Jan. 9, 1923. 1,441,336

A. S. FLOWERS.

LATCH OR BOLT OPERATING MECHANISM.

FILED JUNE 23, 1920. 4 SHEETS-SHEET 1

Fig. 1.

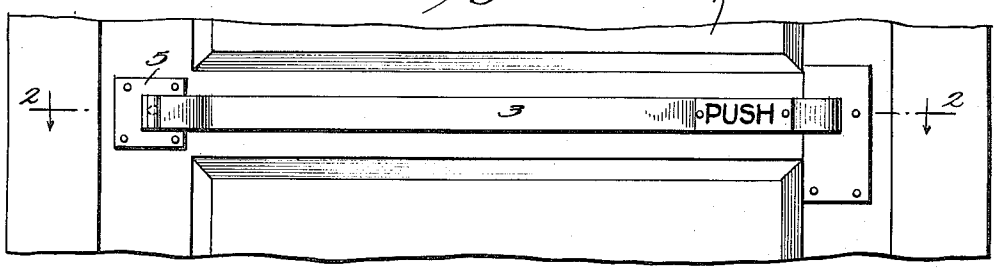


Fig. 2.

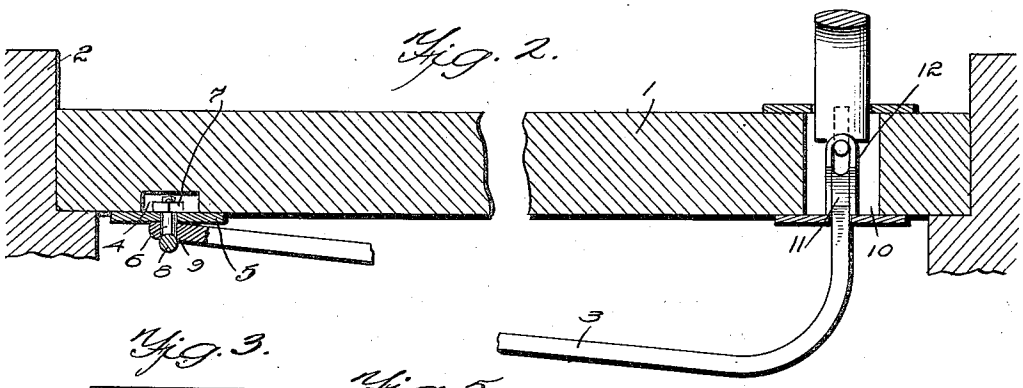


Fig. 3.

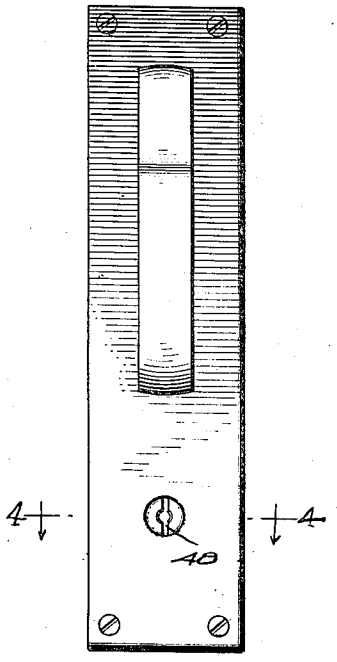


Fig. 5.

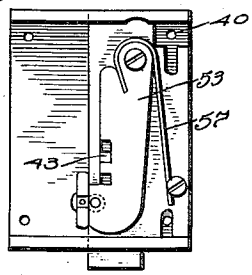


Fig. 4.

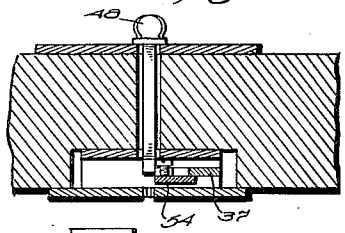


Fig. 6.

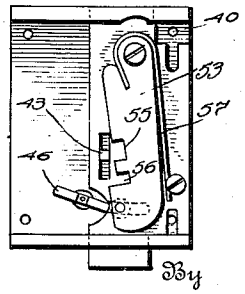
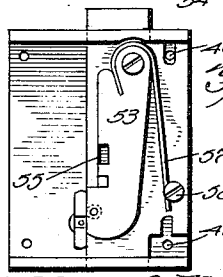


Fig. 7.



