

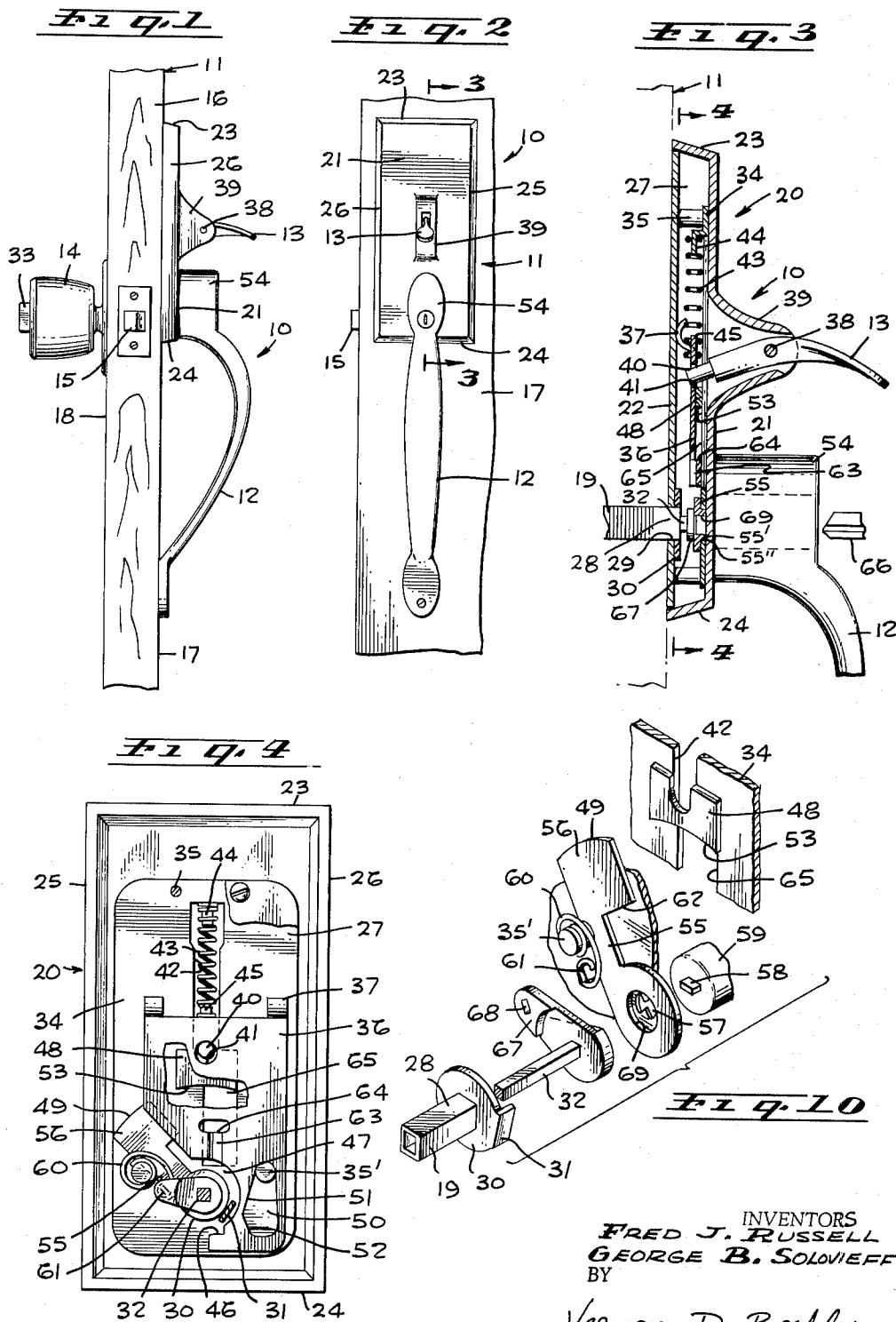
Feb. 15, 1966

F. J. RUSSELL ETAL
SWINGING BLOCK-UNBLOCK MEANS FOR THUMBPIECE
ACTUATED LOCK MECHANISM

3,234,763

Filed March 23, 1964

2 Sheets-Sheet 1



INVENTORS
FRED J. RUSSELL
GEORGE B. SOLOVIEFF
BY
Vernon D. Beehler
ATTORNEY

Feb. 15, 1966

