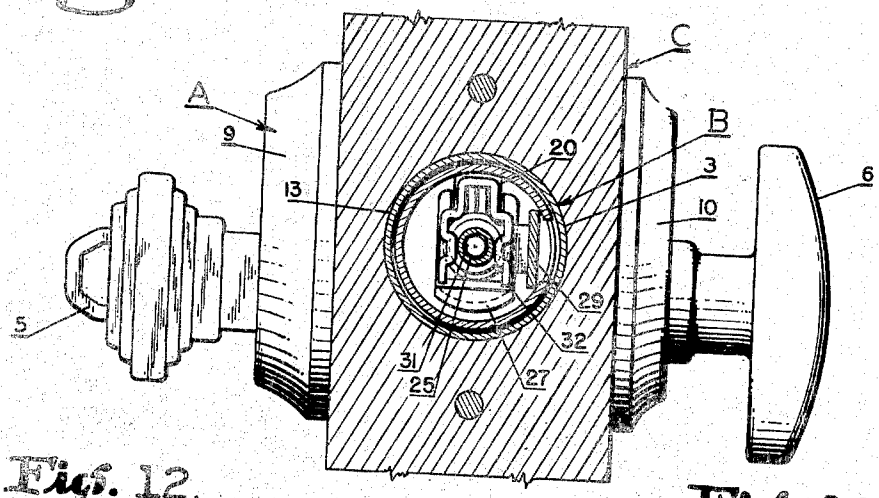
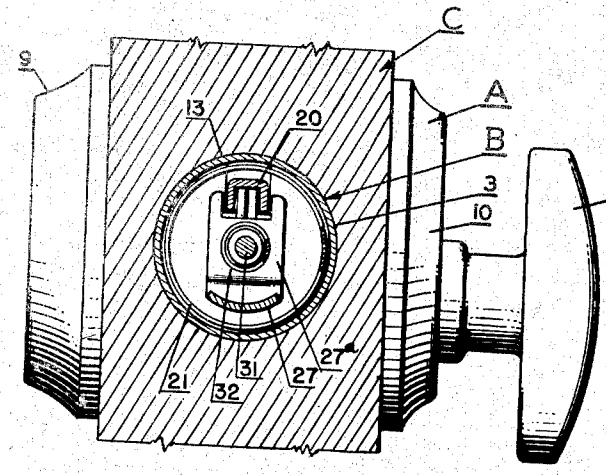


Fig. 12.

Fig. 13.



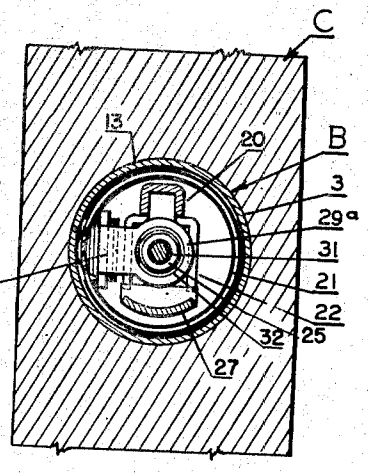


Fig. 14.

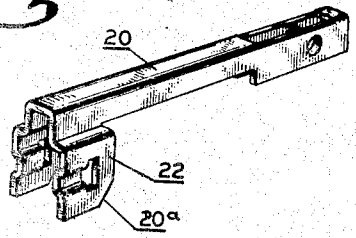
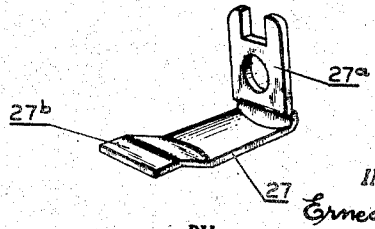


Fig. 15.



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DOOR LOCK

Ernest L. Schlage, Burlingame, Calif., assignor to Schlage Lock Company, a corporation

Application February 15, 1949, Serial No. 76,440

9 Claims. (Cl. 292—167)

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This invention relates to a door lock, and especially to a reversible dead latching mechanism therefor.