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LATCH OR BOLT OPERATING MECHANISM

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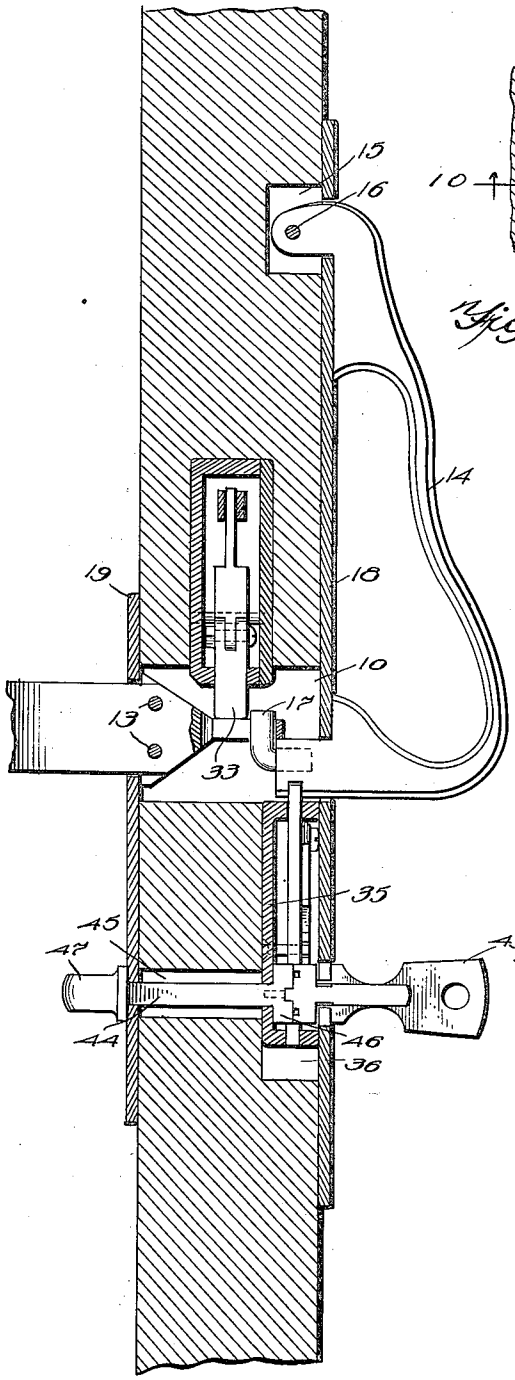


Fig. 9.

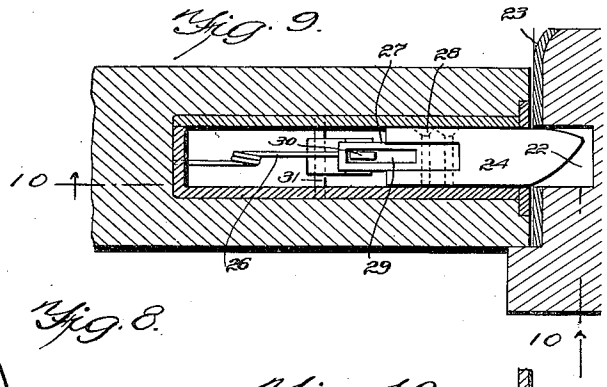


Fig. 8.

Fig. 10.

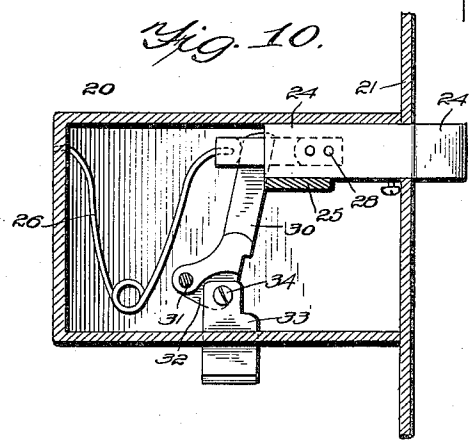
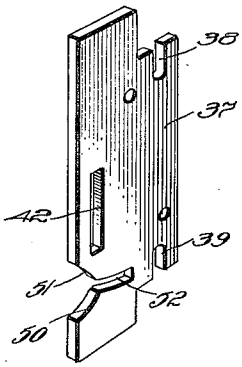


Fig. 11.



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Fig. 12.