F. J. RUSSELL ET AL
SWINGING BLOCK-UNBLOCK MEANS FOR THUMBPIECE
ACTUATED LOCK MECHANISM

3,234,763

Filed March 23, 1964

2 Sheets-Sheet 2

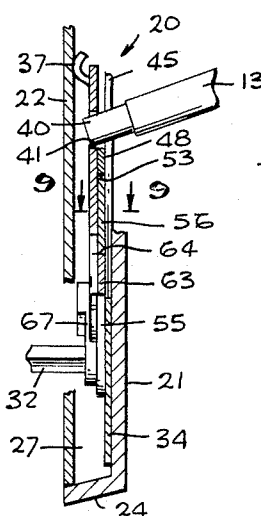
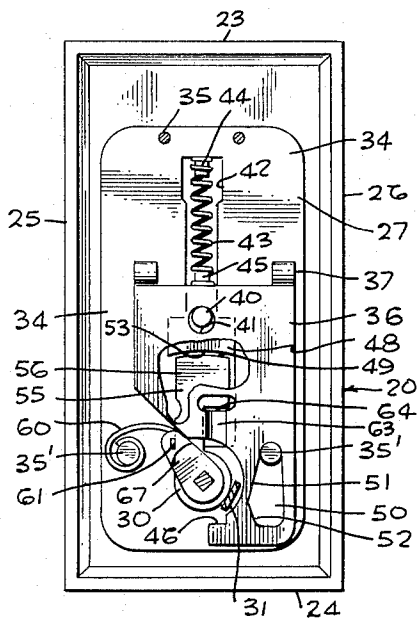
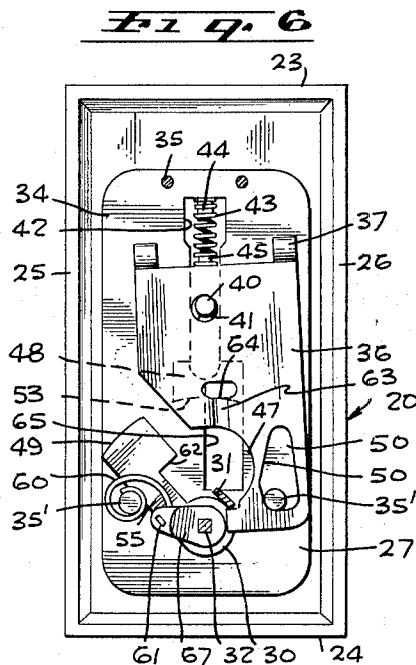
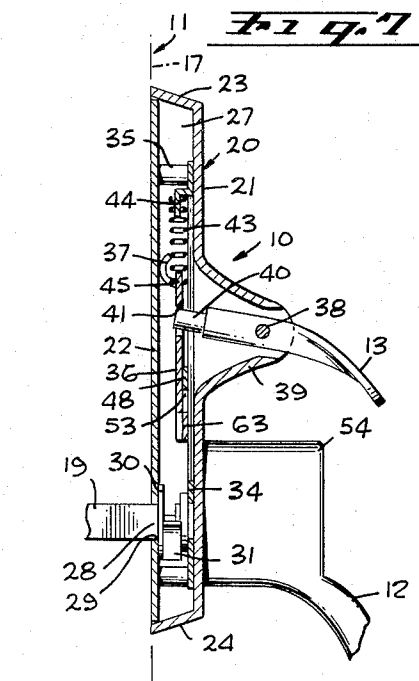