The object of the present invention is generally to improve and simplify the construction and operation of dead latching mechanism, and especially to provide a latching mechanism including a main latch bolt and a cooperating dead bolt which are reversible as a unit to permit either right or left-hand positioning of the latching mechanism when installed in doors.

The invention is shown by way of illustration in the accompanying drawings, in which,

Fig. 1 is a perspective view of the reversible latch bolt unit,

Fig. 2 is a perspective view of the latch bolt actuating unit,

Fig. 3 is a vertical longitudinal section showing the lock mounted in the door and with the door in open position, said view showing the main latch bolt extended,

Fig. 4 is a sectional view similar to Fig. 3, but taken at right angles thereto, and showing both the main latch bolt and the dead bolt extended,

Fig. 5 is a vertical longitudinal section similar to Fig. 3 but with the door in closed position, said view showing the main latch bolt engaged with the striker plate on the door jamb, and the dogging member in position to engage a collar carried by an extension of the main latch bolt.

Fig. 6 is a sectional view similar to Fig. 5, but taken at right angles thereto, said view showing the dead bolt depressed by the striker plate,

Fig. 7 is a perspective view of the main latch bolt,

Fig. 8 is a perspective view of the stud bolt which is carried by the main latch bolt,

Fig. 9 is a perspective view of the dead bolt with the arm secured thereto,

Fig. 10 is a perspective view of the dead bolt only, said view being taken from the end opposite to that shown in Fig. 9,

Fig. 11 is a vertical cross section taken on line XI—XI of Fig. 3 and looking in the direction of the arrow,

Fig. 12 is a vertical cross section taken on line XII—XII of Fig. 3 and looking in the direction of the arrow,

Fig. 13 is a vertical cross section taken on line XIII—XIII of Fig. 3 and looking in the direction of the arrow,

Fig. 14 is a perspective view of the retractor bar, and

Fig. 15 is a perspective view of the dogging member.

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A door latch actuating unit A is inserted in an opening 2 drilled or bored transversely of a door C. A latch bolt unit B is insertible in an opening 3 drilled at right angles to the opening 2, through the edge of the door. A key 5 (Figure 11) when inserted from the exterior of the door in the actuating unit A and turned, imparts rotary motion to a rectangular spindle bar 4 to actuate the latch bolt mechanism. The spindle bar 4 is also rotatable by a knob or turn piece 6 disposed on the inside of the door.

The actuating unit A is provided with a pair of anchor posts 7 engaged by a pair of screws 8. An escutcheon plate 9 surrounding the actuating unit is pressed against the door by the screws 8 which also pass through an escutcheon plate 10 and then into the anchor posts 7. The actuating unit A is thereby secured in the transverse opening 2 of the door. The bolt unit B is provided with a rectangular face plate 11 secured within a recess in the edge of the door C when the lock is installed. Assembled with the face plate 11 is a circular-cylindrical latch bolt housing 13 from the rear end of which projects a duplex anchor plate 14. This plate, folded to provide double walls, has a central opening 15 formed by aligned apertures in both walls thereof and in which a duplex crank arm 16 is journaled by outwardly directed diametrically slotted hubs (Figure 1). The crank arm is actuated by the spindle bar 4 which extends through the slotted portion of the hubs.

The anchor plate 14 is also provided with a pair of openings 17, one at each end (Figure 1) to receive the anchor posts 7 of the actuating unit A so as to form an interlock between the two units.

When assembling the lock in a door, the latch bolt unit B is first inserted in the opening 3 with the anchor plate 14 projecting into the transverse opening 2. The actuating unit A, with the escutcheon plate 9, is then inserted in the transverse opening and as it is inserted, the posts 7 pass through the openings 17 formed in the anchor plate, and the spindle bar 4 passes through the slot opening 4a in the crank arm 16. The escutcheon plate 10 carrying the turn piece 6 is then mounted. When the fastening screws 8 and 12 are finally inserted and tightened, both units are secured in place in interlocked relation to each other.