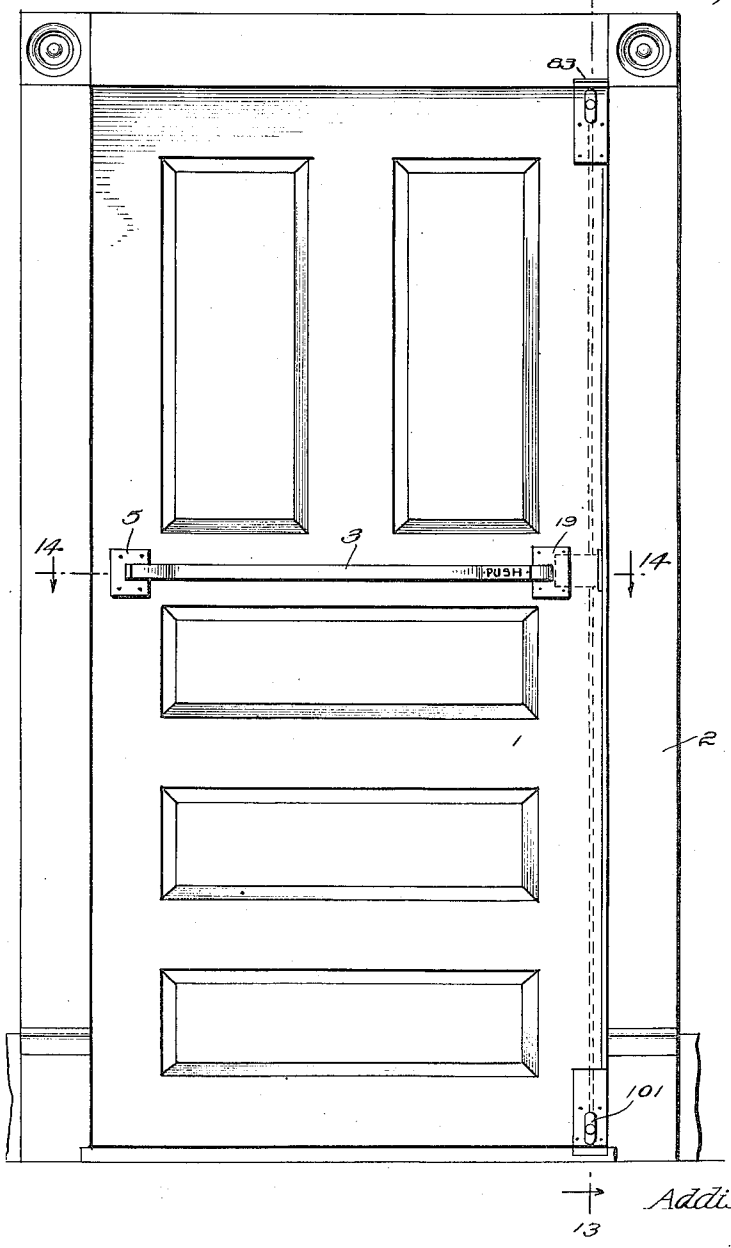
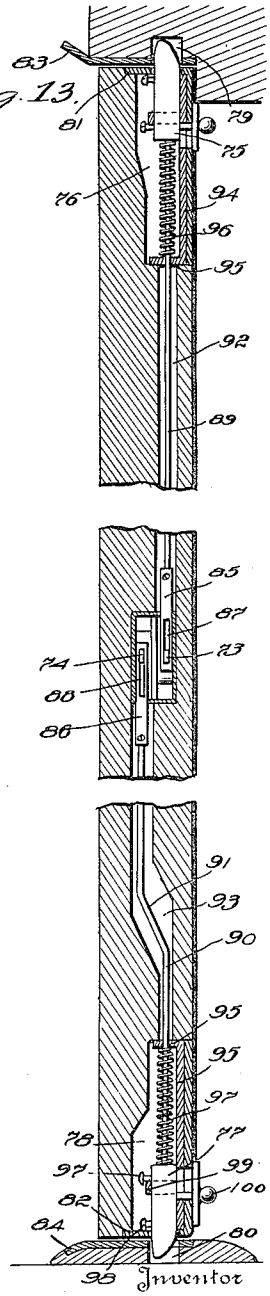


Fig. 13.



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By

Attorney

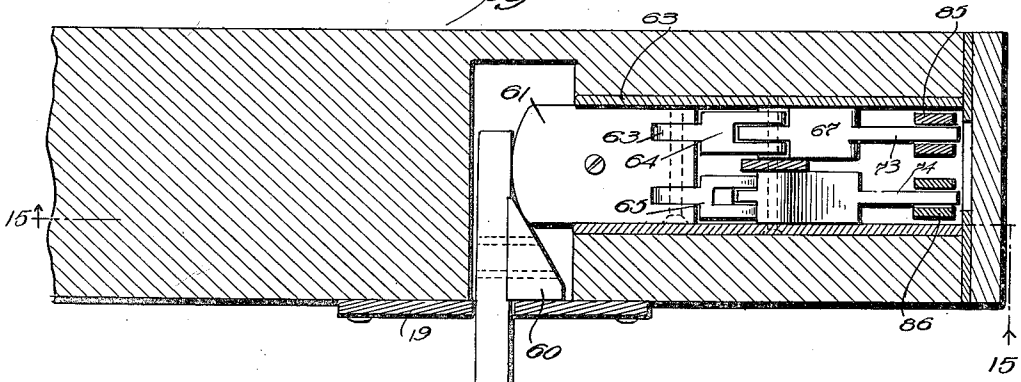
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A. S. FLOWERS.