Fig. 9

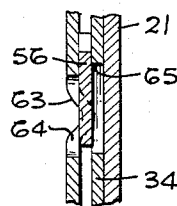


Fig. 8

FRED J. RUSSELL
GEORGE B. SOLDVIEFF
INVENTORS

BY
Vernon D. Beehler

ATTORNEY

1

3,234,763

SWINGING BLOCK-UNBLOCK MEANS FOR THUMBPIECE ACTUATED LOCK MECHANISM

Fred J. Russell, 8635 Otis St., South Gate, Calif., and George B. Solovieff, San Clemente, Calif.; said Solovieff assignor to said Russell

Filed Mar. 23, 1964, Ser. No. 353,740
7 Claims. (Cl. 70-153)

The invention relates to door locks which feature a vertically positioned handle, above the upper end of which is a thumbpiece which is manipulated to retract a conventional latch bolt.

Thumbpiece actuated door locks, in common with other kinds of door locks, have been undergoing considerable revision in the interest of simplifying and streamlining the lock mechanisms and housings for containing them, while at the same time producing a device available in suitable quantities to supply an increasing volume of trade. Thumbpiece actuated mechanisms heretofore available, although capable of withdrawing a latch bolt by manipulation of a thumbpiece, have made use of parts too numerous and complicated to be acceptable under present-day circumstances and also too involved to be capable of manufacture and assembly under increasingly stringent price competition. Also, insufficient attention has been given to appropriate means for blocking manipulation of the thumbpiece actuated parts on the outside of the door by an appropriate structure on the inside of the door.

It is therefore among the objects of the invention to provide a new and improved thumbpiece actuated lock mechanism which is relatively simple and inexpensive in its manufacture and which incorporates a simple, direct acting, blocking mechanism to lock the door from the inside, so that it cannot be opened from the outside except by the use of a key.

Another object of the invention is to provide a new and improved thumbpiece actuated lock mechanism which incorporates a sliding plate structure for translating the thumbpiece movement to a spindle rotating movement, wherein an appropriate blocker is designed and mounted so as to be capable of blocking movement of the motion transmitting slide plate, thereby to bar the door against opening from the outside by use of the thumbpiece.

Still another object of the invention is to provide in a simplified thumbpiece actuated lock mechanism a rotatable blocker which, if desired, can be mounted concentrically with the axis of rotation of the spindle and which is made positive in its action by virtue of placing the blocker in the path of movement of mechanism which transmits motion from the thumbpiece to the spindle, so that the mechanism is physically barred against movement.

With these and other objects in view, the invention consists in the construction, arrangement, and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims, and illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a side elevational view of the device mounted in customary fashion upon a door.

FIGURE 2 is a front elevational view of the device of FIGURE 1.

FIGURE 3 is a longitudinal sectional view of the device taken on the line 3-3 of FIGURE 2.

FIGURE 4 is a rear view partially broken away showing the parts in the positions occupied in unblocked position on the line 4-4 of FIGURE 3.

2

FIGURE 5 is a view similar to FIGURE 4 but showing the parts in the positions occupied in blocked position.

FIGURE 6 is a view similar to FIGURE 4 showing the parts in unblocked position but wherein the thumbpiece has been moved to actuate the spindle.

FIGURE 7 is a longitudinal sectional view similar to FIGURE 3 but showing the thumbpiece in depressed position for withdrawing the latch bolt.

FIGURE 8 is a fragmentary longitudinal sectional view showing the relationship of parts when the blocker is in a blocking position.

FIGURE 9 is a fragmentary cross-sectional view on the line 9-9 of FIGURE 8.

FIGURE 10 is an exploded perspective view of the blocking-unblocking mechanism.

In an embodiment of the invention, the design and construction of which is one for illustrative purposes, there is shown a door lock indicated generally by the reference character 10 mounted in operative position upon a door 11 in such fashion that on the outside of the door there is a vertical handle 12 in association with a thumbpiece 13, and an inside rotating knob 14. The thumbpiece 13 and rotating knob 14 serve to manipulate a conventional latch bolt 15 on an edge 16 of the door 11. The handle 12 is applied to an outside face 17 of the door 11 and opposite the outside face 17 is an inside face 18.

