

Aug. 27, 1957

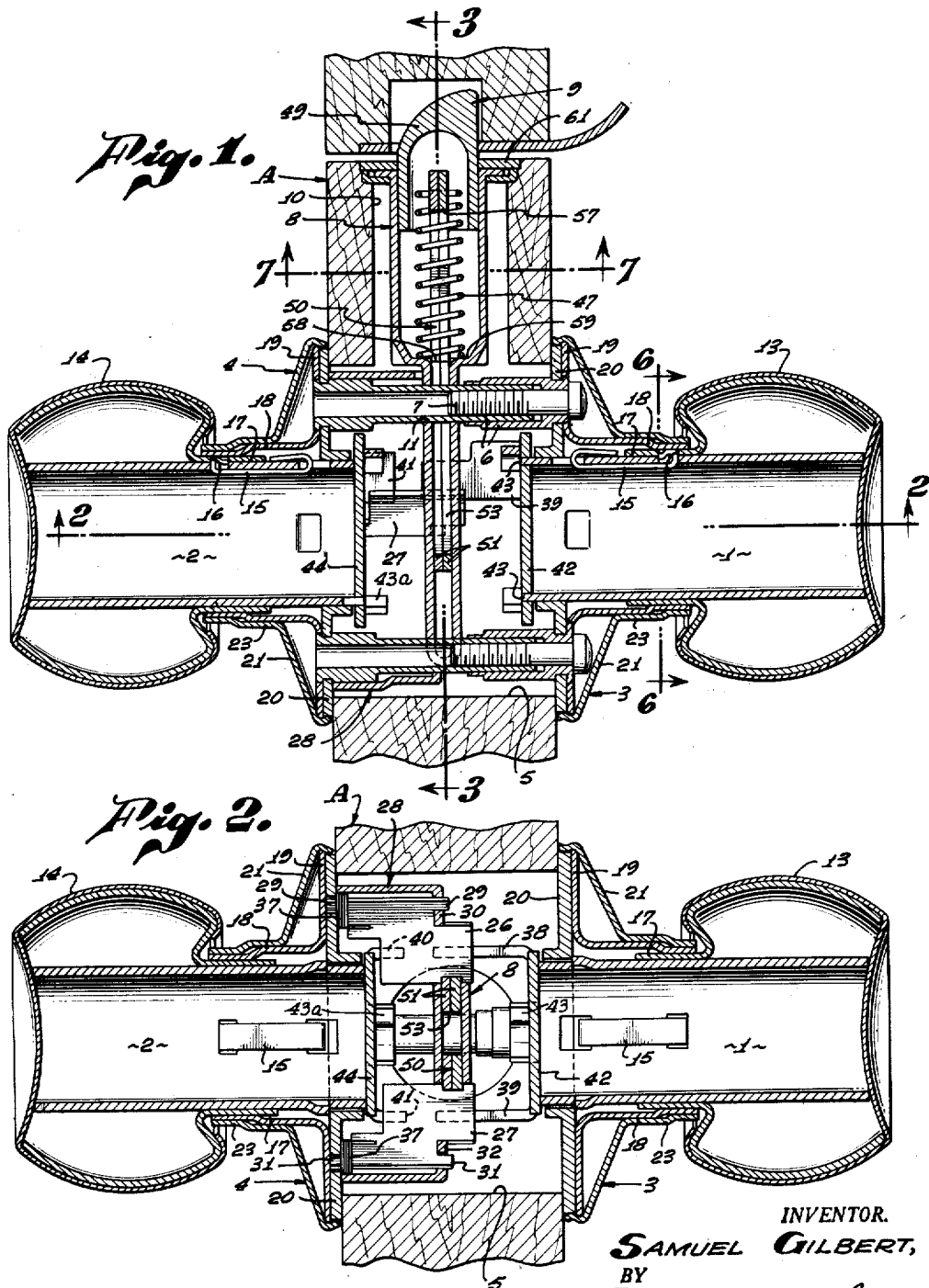
S. GILBERT

2,803,958

DOOR LATCH AND LOCK MECHANISM

Filed Feb. 11, 1955

8 Sheets-Sheet 1



INVENTOR.

SAMUEL GILBERT,

BY

Paul A. Weilein

ATTORNEY.

Aug. 27, 1957

S. GILBERT

2,803,958

DOOR LATCH AND LOCK MECHANISM

Filed Feb. 11, 1955

8 Sheets-Sheet 2

Fig. 3.

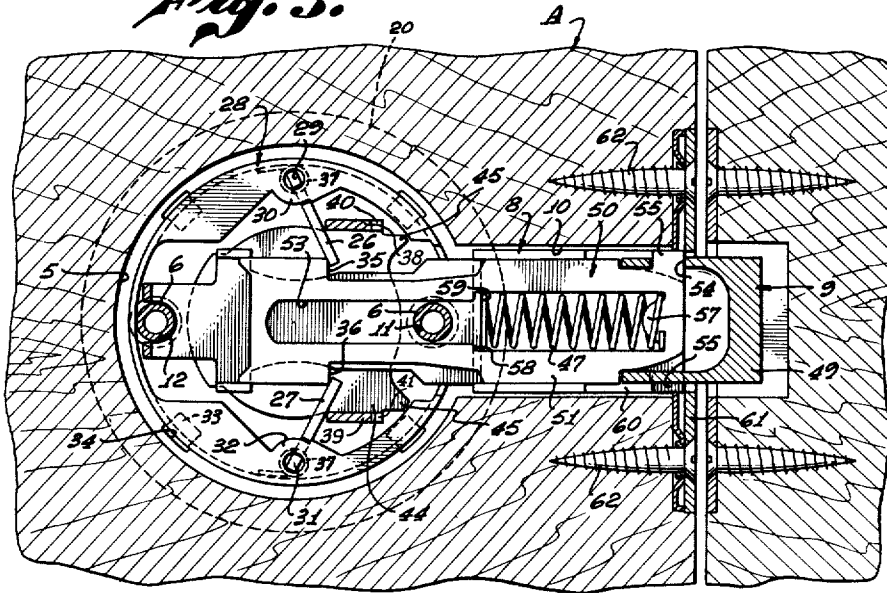
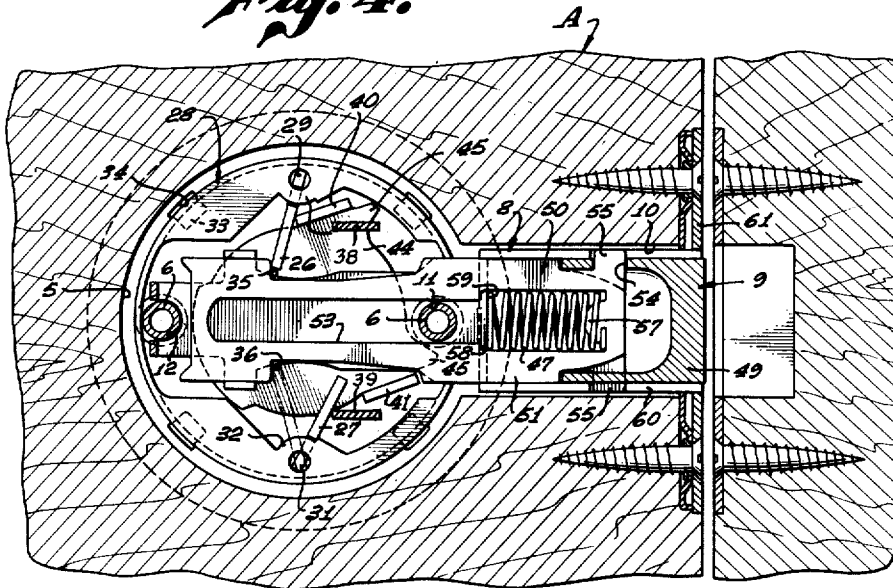


Fig. 4.