LATCH OR BOLT OPERATING MECHANISM.

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Fig. 14.



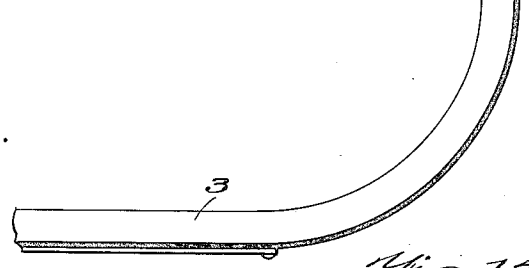


Fig. 16.

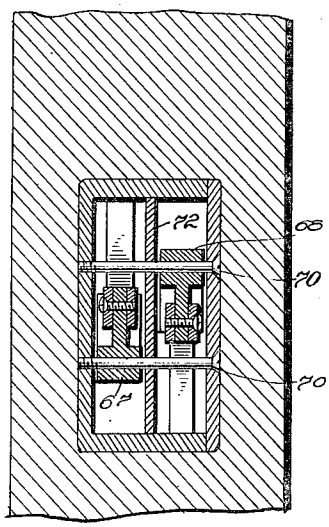


Fig. 15.

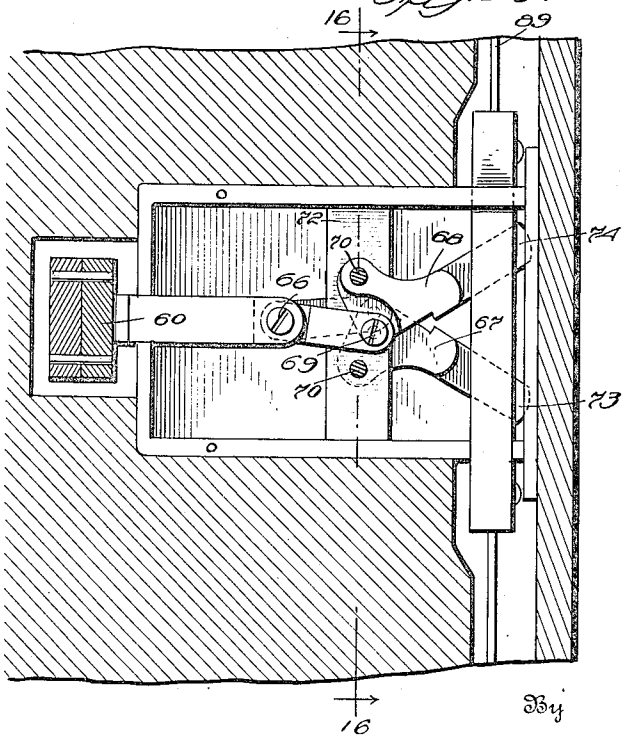
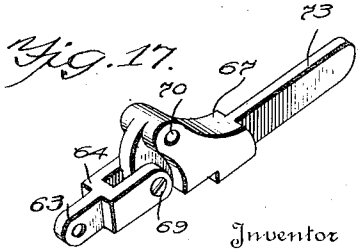


Fig. 17.



Inventor

Addison S. Flowers

By Ch. Parker

Attorney

Patented Jan. 9, 1923. 1,441,336

UNITED STATES PATENT OFFICE.

ADDISON S. FLOWERS, OF WASHINGTON, DISTRICT OF COLUMBIA; MARY E. FLOWERS ADMINISTRATRIX OF SAID ADDISON S. FLOWERS, DECEASED.

LATCH OR BOLT OPERATING MECHANISM.

Application filed June 23, 1920. Serial No. 391,024.

To all whom it may concern:

Be it known that I, ADDISON S. FLOWERS, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Latch or Bolt Operating Mechanism, of which the following is a specification.

This invention relates to latch or bolt operating mechanisms, and it comprises an operating rod, a cam or an inclined face carried by the operating rod, a sliding latch bolt carried by the door and adapted to enter an opening in the door frame, a pivoted lever engaging said latch bolt, means for connecting said lever and said operating rod, and locking means engaging the operating rod to prevent actuation of the latch bolt, said locking means comprising a slidable locking bolt, operating means therefor, and means for maintaining said locking bolt in locked or unlocked position, said means being rendered inoperative by the lock operating means.