The inside rotating knob 14 is nonrotatably attached to a square tubular spindle 19, and conventional appropriate mechanism (not shown) serves to translate the rotating motion of the spindle 19 to a reciprocating motion of the latch bolt 15 so that it can be withdrawn and released at will.

Although the connection between the knob 14 and the spindle 19 can be direct, an appropriate interconnecting mechanism must be provided in order to translate the tilting movement of the thumbpiece 13 to a movement which rotates the spindle 19. At the same time, it is important that even though the door lock be locked from the outside, prohibiting movement of the thumbpiece 13 from operating the latch bolt 15, the arrangement of parts must remain such that the latch bolt 15 can be withdrawn by rotation of the knob 14 even though the lock might be locked. These problems have been long recognized in the past and have heretofore been solved by the employment of various familiar conventional mechanisms.

In the device here under consideration, virtually all of the operating parts are mounted and contained within a frame 20. The frame 20 in this embodiment consists of a front plate 21, a back plate 22, end plates 23 and 24 and side plates 25 and 26. These plates encompass a chamber 27 in which is located operating parts of the device.

The square tubular spindle 19 has an end 28 rotatably mounted in an appropriate hole 29 in the back plate 22. A disc 30 serving as a crank arm non-rotatably attached to the end 28 is located within the chamber 27. A crank 31 is attached to the perimeter of the disc 30 and is also located within the chamber 27. A solid, small, square locking shaft 32 is rotatably mounted inside the square tubular spindle 19 and serves as a locking shaft. The locking shaft 32 extends inwardly through the knob 14, where it engages a turn button 33.

Although the frame 20 up to this point has been described as consisting of the plates 21, 22, 23, 24, 25, and 26, thus creating the chamber 27, another plate element 34 also comprising a portion of the frame 20 is mounted upon the pegs 35, 35' adjacent the inner face of the front plate 21. The plate element 34 is therefore a stationary portion of the frame 20 lying within the chamber 27.

A slide plate 36 has a vertically sliding movement within the chamber 27 and is guided in part for sliding movement by the presence of shoes 37 which slide upon the inside surface of the back plate 22.

In order to manipulate the slide plate 36, the thumbpiece 13 is pivotally mounted by means of a pin 38 upon a bracket 39 extending outwardly away from the front plate 21 so that a drive portion 40 of the thumbpiece 13 can move up and down in its position within the chamber 27. A slot 42 in the plate element 34 allows the drive portion 40 to move freely. In the slide plate 36 is an opening 41 into which the drive portion 40 extends, and the drive portion 40 bears against the opening 41 of the slide plate 36 when the thumbpiece 13 is depressed.

When the thumbpiece 13 is depressed, the drive portion 40 is tilted upwardly, and this causes the slide plate 36 to move upwardly. Upward motion is resisted by tension of the spring 43 which is retained by a keeper 44 at the upper end extending from the plate element 34 and by a keeper 45 at the lower end which is an upwardly extending projection from the slide plate 36. These last defined keepers can be readily observed in FIGURE 3.

In order to convey the vertically reciprocating movement of the slide plate 36 to the crank 31, the slide plate 36 is provided with a shoulder 46, as shown in FIGURES 4 and 5. In initial or normal position of the slide plate 36 and shoulder 46 there is space between the shoulder 46 and the crank 31 so that should the crank be rotated by manipulation of the inside rotating knob 14 in a conventional fashion, there is no impediment to free rotation. Accordingly, the space between the shoulder 46 and the crank 31 is provided as is also the arcuate space 47 immediately above the shoulder 46 as viewed in FIGURE 5.

For additional guidance in positioning of the slide plate 36, there is provided in the slide plate 36 a vertically elongated opening 50 having on the left side, as viewed in FIGURE 4, an edge 51, below which is another edge 52 which together form a clearance for and a cam track to cooperate with the respective peg 35' which lies within the opening 50. The peg 35' thereby serves as a camming means.