INVENTOR.
SAMUEL GILBERT,
BY
Paul A. Weilein
ATTORNEY.

Aug. 27, 1957

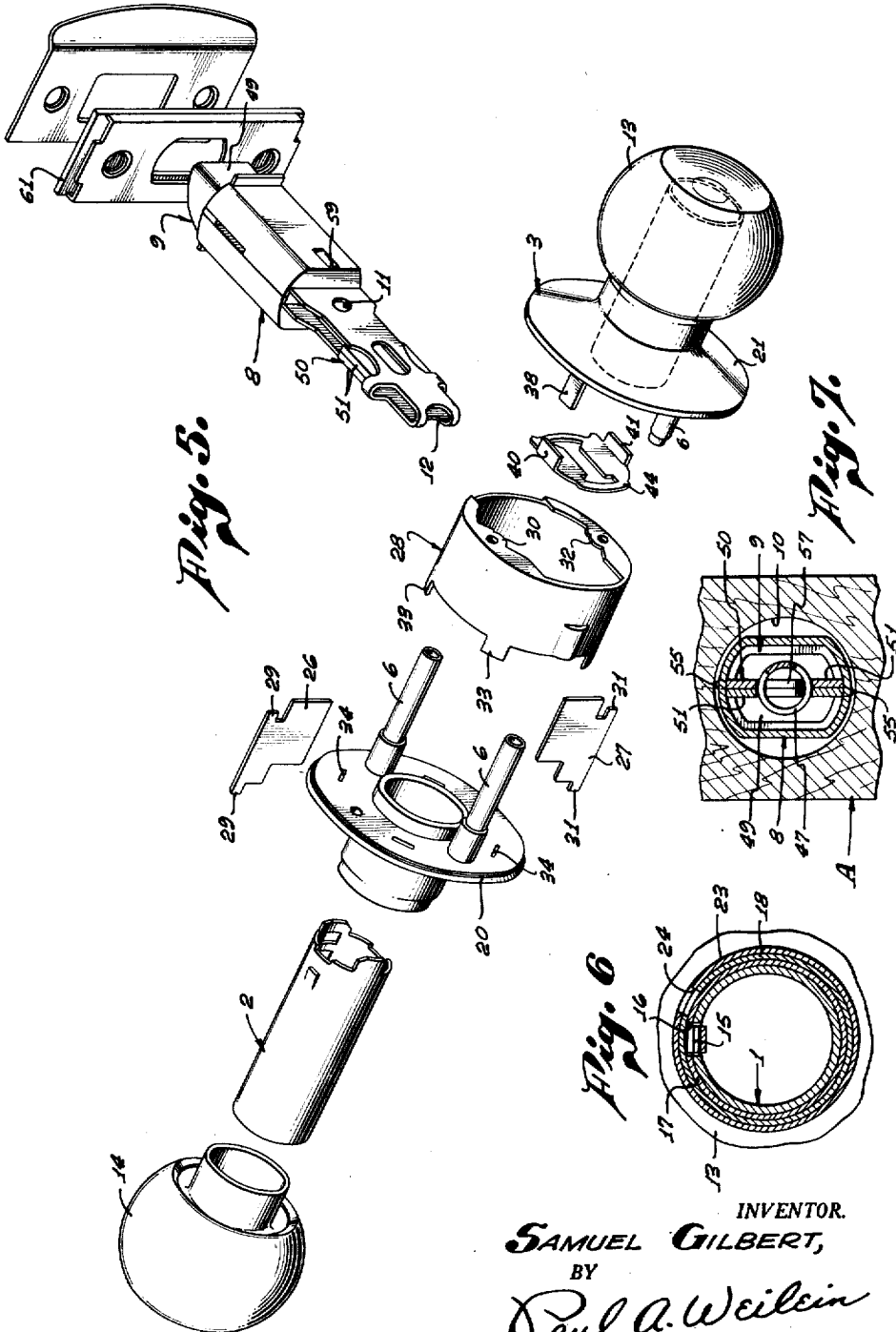
S. GILBERT

2,803,958

DOOR LATCH AND LOCK MECHANISM

Filed Feb. 11, 1955

8 Sheets-Sheet 3



INVENTOR.
SAMUEL GILBERT,
BY
Paul A. Welein
ATTORNEY.

Aug. 27, 1957

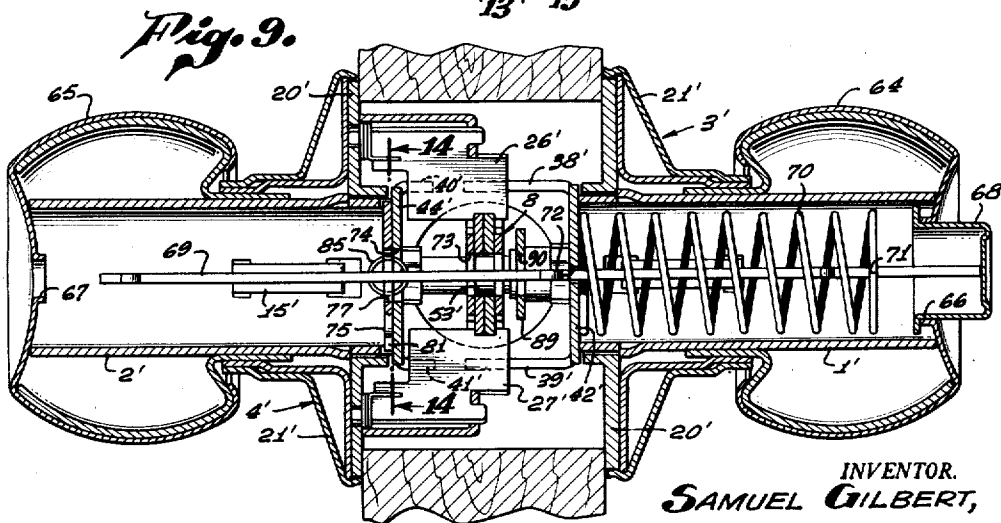
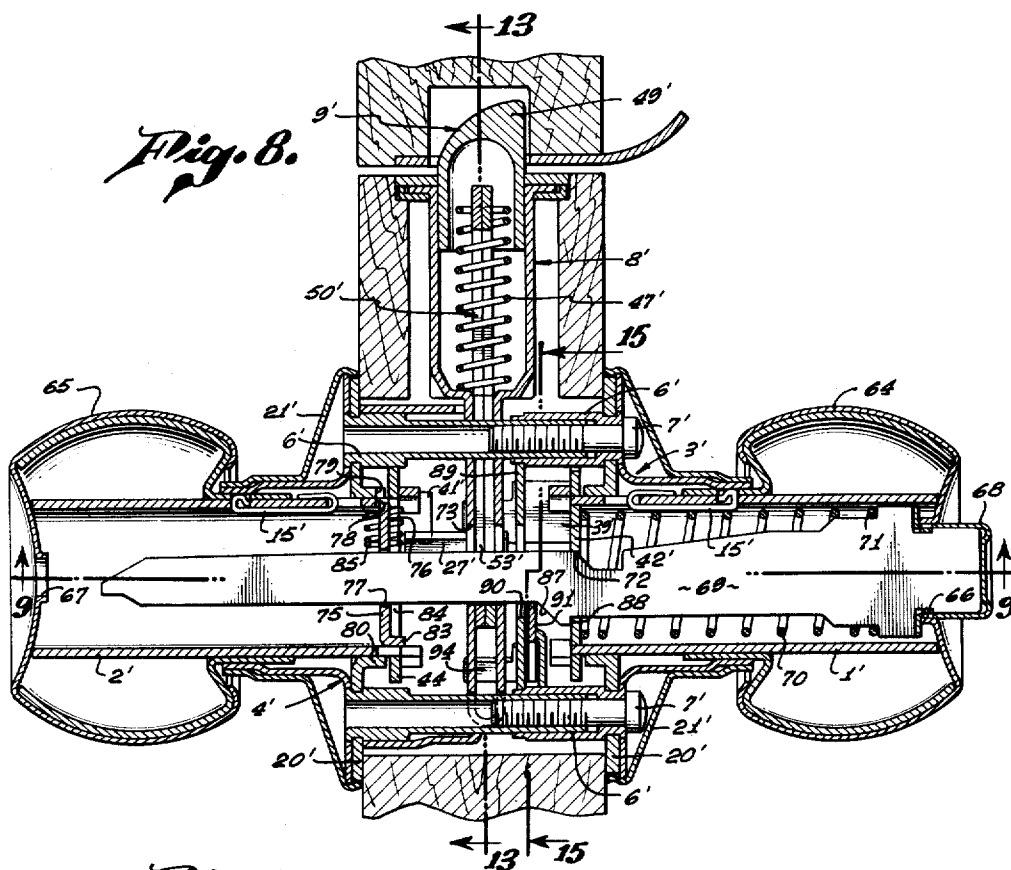
S. GILBERT