An object of the present invention is to provide means for latching a door, said means being operated by a rod pivoted or otherwise movably secured to the door, and provided with a cam face adapted to engage connecting levers to withdraw the latch bolt. The latch bolt is normally maintained in operative position by suitable means, such as springs or the like, and the door may be readily and easily opened by merely operating the pivoted operating rod which is mounted on the door in a convenient position.

A further object of the invention is to provide means in combination with the latch bolt and operating rod for locking the latch bolt in extended position, said means comprising a slidable locking bolt, operating means therefor, and means for securing the bolt in locked or unlocked position, said means being rendered inoperative by the lock operating means.

In the accompanying drawings, I have shown several advantageous embodiments of the invention. In this showing:

Figure 1 is a front elevation of a portion of a door and door frame showing the position of the operating rod,

Figure 2 is a horizontal sectional view on line 2—2 of Figure 1,

Figure 3 is a front elevation of an auxiliary operating rod arranged on the outside of the door,

Figure 4 is a horizontal sectional view through the locking mechanism, on line 4—4 of Figure 3,

Figure 5 is a front elevation of the locking mechanism removed, showing the lock in unlocked position, and the securing mechanism in locked position,

Figure 6 is a similar view showing the securing mechanism in inoperative position,

Figure 7 is a similar view showing the locking bolt in locked position,

Figure 8 is a vertical sectional view of a door showing the invention applied,

Figure 9 is a horizontal sectional view through the latch mechanism,

Figure 10 is a vertical sectional view on line 10—10 of Figure 9,

Figure 11 is a detail perspective view of the locking bolt,

Figure 12 is a front elevation of a modified form of the invention,

Figure 13 is a vertical sectional view on line 13—13 of Figure 12,

Figure 14 is a horizontal sectional view on line 14—14 of Figure 12,

Figure 15 is a vertical sectional view on line 15—15 of Figure 14,

Figure 16 is a transverse vertical sectional view on line 16—16 of Figure 15, and,

Figure 17 is a detail view of the pivoted lever which engages the slidable latch.

Referring to Figures 1 to 11 of the drawings, the reference number 1 designates generally, a door which is mounted in a door frame 2, in the usual manner. An operating rod 3 is mounted on the door in any suitable manner. As shown, a recess 4 is arranged in the face of the door and a plate 5 is secured to the door covering the recess. A bolt 6 arranged in an opening in the plate is held therein by means of a nut 7, disposed in the recess. The end of the bolt is provided with a transverse head 8, which is cylindrical in cross-section, and the operating rod is provided with a recess 9, adapted to receive a portion of the transverse head. As shown, the operating rod is arranged on the inside of

the door, the free end thereof being curved and extended into an opening 10 formed in the door in substantially horizontal alinement with the pivoted or secured end of the operating rod. The extreme end of the operating rod is provided with a pair of inclined or cam faces 11. A yoke or strap 12 is secured to the end of the operating rod, by means of suitable fastening means 13, and as shown in Figure 8 of the drawings, the ends of the yoke are provided with inclined edges 12′ positioned at each side of the inclined faces 11 for the purpose of forming guides for the connecting means which engage the inclined or cam face. An auxiliary operating rod 14 is pivotally mounted on the outside of the door, one end of the rod entering a recess 15 and being secured to a pin 16, arranged therein. The opposite end of the rod enters recess 10, and is provided with a pin 17 which is adapted to be received in the U-shaped yoke or strap carried by the operating rod. It will be apparent that when the auxiliary operating rod is moved outwardly, the main operating rod will also be moved by the connection between the pin 17 and the U-shaped yoke or strap 12. The recess 10 is covered by suitable plates 18 and 19, which are extended a suitable distance in both directions and cover other recesses which receive the locking bolt and locking mechanism.