Included in the latch bolt unit B is a main latch bolt to which is connected a retractor arm 20 channel shaped in cross section. The retractor arm projects through an opening in the

inner end 13a of the latch bolt housing 13 and at its inner end is connected to a slot in the crank arm 16 by a pin 16a. The outer end of the retractor 20 is provided with a forked head 22 pierced and formed to straddle a tubular stud 24 and to engage behind a collar 25 turned on the tubular stud. The stud 24 is secured to the main latch bolt 19. When the crank arm 16 is swung by rotation of the spindle bar 4 either by the key 5 or by the turn piece 6, the connecting 16a causes the retractor arm 20 to retract the main latch bolt 19. When the key 5 of the turn piece 6 is released, the latch bolt and the retractor arm are returned to normal projected position by a spring 21.

The main latch bolt 19 is dogged against inward depression when the door is closed by a dogging lever (Figure 15) including two connected arms 27 and 27a disposed substantially at right angles to each other and between them forming a shoulder. The shoulder serves as a rocker bearing on an inner plate 13b held against the end closure 13a of the latch bolt housing 13 by the spring 21. The plate 13b also supports one end of a central pin 31 coaxial with the circular cylindrical housing 13, extending through an aperture in the arm 27a of the dogging lever and telescoping at its other end in the tubular stud 24.

A dead bolt 28 passes through the plate 11 and is slideably disposed alongside the latch bolt 19. An arm 29 is carried by the dead bolt 28 and terminates in a ring 29a having a central opening to permit the pin 31 to extend therethrough. The pin 31 helps to support and guide the tubular stud 24 and the arm 29 and is encompassed by a spring 32 interposed between the head 29a of the dead bolt and the arm 27a of the dogging lever.

To provide a main latch bolt and a cooperating dead bolt reversible as a unit to permit installation in either right- or left-hand doors, the face plate 11 through which both bolts project is able to rotate with relation to the cylindrical latch bolt housing 13 before installation. An inner face plate 11a having an opening to receive the housing 13, is spaced from the outer face plate 11 a sufficient distance to receive an annular flange 13c forming a part of the housing 13. The fit, while snug, permits rotation of the face plate about the housing just prior to installation, thus making it possible to position the flat side 19a of the main latch bolt and the cooperating dead bolt so that they will face either in a right- or left-hand direction with respect to the housing 13. Upon installation, the door edge recess, the screws 12 and the interlocking posts 7 and anchor plate 14 hold the parts in the selected position.

The tubular stud 24 secured to the main latch bolt, and the arm 29 secured to the dead bolt 28 also rotate when the face plate and the two bolts are rotated, being free to do so as the head 29a of the arm 29 and the tubular stud are coaxial with the central pin 31. Furthermore, the tubular stud collar 25 is free to rotate within the head 22 of the retractor arm 20 and the dead bolt arm 29 and the retractor arm 20 do not interfere for considerably more than a half turn (Figure 13).

The main latch bolt and the tubular studs secured thereto, together with the cooperating dead bolt and its arm 29 are rotatable with relation to the latch bolt housing 13 and the pin 31, and also with relation to the retractor arm and the dogging lever. The retractor arm cannot rotate relative to the housing as it is secured to the crank arm 16 by the pin 16a nor can the dogging lever rotate relative to the housing as the forked outer end of its arm 27a straddles and is guided by the off center retractor arm 20.

In operation, when the door C is swung about its hinges toward closed position, the main latch bolt 19 is forced into depressed position when it rides over the striker plate 30 (Figure 6). The dead bolt 28 is simultaneously carried inwardly by abutment of the inner surface of the main latch bolt 19 against shoulders formed by the enlarged forward portion of the lever 29 (Figures 7, 9 and 13). The dead bolt remains depressed as long as the door is closed, as it abuts the strike plate (Figure 6) while the main latch bolt 19 is only momentarily depressed as it is again projected by the spring 21 the moment it registers with the opening formed for its reception in the striker plate. In projected position with the door closed, the main latch bolt is dead locked or dogged against inward depression. The dead bolt and its arm 29 when depressed compress the spring 32. The ring 29a is moved to a position free of the upturned end 27b of the arm 27 of the dogging lever thereby permitting the compressed spring 32 to rock the dogging lever on its bearing against the inner plate 13b to assume a position with its end 27b in the path of the collar 25, as shown in Figure 5. If any attempt is made to depress the main latch bolt, for instance, with a jimmy or like tool, inward movement will be stopped as the inner face of the collar 25 engages the dogging lever 27. The main latch bolt may be retracted while the dead bolt is depressed, either by the key 5 or the turn piece 6. Either one rotates the spindle bar 4 and thereby actuates the crank 16 to impart retracting movement to the retractor arm 20. A cam 20a formed on the head 22 of the retractor arm 20 engages the dogging lever and forces its end 27b outwardly clear of the collar 25, thus permitting continued retraction of the main latch bolt.