2,803,958

DOOR LATCH AND LOCK MECHANISM

Filed Feb. 11, 1955

8 Sheets-Sheet 4



INVENTOR.
SAMUEL GILBERT,
BY
Paul A. Weirlein
ATTORNEY.

Aug. 27, 1957

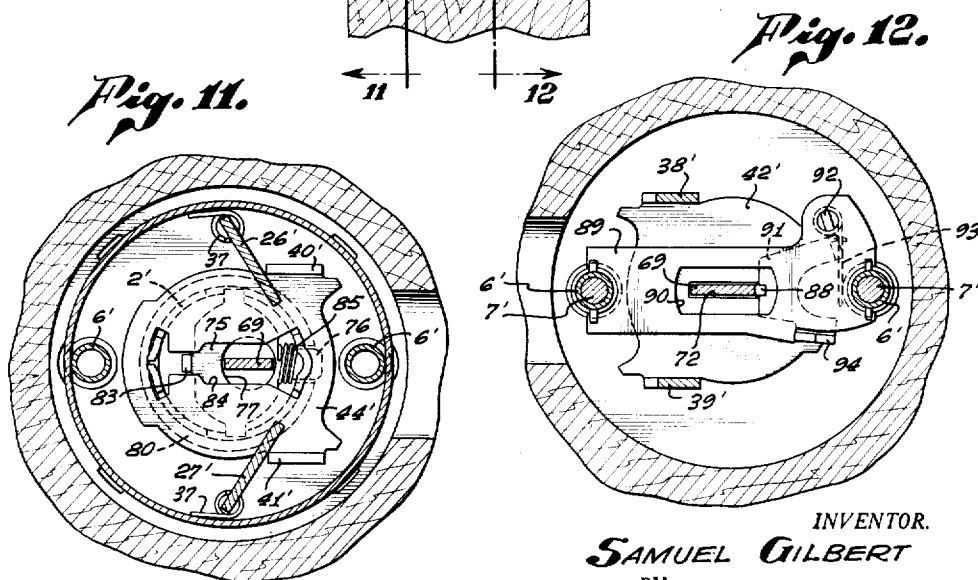
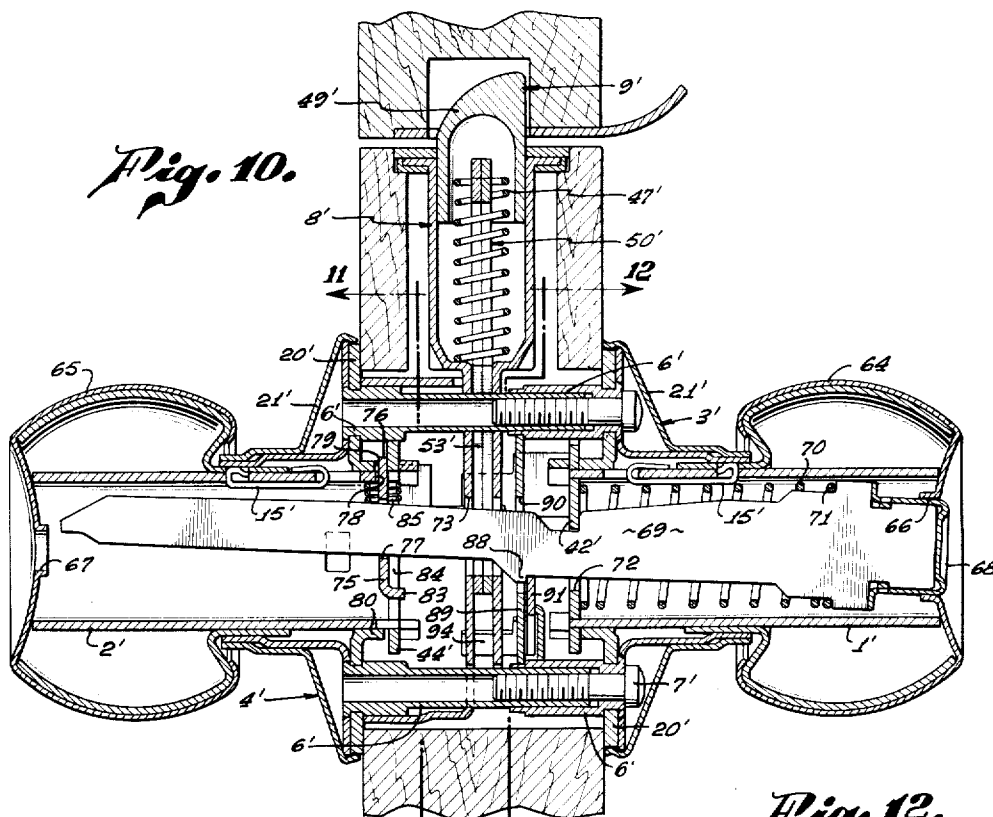
S. GILBERT

2,803,958

DOOR LATCH AND LOCK MECHANISM

Filed Feb. 11, 1955.

8 Sheets-Sheet 5



INVENTOR.

SAMUEL GILBERT

BY

BI
Paul A. Weilin

ATTORNEY.

Aug. 27, 1957

S. GILBERT

2,803,958

DOOR LATCH AND LOCK MECHANISM

Filed Feb. 11, 1955

8 Sheets-Sheet 6

Fig. 13.