Referring to Figures 9 and 10 of the drawings wherein the latch bolt and its associated parts are disclosed, a suitable casing 20 is arranged in the recess, spaced from the two faces of the door, and disposed above the recess 10. The casing is adapted to lie substantially flush with the front edge of the door, and is provided with the usual metallic plate 21. An opening 22 is arranged in the door frame for the reception of the latching bolt and a metallic plate 23 is arranged in front of this opening and provided with a registering slot or opening. A latch bolt 24 is arranged in the latch casing normally projecting through an opening in the plate 21. As shown, the bolt is maintained in alinement with the opening by means of a supporting plate 25, and a spring 26 engages the bolt to normally maintain it in extended position. The rear end of the bolt is provided with a vertical slot adapted to receive a connecting member 27, which is secured therein by suitable means, such as screws 28. This connecting member is provided with an opening 29 adapted to receive one end of a pivoted lever 30, the lever being pivotally mounted in an opening 31, arranged in the latch casing. The free end of the lever is provided with an extension 32 of reduced thickness, and this extension is adapted to be received between the ears of an operating member 33 (see Figure 8). The operating member is connected to the extension of the lever by suitable means, such as screw 34. The lower end of the operating member projects into the path of the operating rod and engages the cam or inclined faces when the operating rod is pushed, swinging the lever 30 on its pivot and withdrawing the latch bolt.

Referring more specifically to Figures 4 to 7, and Figure 11 of the drawings, the means for locking the operating rod to prevent withdrawal of the bolt comprises a lock casing 35 mounted in a recess 36 in one face of the door and positioned below the recess 10. A locking bolt 37 is mounted therein, the bolt being provided with a pair of slots 38 and 39 at the top and bottom, respectively, adapted to engage pins 40 and 41 by means of which the bolt is guided. By reference to Figures 5 to 7, it will be understood that the upper recess engages the upper guide pin when the bolt is being extended before the lower recess is disengaged from the lower guide pin, whereby positive guide means for the bolt is provided at all times. The locking bolt is further provided with a slot 42, in which is arranged a pin 43, carried by the lock casing and adapted to cooperate with means for securing the lock in locked or unlocked position.

The means for operating the locking bolt are as follows:

A key 44 is arranged in a recess 45 communicating with the recess 36, the key extending into the lock casing and being provided with an enlarged end 46. The end of the key extends through the plate 19 on the inside of the door, and is provided with a head 47. It will be seen that this key is irremovable after the head 47 has been applied thereto. From the inside of the door, the locking mechanism operates as a snap lock, the key therefor being always carried by the door. A key hole 48 is arranged in the plate 18 on the outside of the door for the reception of a removable key 49. This key is provided with a series of irregular projections and recesses on its end which are adapted to register with corresponding recesses and projections on the end of the key 44. It will be seen that when the key 49 is inserted in the lock in engagement with the key 44, that the key 44 will be turned when the key 49 is turned. The irregular projections and recesses on the ends of the keys can be made differently for each lock to provide individual locks operative by a single key. The end 46 of the key is adapted to engage a pair of curved or arcuate faces 50 and 51 on the latch bolt. The lower face 50 is arranged on an arc of the circle described by the outer edge of the extension 46 when the bolt is in lowered position, and the upper arcuate face 51 is similarly arranged with respect to the key when the bolt is in extended position

(see Figure 6). A transverse slot 52 communicates with the two arcuate faces at their inner ends.

The means for securing the lock in locked or unlocked position are as follows:

A pivoted plate 53 is arranged on the locking bolt and this plate is provided with a bolt or lug 54, extending into the slot 52. The plate is further provided with a pair of recesses 55 and 56, one of which recesses normally receives the pin 43, projecting through the slot 42 in the bolt. The pivoted plate is normally held in operative position by means of a spring 57, one end of which is secured to the pivoted plate and the other end positioned in engagement with a screw 58, carried by the locking bolt. It will be seen that the pivoted plate moves with the locking bolt, and when the lock is in the position shown in Figure 5 of the drawings, the pin 43 is received in the recess 55 to prevent the locking bolt from being moved upwardly. When the parts are in the position shown in Figure 7 of the drawings, the recess 56 receives the pin 43 and prevents downward movement of the locking bolt.

The operation of the lock is as follows: With the lock in the position shown in Figure 5 of the drawings, the key 44 is turned, the end 45 riding over the arcuate face 50 and at the same time engaging the pivoted plate 53, to move it to the inoperative position shown in Figure 6 of the drawings. With the plate 53 in the position shown in Figure 6 of the drawings, it will be apparent that the bolt may be projected to locking position. When the end of the key reaches the end of the slot 50, it engages the shoulder formed by the end of the arcuate face 51, and the slot 52, as shown in Figure 2 of the drawings, and raises the locking bolt to the position shown in Figure 7 of the drawings. To unlock the door, the reverse operation is performed, the arcuate face 51 then being arranged on an arc of the circle described by the key 46, whereby the end of the key will ride over the face and force the plate 53 into inoperative position. It is, of course, understood that when the key has been turned a complete half revolution, the spring 57 will return the pivoted plate to operative position, and the pin 43 will enter the slot 56. The bolt may be arranged to engage any part of the operating lever to prevent operation thereof, and, as shown, it enters a slot 59 in the auxiliary rod. When the locking bolt is in locked position, the latching mechanism cannot be operated from the outside of the door, but the play in the connection between the main operating lever and the auxiliary operating lever permits operation of the latching mechanism from the inside at all times.