From the position and direction of the edge 51, it will be observed that as the slide plate 36 is moved upwardly by manipulation of the thumbpiece 13, the lower end of the slide plate 36 will move from left toward the right, as viewed in FIGURES 4, 5, and 6, as it is permitted to do by the sloping direction of the edge 51. In this way, the shoulder 46 will be brought into engagement with an adjacent edge of the crank 31 as soon as the slide plate 36 moves upwardly enough to close the initial distance between the shoulder 46 and the crank 31. Movement toward the right will continue until the engaged edge of the crank 31 passes its transverse center line. Thereafter, as the slide plate 36 continues to move upwardly, the edge 52 will come to bear against the peg 35' as viewed in FIGURE 6. In this way, the shoulder 46 is maintained in positive engagement with the crank 31. This movement, in addition to being a vertical movement of the slide plate 36, is also a tilting or pivotable movement of the slide plate 36 in a manner such that the lower end of the slide plate 36, as exemplified in part by the shoulder 46, pivots about the drive portion 40 as a center of rotation. Hence, the wall of the slot 41 may be said to constitute a shoulder in the upper end of the slide plate 36 in engagement with the drive portion 40.

When the thumbpiece 13 is released, tension built up in the spring 43 will return the slide plate 36 downwardly. The cam track embodied in the edges 52 and 51 will become operative against the peg 35', thus limiting the side-to-side movement of the slide plate 36 until it reaches the position as shown in FIGURE 5. The slide plate 36 will move the shoulder 46 to the position of FIGURES 4 and 5, where space is left between the shoulder 46 and the crank 31, so that the crank 31 can

again be freely rotated by manipulation of the knob 14.

From the foregoing description of parts and their movement, it will be apparent that about the only parts needed to translate a vertical tilting movement of the thumbpiece 13 and drive portion 40 to a rotating movement for the spindle 19 is the slide plate 36 pivotally hung upon the drive portion 40 and guided during its movement by engagement between crank 31 and shoulder 46.

In order to block manipulation of the thumbpiece 13, the present structure makes provision for mechanism blocking the vertical reciprocating motion of the slide plate 36. The mechanism involved includes the blocking arm 55 having a blocker 56 at the outermost end. The blocking arm 55 has an opening 57 into which fits a rectangular projection 58 at the inner end of a tailpiece 59, the outer end of the tailpiece 59 being attached to a conventional key-operated mechanism in a housing 54. The somewhat butterfly-like shape of the opening 57 is to provide for a degree of lost motion, making allowance for manipulation of the square shaft 32. On the blocking arm 55 is a circular projection 55' which is received in a complementary hole 55'' in the plate element 34 whereby to rotatably mount the blocking arm 55 on the frame 20.

To provide the degree of security expected of a lock like that incorporating the present invention, a stop 48 is made use of on the plate element 34. The form and location of the stop 48 is shown in perspective in FIGURE 10. The stop 48 is also shown in elevation in FIGURES 4, 5, and 6 and in section in FIGURES 3, 7, and 8. The stop 48 may be pressed from the material of the plate element 34 as shown or added thereto as an extra piece and firmly anchored in place. Formed as described, the stop 48 is part of the stationary portion of the lock 10. To match a curved edge 49 of the blocker 56, the stop 48 has an arcuate lower edge 53. Formed as shown and described, the blocker 56 can be rotated into position beneath the stop 48, as shown in FIGURE 5. Hence, when upward pressure is instituted against the drive portion 40 when it is in blocking position, the blocker 56 is squeezed between the shoulder 64 of the slide plate 36 and the arcuate lower edge 53.

The dish portion 63 is adapted to slide freely in a relatively wide opening 65 in the plate element 34.