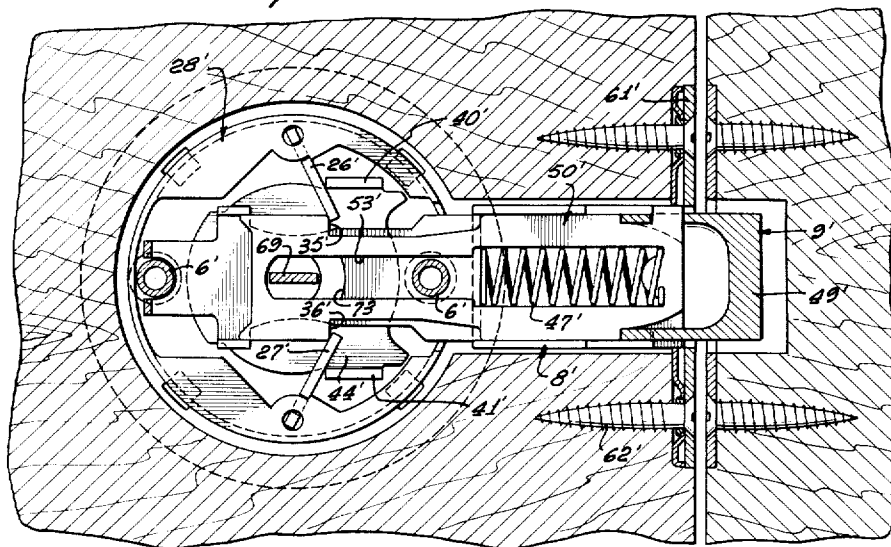


Fig. 14.

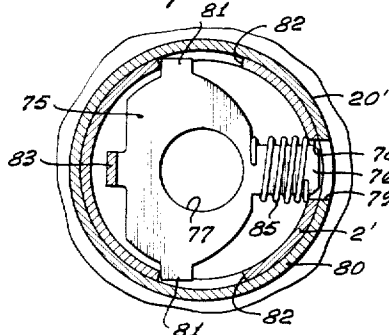


Fig. 15.

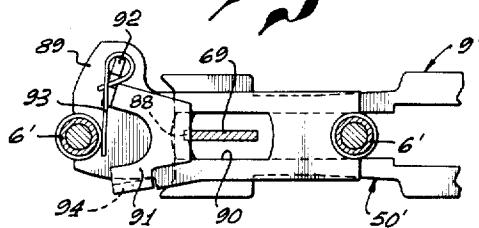
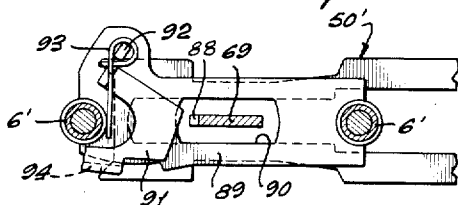


Fig. 15a.



INVENTOR.
SAMUEL GILBERT,
 BY
Paul A. Weilin
 ATTORNEY.

Aug. 27, 1957

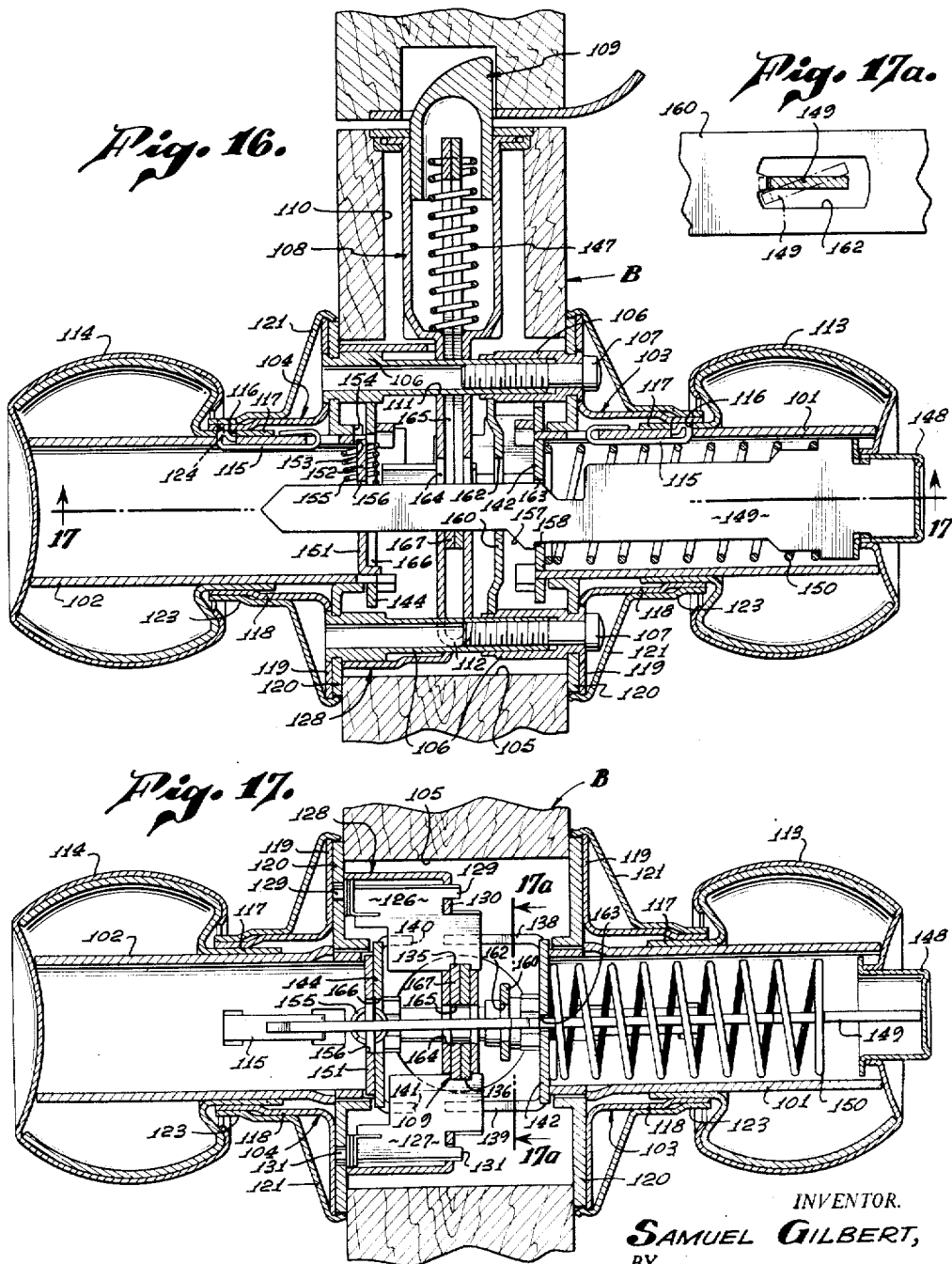
S. GILBERT

2,803,958

DOOR LATCH AND LOCK MECHANISM

Filed Feb. 11, 1955

8 Sheets-Sheet 7



INVENTOR.

SAMUEL GILBERT,
BY

Paul A. Weilin
ATTORNEY.