Referring to Figures 12 to 17 of the drawings, I have therein illustrated a slightly different form of the invention, wherein a pair of latching bolts are provided, adapted to engage openings at the top and bottom of the door. In this form of the invention, the arrangement of the operating rod 3 is the same as in the other form, and the auxiliary operating rod 14 may be employed in connection therewith. For the purpose of simplicity in illustration, I have not shown the auxiliary operating rod or the locking mechanism in connection with this form of the invention, but it will be apparent that these parts may be used and assembled in the same manner as in connection with the form illustrated in Figures 1 to 11. In this form of the invention, the cam or inclined face 60 is arranged on the side of the operating rod and is adapted to engage a laterally movable plate 61, mounted in a casing 62. The opposite end of the laterally movable plate is provided with slots 63 for the reception of ears, formed on connecting links 64 and 65, the links being pivoted to the plate by means of a bolt 66, passing through an opening in the plate and openings in the ears of the links. The opposite ends of these links are adapted to receive the ends of levers 67 and 68, respectively, the levers being provided with portions reduced in cross-section adapted to enter slots formed in the ends of the links, the levers and the links being pivotally secured to each other by means of bolts 69. The detail construction of one of the levers is shown in Figure 17 of the drawings. As shown, the lever is substantially a bell crank lever, each of the levers being mounted on pivots 70 and 71, respectively, the pivots extending entirely across the casing (see Figure 16), and through a lateral dividing plate 72, by which the levers are separated from each other. As shown in Figure 16, one of the pivots is arranged below the center of movement and the other pivot above the center of movement, whereby the ends 73 and 74, respectively, of the pivoted levers are moved in opposite directions. Referring to the lever 67, it will be apparent that when the laterally movable plate 61 is forced outwardly by the cam block 60, the lever will swing downwardly on its pivot 70 from the horizontal position shown in Figure 14 of the drawings, to the position shown in Figure 15 of the drawings. This lever is connected to the upper latching bolt whereby the upper latching bolt is moved downwardly or retracted. The lower latching bolt will be retracted by the pivoted lever 68, the end 74 of which will be moved upwardly.

Referring in detail to Figure 13 of the drawings, an upper latch bolt 75 is arranged in a recess 76, formed in the upper part of

the door and a lower latch bolt 77 is similarly arranged in a recess 78 in the lower part of the door. When the latch bolts are in the extended position, they are adapted to enter recesses 79 and 80, respectively, formed in the door frame. The recesses 76 and 78 may be covered by metallic plates 81 and 82, and the recesses 79 and 80 may be covered by similar plates 83 and 84.

Means are provided for connecting each of the latching bolts to the corresponding pivoted levers, and this means comprises a pair of plates 85 and 86, provided with slots or openings 87 and 88, respectively, which are adapted to receive the ends 73 and 74 of the pivoted levers. These plates are connected to the latching bolts by means of rods 89 and 90, respectively, the rod 90 being provided with an off-set portion 91 to position the latching bolts in the same vertical plane. As shown, the connecting rods extend through slots or recesses 92 and 93 in the door. Metallic plates 94 are arranged in the recesses 76 and 78, respectively, these plates being provided with ends 95 which are mounted in a horizontal plane and provided with openings through which the rods 89 and 90 pass. Coil springs 96 are mounted on these rods to normally project the bolt to latching position. As shown, a pair of pins 97 and 98 are adapted to limit the movement of the locking bolt in either direction, the pins being adapted to engage a band or collar 99, arranged in the recess and surrounding the bolt. A pin 100 is secured to the latching bolt, whereby the bolt may be operated by hand, if any part of the mechanism gets out of order. This pin operates in a slot 101.

From the above description, the operation of the invention will be readily apparent to those skilled in the art. In the form shown in Figures 1 to 11 of the drawings, the latching bolt 24 is normally held in the recess 22 in the door frame, by the spring 26. When the operating rod 23 is moved inwardly, either directly or by the operation of the rod 14, the latch is withdrawn and the door may be opened. The locking mechanism may be operated from either side of the door by the snap key 44, or by the removable key 49. When the lock is in locked position, movement of the auxiliary operating rod is prevented and the door cannot be opened from the outside, but due to the play in the connection between the main operating rod and the auxiliary operating rod, the latch may be operated from the inside when the door is in locked position. It will, of course, be understood that the mechanism may be applied to a door in the reverse manner with the main operating rod on the outside and the auxiliary operating rod on the inside, whereby the door may be locked on the inside and not locked on the outside.