To manipulate the blocker 56 and move it from released position, as shown in FIGURES 4, 6, and 10, for example, to blocked position, as shown in FIGURE 5, it is necessary merely to insert and rotate a key 66 and thus rotate clockwise, through the tailpiece 59, the blocking arm 55 and blocker 56, as viewed in FIGURES 4, 5, 6, and 10, to the position of FIGURE 5. In the last identified position, the shoulder 62 of the blocker 56 will overlie the shoulder 64 of the slide plate 36, and thereafter the slide plate 36 cannot be manipulated from outside by movement of the thumbpiece 13. The slide plate 36 can be unlocked merely by rotating the key 66 in the opposite direction, thereby to rotate the blocking arm 55 and the blocker 56 in a counter-clockwise direction from the position of FIGURE 5 to the position of FIGURES 4 or 6, for example. Thereafter, the thumbpiece 13 can be manipulated as usual.

In order that it may also be possible to unblock the blocker 56 from the inside by use of the turn button 33, a rock arm 67 is nonrotatably mounted upon the solid small square shaft 32. A circular projection (not shown) on the back of rock arm 67, as shown in FIGURE 10, fits rotatably in a hole 69 in the blocking arm 55. A hole 68 in the rock arm 67 fits over the tab 61 on the blocking arm 55. Consequently, by rotation of the turn button 33 in one direction, namely, clockwise, as viewed in FIGURES 4 and 6, for example, the rock arm 67, being moved, moves also the blocker 56 because of the interconnection of the hole 68 with the tab 61. Rotation, as described, therefore is capable of moving the shoulder 62

5

of the blocker 56 over the shoulder 64 of the slide plate 36, thereby to block manipulation of the slide plate 36 by the thumbpiece 13. Conversely, when the device is to be unblocked by operation of the turn button 33 irrespective of how it may be blocked, the turn button 33 is again rotated in a counter-clockwise direction, as viewed in FIGURES 4, 5, and 6, for example, thereby rotating the rock arm 67 in a counter-clockwise direction. Again, because of engagement of the tab 61 in the hole 68, the blocking arm 55 will also be moved counter-clockwise until the shoulder 62 is disengaged from a position over the shoulder 64. The return motion will be aided to a degree by the return spring 60.

Extra security is provided by the strip 48. Although a clearance is shown, in FIGURE 5, between the blocker 56 and the stop 48, this is merely a working clearance. With the blocker 56 in the blocked position shown and described, should the lifting force on the slide plate 36 be greater than could be resisted by the rotatable mounting of the rock arm 67 in the blocking arm 55 and the blocking arm 55 in the plate element 34, the blocker 56 is additionally prevented by the stop 48 from being disturbed from its blocking position. The blocker 56 will merely be shifted a short distance sufficient to close the clearance between the curved upper edge 49 of the blocker 56 and the arcuate lower edge 53 of the stop 48, and, thereafter, the stop 48, and accordingly, the plate element 34 will hold the blocker 56 in position, thus blocking movement of the slide plate 36.

Because of the rotating structure and mounting of the blocking arm 55 and its associated parts, these may be compacted in a very small space within the chamber 27. To make it possible for the blocker 56 to engage the slide plate 36, all that is needed is to deform or dish the slide plate 36 to form the shoulder 64 upon it. Moreover, to allow plenty of freedom for the slide plate 36 to swing laterally while being operated by the thumbpiece 13, the wide opening 65 of the plate element 34 allows for whatever motion may be necessary of the dished portion 63 as the slide plate 36 swings relative to the plate element 34. Moreover, as shown and described, the blocking and unblocking actions of the blocker 56 are accomplished by operation of the turn button 33 at the knob 14 or by manipulation of a key 66 from the outside.