Aug. 27, 1957

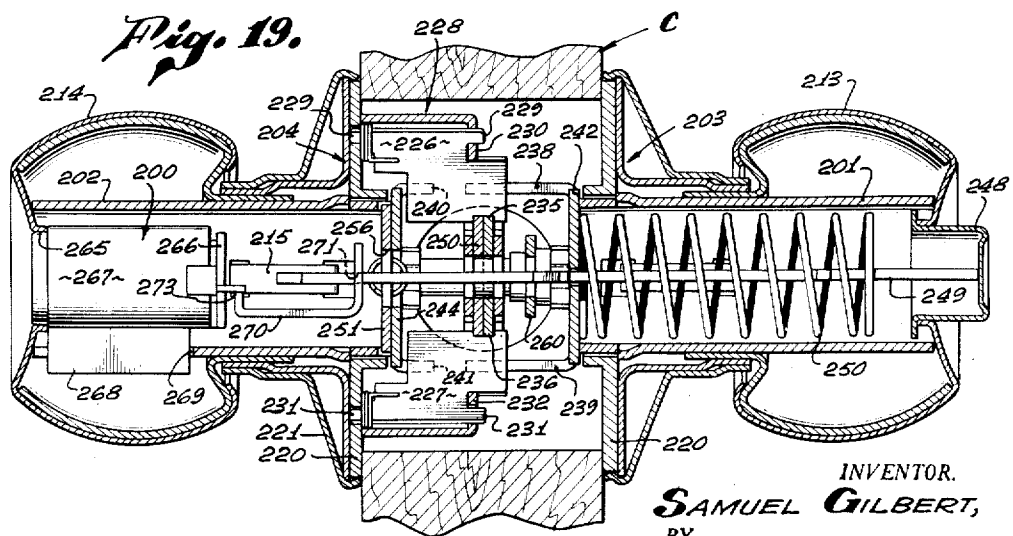
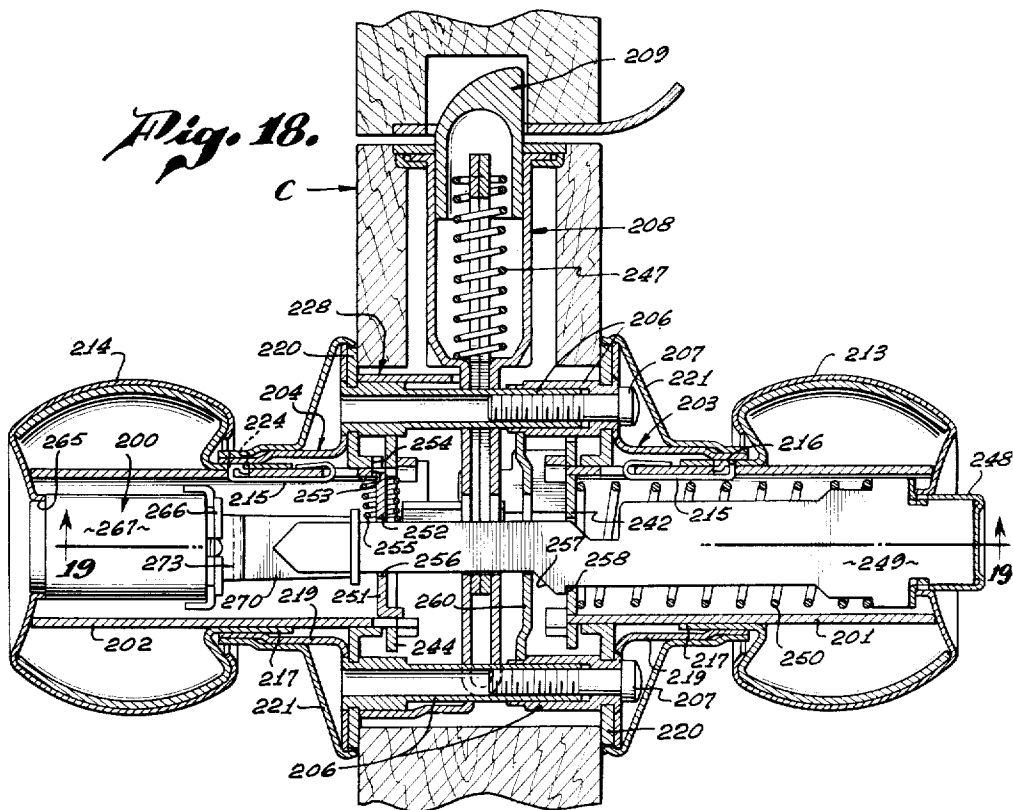
S. GILBERT

2,803,958

DOOR LATCH AND LOCK MECHANISM

Filed Feb. 11, 1955

8 Sheets-Sheet 8



INVENTOR.

SAMUEL GILBERT,

BY

Paul A. Weilsin

ATTORNEY.

1

2,803,958

DOOR LATCH AND LOCK MECHANISM

Samuel Gilbert, Los Angeles, Calif.

Application February 11, 1955, Serial No. 487,483

42 Claims. (Cl. 70—216)

This invention relates to improvements in latch and lock sets for doors and similar closures.

It is an object of this invention to provide latch and lock mechanism which constitutes an improvement in this art, in point of its simplicity and inexpensiveness of construction, ease of installation, ruggedness, long life and reliability of operation.

It is another object of this invention to provide an improved door-knob-operated latch bolt retracting mechanism for latches and locks wherein the latch bolt is retracted positively with but a small amount of angular movement of the door knob about its axis.

It is another object hereof to provide a retracting mechanism such as described which consists of a minimum of positively driven parts and lends itself readily to use in various forms of locks and latches.

Another object of this invention is to provide a novel form of bathroom or privacy lock and latch set embodying the aforesaid improved latch mechanism.

It is a further object hereof to provide a privacy latch set such as described embodying improved locking means which is operable to lock the outer knob responsive to actuation of a push button on the inner knob and is automatically released upon closing the door, or may be released by turning the inner knob, or by inserting an instrument through an access opening in the outer knob and moving an element of the locking means.

It is an additional object hereof to provide an improved exit lock embodying the novel latch mechanism hereof as well as novel push button-actuated locking means, whereby the outer knob may be locked by actuating a push button on the inner knob and released by turning the inner knob.

A further object of this invention is the provision of a novel key-controlled lock and latch set embodying the aforesaid novel latch mechanism as well as the aforesaid novel push button operated locking mechanism in a compact rugged unit capable of reliable operation over long periods of use.

An additional object of this invention is the provision of an improved retracting mechanism for a spring-projected latch bolt, wherein a novel means mounted exteriorly of the latch bolt casing and engaged with the bolt and a rotary spindle is positively operated to retract the bolt responsive to but a short turning movement of the spindle.

It is another object of this invention to provide a novel and efficient form of latch bolt which readily lends itself to use in the novel retracting mechanism hereof and is well adaptable to various forms of latch and lock mechanisms.

This invention possesses many other advantages and has other objects which may be made more easily apparent from a consideration of several embodiments of the invention. For this purpose there are shown several forms in the drawings accompanying and forming part of the present specification. These forms will now be

2

described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawings:

Fig. 1 is a horizontal sectional view of a latch set embodying the present invention, shown in latched position on a door;

Fig. 2 is a sectional view taken on the plane of line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1 with parts omitted for clarity of illustration;

Fig. 4 is a sectional view corresponding to Fig. 3 but showing the latch bolt retracted;

Fig. 5 is an exploded perspective view of the latch set shown in Figs. 1 and 2, with some of the elements omitted for clarity of illustration of the manner in which the main parts are assembled;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 1;

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 1;

Fig. 8 is a horizontal sectional view of the latch mechanism shown in Figs. 1—7 as embodied in a latch set of the bathroom or privacy type;

Fig. 9 is a sectional view taken on the line 9—9 of Fig. 8.

Fig. 10 is a sectional view corresponding to Fig. 8, showing the latch mechanism locked against release by the outer knob;

Fig. 11 is a sectional view taken on the line 11—11 of Fig. 10;

Fig. 12 is a sectional view taken on the line 12—12 of Fig. 10;

Fig. 13 is a sectional view taken on the line 13—13 of Fig. 8;

Fig. 14 is a sectional view taken on the line 14—14 of Fig. 9;

Fig. 15 is a fragmentary sectional view taken on the plane of line 15—15 of Fig. 8, showing locking bar in locked position;

Fig. 15a is a fragmentary sectional view similar to Fig. 15, showing the locking bar released;

Fig. 16 is a horizontal sectional view of an exit type door lock embodying the latch mechanism shown in Figs. 1—7;

Fig. 17 is a sectional view taken on the line 17—17 of Fig. 16;

Fig. 17a is a sectional view taken on the line 17a—17a of Fig. 17 showing the locking bar in locked position in full lines and in releasing position in broken lines;

Fig. 18 is a horizontal sectional view of a key operated lock and latch set embodying latch mechanism as shown in Fig. 1—7 as well as features of the locking bar mechanism shown in Figs. 16—17a; and

Fig. 19 is a sectional view taken on the line 19—19 of Fig. 18.