In the form shown in Figures 12 to 17 of the drawings, the latching bolts move in a vertical plane, and the cam on the operating rod is arranged in a horizontal plane. It is apparent that the operation of the operating rod will move the plate 61 laterally and swing the bell crank levers 67 and 68 on their pivots from a horizontal position to the position shown in Figure 15 of the drawings. Through the connecting mechanism described, the latching bolts 75 and 77 are withdrawn from the recesses 78 and 79, and the door may be opened. As stated, the auxiliary operating rod and the latching mechanism may be also employed with this form of the invention.

It is to be understood that the forms of my invention herewith shown and described are to be taken as preferred examples of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. Latch or bolt operating mechanism for doors, comprising an operating rod arranged on one side of the door, the door being provided with a recess, the end of said rod entering said recess, a cam formed on the end of said rod, an auxiliary operating rod arranged on the other side of the door, projecting into said recess, and secured to the end of said operating rod, a latch bolt slidably mounted in said door and normally projecting therefrom, a pivoted lever engaging said latch bolt, and mechanism connected with said lever and engaging said cam to withdraw the bolt from its normal position.

2. Latch or bolt operating mechanism for doors, comprising an operating rod arranged on one side of the door, the door being provided with a recess, the end of said rod entering said recess, a cam formed on the end of said rod, an auxiliary operating rod arranged on the other side of said door, one end of said rod projecting into said recess, a pin arranged on the end of said auxiliary operating rod and connected to said operating rod, a latch bolt slidably mounted in said door and normally projecting therefrom, a pivoted lever engaging said latch bolt, and mechanism connected with said lever and engaging said cam to withdraw the bolt from its normal position.

3. Latch or bolt operating mechanism, for doors, comprising an operating rod arranged on one side of the door, the door being provided with a recess, the end of said rod entering said recess, a cam formed on the end of said rod, an auxiliary rod pivoted on the other side of the door and projecting into

said recess, a yoke secured to the end of the operating rod, a pin carried by the auxiliary operating rod and entering said yoke, a latch bolt slidably mounted in said door and normally projecting therefrom, a pivoted lever engaging said latch bolt, and mechanism connected with said lever and engaging said cam to withdraw said bolt from its normal position.

4. Latch or bolt operating mechanism for doors comprising an operating rod arranged on one side of the door, the door being provided with a recess, the end of said rod entering said recess, a cam formed on the end of said rod, an auxiliary operating rod arranged on the other side of the door and projecting into said recess, said auxiliary operating rod being connected to the end of said operating rod, a latch bolt slidably mounted in said door and normally projecting therefrom, and means connected between said latch bolt and said cam for withdrawing said bolt upon manual actuation of either of said rods.

5. Latch or bolt operating mechanism for doors comprising an operating rod and a handle pivotally connected with the door upon opposite sides thereof, said door being provided with an opening, means for connecting the free ends of said rod and said handle through said opening whereby said rod is movable independently of said handle, means for locking said handle, a latch bolt slidably mounted in said door and normally projecting therefrom, and means connected between said latch bolt and said operating rods for withdrawing the bolts upon actuation of either of said operating rods.

6. Latch or bolt operating mechanism for doors comprising an operating rod pivoted at one end to the door, the door being provided with a recess, a plate covering said recess and provided with an opening, the free end of said rod extending through the opening in said plate and terminating in a cam disposed within the recess in the door, a portion of said cam being adapted to engage said plate to limit the outward movement of said rod, a spring pressed latch bolt slidably mounted in said door and normally projecting therefrom, and means connected between said cam and said latch bolt for withdrawing the latter upon inward movement of said operating rod.

7. Latch or bolt operating mechanism for doors comprising an operating rod pivoted at one end to the door, the door being provided with a recess, a plate covering said recess and provided with an opening, the free end of said rod extending through the opening in said plate and terminating in a cam disposed within the recess in the door, a portion of said cam being adapted to engage said plate to limit the outward movement of said rod, a yoke carried by the free end of said operating rod, an auxiliary operating rod pivotally connected at one end on the other side of the door, the free end of said auxiliary operating rod projecting into the recess in said door and engaging within said yoke, a spring pressed latch bolt slidably mounted in said door and normally projecting therefrom, and means connected between said cam and said latch bolt for withdrawing the latter upon actuation of either of said operating rods.

In testimony whereof I affix my signature.

ADDISON S. FLOWERS.