While the invention has herein been shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described the invention, what is claimed as new in support of Letters Patent is:

1. A door lock structure including a frame adapted to be mounted in a door, a spindle rotatably mounted in said structure and a crank arm in nonrotatable engagement with said spindle, a manually actuatable thumbpiece pivotally mounted on the frame and having a drive portion movable through a path of movement relative to said frame, a spindle-rotating slide plate having a slidable mounting in said frame and being slidable in a direction transverse with respect to the axis of rotation of said spindle, said slide plate having portions thereof in engagement respectively with said drive portion and with said crank arm whereby said spindle is rotated by action of said thumbpiece, a shoulder on said slide plate having a path of movement when said slide plate is moved, a blocking arm movably mounted on said structure, a blocker on said blocking arm, and operative means attached to said blocking arm adapted to move said blocker to one position in the path of movement of said shoulder whereby to block movement of said slide plate and to another position clear of said shoulder whereby said slide plate is operable to rotate said spindle.

6

2. A door lock structure including a frame adapted to be mounted in a door, a spindle rotatably mounted in said structure and a crank arm in nonrotatable engagement with said spindle, a manually actuatable thumbpiece pivotally mounted on said frame and having a drive portion movable through a path of movement relative to said frame, a spindle-rotating slide plate having a slidable mounting in said frame and being slidable in a direction transverse with respect to the axis of rotation of said spindle, said slide plate having portions thereof in engagement respectively with said drive portion and with said crank arm whereby said spindle is rotated by action of said thumbpiece, a shoulder on said slide plate having a path of movement when said slide plate is moved, a key-operated mechanism tailpiece rotatably mounted on said structure, a blocking arm rotatably mounted on said structure and attached to said tailpiece for movement in a plane parallel to the plane of said slide plate, and a blocker on said blocking arm, said blocker having one position in the path of movement of said shoulder whereby to block movement of said slide plate, said blocker having another position clear of said shoulder whereby said slide plate is operable to rotate said spindle.

3. A door lock structure including a frame adapted to be mounted in a door, a tubular spindle rotatably mounted in said structure, a crank arm in nonrotatable engagement with said tubular spindle, a locking shaft rotatably contained in said tubular spindle, a manually actuatable thumbpiece pivotally mounted on said frame and having a drive portion movable through a path of movement relative to said frame, a spindle-rotating slide plate having a slidable mounting in said frame and being slidable in a direction transverse with respect to the axis of rotation of said tubular spindle, said slide plate having portions thereof in engagement respectively with said drive portion and with said crank arm whereby said tubular spindle is rotated by action of said thumbpiece, a shoulder on said slide plate having a path of movement when said slide plate is moved, a key-operated mechanism tailpiece rotatably mounted on said structure, a blocking arm rotatably mounted on said structure and a rotational lost motion attachment between said tailpiece and said blocking arm, said blocking arm being movable in a plane parallel to the plane of said slide plate, a blocker on said blocking arm, said blocker having one position in the path of movement of said shoulder whereby to block movement of said slide plate, said blocker having another position clear of said shoulder whereby said slide plate is operable to rotate said tubular spindle, and a connection between said locking shaft and said blocking arm whereby to enable blocking and unblocking of said blocker by said locking shaft.

4. A door lock structure including a frame adapted to be mounted in a door, a spindle rotatably mounted in said structure and a crank arm in nonrotatable engagement with said spindle, a manually actuatable thumbpiece pivotally mounted on the frame and having a drive portion movable through a path of movement relative to said frame, a spindle-rotating slide plate having a slidable mounting in said frame and being slidable in a direction transverse with respect to the axis of rotation of said spindle, said slide plate having portions thereof in engagement respectively with said drive portion and with said crank arm whereby said spindle is rotated by action of said thumbpiece, a shoulder on said slide plate having a path of movement when said slide plate is moved, a stop on said frame having a location spaced from said shoulder and in the path of movement of said shoulder, a blocking arm movably mounted on said structure, a blocker on said blocking arm, and operative means attached to said blocking arm adapted to move said blocker to one position in the path of movement of said shoulder and between said shoulder and said stop, whereby to block movement of said slide plate, said blocker being movable to another position clear of said

7

shoulder and said stop whereby said slide plate is operable to rotate said spindle.