A latch set embodying the present invention as shown in Figs. 1—5, includes a pair of opposed dependently rotatable spindles 1 and 2 mounted in separate frame sections 3 and 4, which latter constitutes the supporting structure for the working elements of the set.

The frame sections 3 and 4 are mounted in an opening 5 in the door A and joined one to the other by means of tubular members 6 fixed thereto and telescopically engaged one with the other. Screws 7 are inserted through the section 3 and tubular member 6 on the section 3 so as to be threadedly engaged with the tubular members 6 fixed to the section 4, thereby uniting these

3

sections as a supporting structure for the elements of the set.

A casing 8 for a latch bolt 9 is adapted to be mounted in the usual bore 10 provided therefor in the door A, being held in place by the tubular members 6. One of the tubular members 6 extends through an opening 11 intermediate the ends of the casing 8. Another of the members 6 is engaged in a notch 12 at the inner end of the casing 8.

Knobs 13 and 14 are mounted on the spindles 1 and 2 to provide for the turning of the spindles, being detachably held thereon by spring detents 15 which snap into openings 16 formed in the tubular hub portions 17 of the knobs.

As here shown, the spindles 1 and 2 are tubular and the knobs are hollow as this formation facilitates the use of the novel latch bolt retracting mechanism of the present invention, also makes this formation and the latch mechanism readily adaptable for use in different forms of latch and lock sets as will be apparent as this description progresses.

The tubular hub portions 17 of the knobs 13 and 14 telescope the spindles 1 and 2 and extend within the tubular portions 18 of annular members 19 which are fixed to flat annular frame members 20 for example, by being spot welded thereto. The members 20 abut the side faces of the door and serve as bearings for the spindles. The telescoping tubular members 6 are fixed to the members 20. The screws 7 are inserted through the members 19 and 20 from the inner side of the door.

Rosettes 21 are removably mounted on the members 19 so as to conceal the members 19 and 20 also the screws 7. These rosettes have flanged outer peripheries which removably fit over the outer peripheries of the annular members 19. The rosettes are also provided with tubular hub portions 23 which extend over the tubular portions 18 of the members 19 and out to the knobs 13 and 14.

The knobs 13 and 14 may be removed by depressing the detents 15 from engagement with the openings 16. Access to the detents 15 is had through openings 24 (see Fig. 6) in the tubular portions 18 of the members 19 and in the hub portions 23 of the rosettes 21. Any suitable pointed tool not shown may be inserted through the openings 24 and engaged with the detents 15, when the knobs are turned to bring the detents and openings 16 into registry with openings 24, whereby the detents may be depressed to release the knobs.

In accordance with this invention, the means for retracting the latch bolt consists of but few simply constructed parts that may be stamped and are durable, rugged and arranged so that with but a small amount of angular movement of the knobs and spindles, for example of the order of 25 degrees of arc, the latch bolt will be retracted.

As here shown, the bolt retracting means includes a pair of plate-like retracting members 26 and 27 which are pivoted to act as levers for retracting the latch bolt 9 responsive to turning of either of the knobs 13 and 14. An open-ended cylindrical shell 28 together with the member 20 on the outer frame section 4, act as a support or housing for pivotally mounting the levers 26 and 27. The lever 26 is mounted above the bolt 7 on a pair of pintles 29 extending laterally from the upper end of the lever 26 and pivoted on the adjacent member 20 and a flange 30 on the shell 28 respectively. The lever 27 is mounted below the bolt 9 and has a pair of pintles 31 extending laterally from the lower end thereof and pivoted on the member 20 and on a flange 32 on the shell 28 respectively. The shell 28 is provided with tongues 33 which extend through slots 34 in the member 20 to hold the shell in place.

The free ends of the levers 26 and 27 engage shoulders 35 and 36 on the upper and lower edges respective-

4

ly of the latch bolt 9, whereby upon rocking of either of said levers in one direction the bolt 9 will be retracted.

As a means for rocking the levers 26 and 27 to retract the latch bolt 9, the spindle 1 is provided with a pair of axially extending arms 38 and 39. The spindle 2 is provided with a similar pair of arms 40 and 41. The arms 38 and 39 are carried by a plate 42 secured upon the inner end of the spindle 1 by means of tongues 43 on the spindle. A similar plate 44 is secured to the inner end of the spindle 2 in the same manner as plate 42, as by the aid of the tongues 43a, and carries the arms 40 and 41.

As shown in Figs. 3 and 4, the arm 38 bears against one side of the upper lever 26, whereby the arm 39 bears against the corresponding side of the lower lever 27. Likewise, as shown in Fig. 1, the upper arm 40 abuts the side of the upper lever 26 engaged by the arm 39 whereas the lower arm 41 abuts the side of the lower lever 27 engaged by the arm 39.

It will now be apparent that upon turning either of the knobs 13 and 14 in either direction, one of the two retracting levers will be swung in the direction for retracting the latch bolt 7. But a small amount of turning of the knobs is required, due to the leverage afforded by the arrangement of the spindle carried arms 38, 39, 40 and 41 and the levers 26 and 27. The turning movement of the knobs is limited by lugs 45 on the plates 42 and 44 coming into contact as shown in Fig. 4 with the adjacent tubular members 6.

The spring 47 for urging the bolt 9 into extended position, exerts a force through the shoulders 35 and 36, for maintaining the levers 26 and 27 in engagement with the spindle-operated arms 38, 39, 40 and 41, thereby eliminating lost motion in turning the knobs to retract the bolt.

With reference to Figs. 3, 4 and 5, it will be seen that the latch bolt 9 includes the bolt proper or bolt head 49 and a draw bar 50. The draw bar 50 is made of a pair of elongated flat sections 51 mounted in abutting side-by-side relation to reciprocate with the bolt head 49 in the casing 8. The casing 8 is open along upper and lower sides opposite the draw bar 50 whereby the shoulders 35 and 36 on the draw bar portion of the bolt are disposed for contact with the levers 26 and 27. A longitudinal slot 53 is provided in both sections 51 to accommodate one set of the tubular members 6.

The two sections 51 of the draw bar 50 are detachably connected with the latch bolt head 49. This head is hollow and provided with slots 54 on upper and lower sides. Corresponding ends of the sections 51 are adapted to be mounted in the hollow head 49 and are provided with lugs 55 engageable in the slots 54 to connect the draw bar with the bolt head. The engagement of the lugs 55 in the slots 54 is effected by inserting the sections 51 angularly into the head 49 and then bringing them into position causing the lugs to enter the slots and the sections to extend parallel to one another and axially of the head. When mounted in this manner in the head 49, the sections 51 are locked together in axial alignment and the latch bolt 9 as a whole is insertable into the casing 8, from the open outer end of the latter.

The spring 47 is mounted in the slot 53 with the outer end thereof on a keeper lug 57 on the bar 50. The inner end of this spring abuts shoulders 58 on the sections 51 so as to be held in place when inserting the bolt 9 into the casing 8. Small coil springs 37 are mounted on the pintles 29 and 31 for normally holding the members 26 and 27 in the position shown in Fig. 3 to facilitate the assembling of the retracting mechanism and the latch bolt. The springs 37 urge the members 26 and 27 against the arms 38, 39, 40 and 41 after assembly of the lock, thereby eliminating lost motion in actuating the bolt responsive to turning of the spindles.