When the door is in open position, both bolts 19 and 28 are extended, the bolt 19 being urged outwardly by the spring 21 and the bolt 28 being urged outwardly by the spring 32. When the bolt 28 is extended, the ring 29a on its arm 29 engages a cam face on the arm 27 of the dogging lever and rides over the cam end 27b, finally coming to rest on a flat holding surface and so forces the lever end outwardly free of the collar 25 and holds the dogging lever in its free or inoperative position. The main latch bolt 19 is then free to be depressed as the door closes, the dead bolt also being then depressed. The dogging lever is thereby released to operative position and is ready to dog or lock the main latch bolt when it projects into the opening in the striker plate.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. In a lock structure, a housing having an outer end and an inner end, a face plate rotatably mounted on said housing at its outer end, a latch bolt projecting through the face plate, a tubular stud extending from the end of the latch bolt, a pin extending from the inner end of the housing and into the tubular stud, a collar on the tubular stud, a retractor arm in the housing, a head on the arm rotatably engaging the collar, a dogging member, a dead bolt projecting through the face plate and ro-

tatable on said pin with respect to said dogging member, a spring effective upon depression of the dead bolt for moving the dogging member into engagement with the collar, and a cam on said retractor arm for holding said dogging member out of engagement with said collar.

2. In a lock structure, a housing having an outer end and an inner end, a face plate rotatably mounted on said housing at its outer end, a latch bolt projecting through the face plate, a tubular stud extending from the latch bolt, a pin extending from the inner end of the housing into the tubular stud, a collar on the tubular stud, a retractor arm in the housing, a head on said arm rotatably engaging the collar, a dogging member, a dead bolt projecting through the face plate and rotatable on said pin with respect to said dogging member, means effective upon depression of the dead bolt for moving the dogging member into engagement with the collar, and a cam on the retractor arm engageable with the dogging member to move the dogging member out of engagement with the collar when the retractor arm is actuated.

3. In a lock structure, a housing having an outer end and an inner end, a face plate rotatably mounted on said housing at its outer end, a latch bolt projecting through the face plate, a tubular stud extending from the end of the latch bolt, a pin extending from the inner end of the housing and into the tubular stud, a collar on the tubular stud, a retractor arm in the housing, a head on said arm rotatably engaging the collar, a dogging member, a dead bolt projecting through the face plate and rotatable on said pin with respect to said dogging member, a spring controlled by the dead bolt for moving the dogging member into engagement with the collar, a ring controlled by the dead bolt for moving the dogging member out of engagement with the collar, and means on the retractor arm for moving the dogging member to released position.

4. In a lock structure, a housing, a latch bolt projecting from one end of said housing, a tubular stud extending from the end of the latch bolt, a pin within said housing and extending into the tubular stud, a collar on the tubular stud, a retractor arm in the housing, a head on said arm rotatably engaging the collar, a dogging member, a dead bolt projecting from and rotatable with respect to said end of the housing, means controlled by the dead bolt in any rotated position thereof for moving the dogging member into and out of engagement with the collar, and a cam on the retractor arm for moving the dogging member out of said engagement.

5. In a lock structure, a housing, a latch bolt projecting from one end of said housing, a stud extending from the latch bolt, a pin within said housing and interengaging said stud, a collar on the stud, a retractor arm in the housing, a head on said arm rotatably engaging the collar, a dogging member, a dead bolt projecting from and rotatable with respect to said end of the housing, means controlled by the dead bolt in any rotated position thereof for moving the dogging member into and out of engagement with the collar, and a cam on the retractor arm for engagement and moving the dogging member out of said engagement.