5. A door lock structure including a frame adapted to be mounted in a door, a spindle rotatably mounted in said structure and a crank arm in nonrotatable engagement with said spindle, a manually actuatable thumb-piece pivotally mounted on said frame and having a drive portion movable through a path of movement relative to said frame, a spindle-rotating slide plate having a slidable mounting in said frame and being slidable in a direction transverse with respect to the axis of rotation of said spindle, said slide plate having portions thereof in engagement respectively with said drive portion and with said crank arm whereby said spindle is rotated by action of said thumbpiece, a shoulder on said slide plate having a path of movement when said slide plate is moved, a stop on said frame having a location spaced from said shoulder and in the path of movement of said shoulder, a key-operated mechanism tailpiece rotatably mounted on said structure, a blocking arm rotatably mounted on said structure and attached to said tailpiece for movement in a plane parallel to the plane of said slide plate, and a blocker on said blocking arm, said blocker having one position in the path of movement of said shoulder and between said shoulder and said stop, whereby to block movement of said slide plate, said blocker having another position clear of said shoulder and said stop whereby said slide plate is operable to rotate said spindle.

6. A door lock structure including a frame adapted to be mounted in a door, a tubular spindle rotatably mounted in said structure, a crank arm in nonrotatable engagement with said tubular spindle, a locking shaft rotatably contained in said tubular spindle, a manually actuatable thumbpiece pivotally mounted on said frame and having a drive portion movable through a path of movement relative to said frame, a spindle-rotating slide plate having a slidable mounting in said frame and being slidable in a direction transverse with respect to the axis of rotation of said tubular spindle, said slide plate having portions thereof in engagement respectively with said drive portion and with said crank arm whereby said tubular spindle is rotated by action of said thumbpiece, a shoulder on said slide plate having a path of movement when said slide plate is moved, a stop on said frame having a location spaced from said shoulder and in the path of movement of said shoulder, a key-operated mechanism tailpiece rotatably mounted on said structure, a blocking arm rotatably mounted on said struc-

8

ture and a rotational lost motion attachment between said tailpiece and said blocking arm, said blocking arm being movable in a plane parallel to the plane of said slide plate, a blocker on said blocking arm, said blocker having one position in the path of movement of said shoulder and between said shoulder and said stop, whereby to block movement of said slide plate, said blocker having another position clear of said shoulder and said stop whereby said slide plate is operable to rotate said tubular spindle, and a connection between said locking shaft and said blocking arm whereby to enable blocking and unblocking of said blocker by said locking shaft.

7. A door latch structure including a frame adapted to be mounted in a door, a spindle rotatably mounted in the structure and a crank arm in non-rotatable engagement with the spindle, a manually actuatable thumb piece pivotally mounted on the frame and having a drive portion movable relative to the frame, and a spindle rotating slide means movably mounted on the frame, said slide means including a plate having a slidable mounting in the frame and being slidable in a direction transverse with respect to the axis of rotation of the spindle, said slide means having portions thereof in engagement respectively with said drive portion of the thumb piece and with said crank arm whereby said spindle is rotated by action of said thumb piece, a shoulder on said plate, blocking means having at least a portion thereof movably mounted on said frame, said blocking means including a blocker and operating means attached to said blocking means adapted to effect alignment of said blocking means with said shoulder whereby to block movement of said plate, and adapted to effect removal of said blocking means from alignment with said shoulder, whereby said plate is operable to rotate said spindle.

References Cited by the Examiner

UNITED STATES PATENTS

437,590	9/1890	Gleason	70—150
1,720,637	6/1929	Wread	70—150
2,266,106	12/1941	Voight et al.	70—153
2,752,773	6/1956	Abelson et al.	70—153 X
2,784,993	3/1957	Collar	70—150 X
2,854,838	10/1958	Foster	70—153 X
2,887,866	5/1959	Leslie et al.	70—153
3,064,462	11/1962	Ng et al.	70—153

JOSEPH D. SEERS, *Primary Examiner.*

BOBBY R. GAY, *Examiner.*