When the bolt is positioned for operation in the casing 8, and the tubular members 6 are extended through the slot 53, the inner end of the spring 47 will abut shoulders

5

59 on the casing 8 whereby the spring will extend the bolt 9 from the edge of the door in the usual manner. The outward movement of the bolt is limited by the lugs 55 which slide in slots 60 in the casing 8. These lugs act as stops against the outer plate 61 through which the bolt head 49 extends. The plate 61 is fastened on the edge of the door by the aid of screws 62 in the usual manner.

In Figs. 8-15a there is shown a bathroom or privacy lock set embodying the present invention. This set is characterized by a novel push button actuated locking means on the inner knob for releasably locking the outer knob against operation to retract the latch bolt. It is also provided with a novel automatic release means which operates responsive to the closing of the door in which the set is installed. In addition this set provides for releasing the outer knob in case of an emergency. This emergency release operation may be effected through an access opening in the outer knob. A nail or similar object when inserted through this opening, may be manipulated to release the locking means in a manner to be hereinafter described.

The particular construction and arrangement of the spindles and the supporting structure for the spindles and associated parts, also the latch bolt and the retracting mechanism, all as shown in Figs. 1-5, are used to advantage in the subject privacy lock set and contribute to the simplicity, efficiency and reliability of the latter.

As the base structure of this privacy lock set is substantially identical with the structure shown in Figs. 1-5, as to the frame sections, spindles, latch bolt, bolt retracting mechanism and means for detachably mounting the knobs on the spindles, the parts in this privacy set corresponding to those shown in Fig. 1 are identified by the same reference numerals to which the prime character has been added.

With reference to Figs. 8, 9 and 10 it will be seen that the spindles 1' and 2' are provided with inner and outer knobs 64 and 65 which are detachably mounted on the spindles by means of the detents 15'. These knobs, unlike the knobs shown in Figs. 1-5, have openings 66 and 67 in the outer ends thereof.

A push button 68 is mounted in the opening 66 of the inner knob 64, for actuation of a spring-loaded locking bar 69 which extends through the bore of the spindle 1' and into the bore of the spindle 2'. The push button 68 is fixed to one end of the bar 69, whereas the other end of this bar is disposed adjacent the opening 67 in the outer knob 65. A tool not shown may be inserted through the opening 67 in the outer knob 65 for actuating the locking bar 69 to release the outer knob in a manner which will be hereinafter described.

A spring 70 surrounds the locking bar 69 within the spindle 1', being engaged at one end with the member 42' on the inner end of the spindle. The other end of this spring abuts a shoulder 71 on the bar 69, whereby the bar is normally retracted from locking position and the push button 68 is extended as shown in Figs. 6 and 7.

The plate 42', latch bolt casing 8', bolt 9' and plate 44' are provided with aligned openings 72, 73 and 74 respectively, through which the locking bar 69 is movable to lock and release the outer knob 65. The locking bar 69 also extends through the slot 53' in the draw bar 50' of the latch bolt 9'.

A locking member 75 in the form of a plate or disk is mounted in the spindle 2' for movement to dispose a locking lug 76 thereon into and out of a position for locking the outer knob 65 against turning. This locking member is provided with an opening 77 through which the locking bar 69 is movable to urge the locking member into locking position.

The locking lug 76 on the member 75, as shown in Figs. 8, 10 and 14, is adapted to be extended through aligned openings 78 and 79 in the spindle 2' and a flange 80 on the adjacent frame member 20' respectively, to lock the knob 65 against turning. A pair of guide lugs

6

81 on the member 75 are slidable in arcuate slots 82 (see Fig. 14) in the spindle 2' to guide the member 75 for lateral movement into and out of locking position. Another guide lug 83 (see Fig. 8) on the member 75 is slidable in a slot 84 in the member 44' fixed on the inner end of the spindle 2', to restrain rotative movement of the member 75 relative to the spindle 2'. A spring 85 on the locking lug 76 operates to hold this lug and locking member 75 retracted from locking position.

It should be noted that the latch bolt spring 47' operates through the shoulders 35' and 36' on the latch bolt-draw bar 50', the levers 26' and 27' and the spindle-carried arms 40' and 41', to normally hold the spindle 2' in a position in which the locking lug 76 and the opening 78 in the spindle are in registry with the opening 79 in the associated stationary frame member 20'. Thus, when the latch bolt 9' is extended under the force of the spring 47', the locking member 75 may be moved to cause the locking lug 76 to enter the aligned openings 78 and 79 to lock the outer knob 65 against turning. This operation of the locking member 75 is effected by the locking bar 69 in a manner which will now be described.

With reference to Fig. 6, it will be seen that the locking bar 69 is provided with a cam portion 87 defining a shoulder 88. Under the action of the spring 70, the bar 69 is normally retracted so that the cam portion 87 is disposed between the plate 42' on the spindle 1' and a bracket 89 (see Figs. 8, 9 and 10) supported by the tubular members 6' and fixed thereto in any suitable manner. The bracket 89 has an opening 90 therein through which the bar 69 extends. When the push button 68 is depressed, the bar 69 is moved forwardly so that the cam portion 87 moves into the opening 90 over the edge of a spring-urged latch member 91 pivoted on a pin 92 on the bracket 89. The cam portion 87 in moving over the edge of the latch member 91 causes the bar 69 to be moved laterally as well as forwardly, thereby producing a camming action of the bar against the locking member 75 (see Fig. 8), such that the locking lug 76 is moved into the openings 78 and 79 for locking the outer knob 65 against turning.

When the knob 65 is locked the spring-urged latch member 91 is engaged with the bar 69 behind the shoulder 88 as shown in Fig. 10, thereby locking the bar against being retracted from locking position by the spring 70.

The latch member 91 is urged toward the bar 69 by a coiled spring 93 mounted on the pivot pin 92, the ends of the spring being engaged with the member 91 and an adjacent tubular member 6' respectively.

Provision is made for effecting the release of the locked outer knob 65 by any one of three different operations. One of these releasing operations is effected by turning the inner knob 64. This turning of the inner knob causes the one of the retracting levers 26' and 27', depending upon the direction of turning the knob, to be moved so as to retract the bolt 9'. When the bolt is retracted the draw bar 50' strikes an arm 94 (see Figs. 8, 10 and 12) projecting from the pivoted latch member 91, thereby moving this latch member away from the shoulder 88 on the bar 69 whereby the spring 70 will retract the bar. Responsive to this retraction of the bar 69 the spring 85 retracts the locking lug 76 from the opening 79, thereby releasing the outer knob 65. As shown in Fig. 6, the cam portion 87 is disposed between the member 29' and the latch member 91 when the bar 69 is retracted, whereas the shoulder 88 on the bar abuts the plate 42' on the inner spindle 1'.

If the outer knob 65 is locked by actuation of the push button 68 when the door is open, the closing of the door will release the outer knob. This is another of the three releasing operations for the outer knob and is similar to that effected by turning the inner knob 64, inasmuch as the bolt is pushed inwardly during the closing of the door and strikes the arm 94 on the pivoted latch member 91. This causes the member 91 to release the locking bar 69

7

for retraction by the spring 70 thereby allowing the spring-urged locking member 75 to be moved out of locking position.

It should be noted that the locking bar 69 turns with the knob inasmuch as the opening 72 in the plate 42' carried by the spindle 1' is narrow and prevents relative turning between the spindle and the locking bar. However, the openings (see Fig. 9) 90, 73, 53', 74 and 77 through which the bar extends, are of such size as to permit the bar 69 to turn about its axis relative to the parts in which such openings are formed. This turning of the locking bar 69 is not depended upon to effect any operation in this lock set and is merely incidental to the arrangement of the knob 64 and bar 69. However, this knob-locking bar arrangement is a feature of other forms of this invention which will be hereinafter described.