6. In a lock structure provided with a cylindrical latch bolt housing having inner and outer ends, an elongated axially extending member in

said housing, a latch bolt rotatably mounted on said member and free for reciprocation thereon from a projected position extending outwardly of said outer end to a depressed position substantially within said housing, a dead bolt slidably supported in said housing alongside said latch bolt and slidable relative to the latter, separate means for urging said bolts to projected position, said latch bolt being formed with an annular shoulder directed axially outwardly of said housing, an elongated retractor arm having opposite outer and inner ends with said outer end formed to engage said shoulder for retracting said latch bolt upon inward movement of said arm, latch dogging means actuated by said dead bolt for dogging said latch bolt to said housing against depression, and means on said retractor arm engaging said dogging means upon inward movement of said retractor arm for operating said dogging means to release said latch bolt, said dead bolt being provided with an inwardly extending extension apertured at its inner end to surround said member whereby both of said bolts may be swung as a unit to opposite sides of said member as desired.

7. In a lock structure provided with an elongated latch bolt housing having inner and outer ends, a latch bolt supported in said housing for rotation about an axis to positions 180° apart relative to said axis and free for reciprocation from a projected position extending outwardly of said outer end to a depressed position substantially within said housing, a dead bolt slidably supported in said housing alongside said latch bolt, separate means for urging said latch bolt and dead bolt respectively to projected positions, said latch bolt being formed with an annular shoulder directed axially outwardly of said housing, an elongated retractor arm having opposite inner and outer ends with said outer end supported on said latch bolt to permit rotation of the latter relative to said outer end and formed to permit engagement of said shoulder by said outer end for depression of said latch bolt upon inward movement of said bar, a dogging member rockably mounted in said housing for movement into and out of dogging relationship with said latch bolt, said dead bolt being provided with an inwardly extending extension supported at its inner end for rotation to permit swinging said dead bolt about said axis with said latch bolt to said position, said extension being engageable with said dogging member for swinging the latter into dogging relationship with said latch bolt upon depression of said dead bolt, and said extension being formed to engage said member for swinging the latter out of dogging relationship when said dead bolt moves to projected position.

8. In a lock structure, an elongated cylindrical housing, a latch bolt reciprocable in said housing and rotatable therein about an axis, an annular shoulder formed on said latch bolt and concentric with said axis, a retractor arm extending longitudinally of said housing and mounted for generally longitudinal movement relative thereto, one end of said arm being supported on said latch bolt to permit rotating the latter relative to said one end and for engagement of said bar at said one end with said shoulder, a dogging member rockably mounted in said housing for movement into and out of dogging relationship with said bolt, a dead bolt reciprocable relative to said housing and said latch bolt, an extension on said dead bolt secured in said housing for rotation of said dead bolt about said axis with said latch

bolt, said extension being formed to engage said dogging member for holding the same out of dogging relationship with said latch bolt.

9. In a lock structure provided with a cylindrical latch bolt housing having inner and outer ends, an elongated axially extending member in said housing, a latch bolt rotatably mounted on said member and free for reciprocation thereon from a projected position extending outwardly of said outer end to a depressed position substantially within said housing, a dead bolt slidably supported in said housing alongside said latch bolt and slidable relative to the latter, separate means for urging said bolts to projected position, said latch bolt being formed with an annular shoulder directed axially outwardly of said housing, an elongated retractor arm having opposite outer and inner ends with said outer end formed to engage said shoulder for retracting said latch bolt upon inward movement of said arm, latch dogging means actuated by said dead bolt for dogging said latch bolt to said housing against depression, and means on said retractor arm engaging said dogging means upon inward movement of said retractor arm for operating said dogging means to release said latch bolt, said dead bolt being provided with an inwardly extending extension apertured at its inner end to surround said member whereby both of said bolts may be swung as a unit to opposite sides of said member as desired, said extension being provided with a radially outwardly extending projection concentric with said member and adjacent said inner end and adapted to actuate said dogging means upon outward movement of said dead bolt for moving said dogging means out of dogging relationship with said latch bolt.

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