The third of the three operations for releasing the outer knob 65 is used in case an occupant of a room closed by the door, after locking the outer knob, is unable to turn the inner knob 64. As previously pointed out herein, this emergency operation is effected by insertion of a nail or like instrument through the opening 67 in the outer knob so as to engage and move the locking bar 69 laterally sufficiently to remove the shoulder 88 from contact with the pivoted latch member 91, thereby releasing the bar 69 and allowing the locking member 75 to move out of position locking the outer knob.

In another form of lock embodying the present invention, as shown in Figs. 16 and 17, provision is made for locking and releasing a door from the inner side only of the door. This form of the invention embodies the novel latch mechanism shown in Figs. 1-5, also a push-button operated locking means similar to that shown in Figs. 8-15 for locking the outer knob.

This form of the present invention includes a pair of tubular spindles 101 and 102 and frame sections 103 and 104. These elements corresponding to the spindles 1 and 2 and the sections 3 and 4 respectively, shown in Figs. 1-5. The frame sections 103 and 104 are mounted in an opening 105 in a door B and joined to one another by means of tubular members 106 and screws 107.

A latch bolt casing 108 for a spring-loaded latch bolt 109 is adapted to be mounted in the usual opening 110 therefor in the door and held in place by the tubular members 106, which latter extend through an opening 111 and in a notch 112 in the latch bolt casing 108. Knobs 113 and 114 are mounted on the spindles 101 and 102, being detachably held thereon by means of detents 115. These detents engage in openings 116 in the tubular hub portions 117 of the knobs 113 and 114. Any suitable instrument may be inserted through openings 121 in the tubular portions 118 and 123 of members 119 and rosettes 121 respectively, for depressing the detents 115 to release the knobs 113 and 114. The members 119 are fixed to flat annular frame members 120 to which latter the tubular members 106 are fixed. The rosettes 121 cover the members 119 and 120 also the screws 107 which latter pass through the members 119 and 120 from the inner side of the door.

The bolt retracting means is the same as shown in Figs. 1-5, and includes a pair of retracting levers 126 and 127. Pintles 129 on the lever 126 are pivoted above the bolt 109 on a flange 130 of a cylindrical shell 123, also pivoted on the frame member 20 on the outer side of the door. The shell 123 is secured to the frame member 20. The lever 127 is pivoted below the bolt 109 on pintles 131, in the same manner as the lever 126.

The free ends of the levers 126 and 127 are engaged with shoulders 135 and 136 on the upper and lower edges respectively, of the latch bolt 109, whereby upon the swinging of either lever in a direction away from the outer edge of the door the latch bolt will be retracted.

As a means for actuating the levers 126 and 127 a plate 142 having a pair of arms 138 and 139 thereon, is fixed on the inner end of the spindle 101. The arm

8

138 contacts the lever 126 whereas the arm 139 contacts the lever 127. A similar plate 144, carrying arms 140 and 141 is mounted on the inner end of the spindle 102, with the arm 140 contacting the lever 126 and the arm 141 contacting the lever 127.

With this arrangement the turning of either knob in either direction will cause one of the levers 126 and 127 to be rocked so as to retract the latch bolt 109. But a short turning movement of either knob, for example, of the order of 25 degrees of arc, will positively retract the bolt.

A spring 147 is arranged in the latch bolt casing 108 so as to normally extend the bolt 109. This spring exerts a force through the shoulders 135 and 136, the levers 126 and 127 to maintain the levers in engagement with the shoulders and the arms 138, 139, 140 and 141, whereby no lost motion will take place in retracting the bolt.

In this form of the present invention a push button 148 is provided on the inner knob 113 for actuating a locking bar 149 which latter extends through the bore of the spindle 101 and into the bore of spindle 102.

A spring 150 is arranged in the spindle 101 so as to normally retract the bar 149 and extend the push button 148. When the push button is depressed, the bar 149 is moved so as to shift a locking member 151 in the spindle 102, into position to lock the outer knob 114 against turning. This locking member 151 is provided with a locking lug 152 which is adapted to be extended through an opening 153 in the spindle 102 and into an opening 154 in the frame member 120. A spring 155 is mounted on the lug 152 and operates to normally hold the member 151 and lug 152 out of locking position. The locking member 151 is mounted for movement into and out of locking position in the same manner as the locking member 75 shown in Figs. 8-15 respectively.

The locking bar 149 is moved laterally as well as axially responsive to actuation of the push button 148. This lateral movement causes the locking member 151 to be shifted laterally, as the bar 149 passes through an opening 156 in the locking member 151 and contacts a side of the opening when shifted laterally.

A cam portion 157 on the bar 149 defines a shoulder 158. When the bar 149 is moved axially by actuation of the push button 148, the cam portion 157 rides upon the edge of a fixed latch plate 160 held in place by the tubular members 106, thereby moving the bar laterally to actuate the locking member 151 so as to lock the outer knob 114 against turning.

When the locking bar 149 has been moved sufficiently to actuate the locking member 151, the shoulder 158 is moved ahead of the latch plate 160 and contacts the outer side of this plate, thereby locking the bar 149 against retraction by the spring 150 and maintaining the outer knob 114 locked.

Release of the locking bar 149 is effected by turning the inner knob 113 in either direction. The bar 149 turns with this knob and moves the shoulder 158 in an arc and out of engagement with the latch plate 160, thereby allowing the spring 150 to retract the locking bar through a slot 162 in the plate 160. Upon this retraction of the locking bar 149, the spring 155 moves the locking member 151 so as to retract the lug 152 from engagement with the opening 154 in the stationary frame member 120 thereby releasing the outer knob.

It should be noted that the narrow slot 163 in the plate 142 on the inner spindle 101 causes the locking bar 149 to turn with the inner knob 113, yet permits of axial and lateral movement of the locking bar relative to the inner spindle and plate 142. However, openings 161, 165 and 166 in the latch bolt casing 108, the draw bar 167 of the latch bolt 109, and in the plate 144, respectively, also in the opening 156 in the locking member 151, are of such size as to permit of angular movement of the bar 149 about its axis as well as lateral movement of the bar.

Another form of the present invention, as shown in

Figs. 18 and 19, includes the novel latch mechanism which is common to all the forms of the invention here shown. This form also includes a key-actuated lock means designated 200 for releasing the outer knob, and otherwise corresponds to the lock shown in Figs. 16 and 17. Thus, it includes the push button operated locking means shown in Figs. 16 and 17, with provision however, for releasing this locking means responsive to operation of the key lock means 200, as well as responsive to the turning of the inner knob.

This key-lock form includes a pair of separate tubular spindles 201 and 202 and frame sections 203 and 204 which are assembled and mounted on a door C in the same manner as shown in Figs. 1-5.

A latch bolt casing 208 for a spring-projected latch bolt 209, is held in place by means of the tubular member 206 which latter connects the two frame sections 203 and 204 by the aid of the screws 207.

Knobs 213 and 214 are detachably held on the spindles 201 and 202 by means of detents 215 on the spindles. These detents are engageable in openings 216 in the hubs 217 of the knobs. Opening 224 in the members 219 and rosettes 221 respectively, provide for the insertion of a suitable instrument for depressing the detents 215 in order to remove the knobs for the spindles. The rosettes 221 are removably fitted over the peripheries of the members 219, which latter are fastened to annular frame members 220 surrounding the inner ends of the spindles 201 and 202. The tubular members 206 are fixed to the members 220.

The latch bolt 209 is retracted by means of levers 226 and 227 arranged above and below the latch bolt. The lever 226 has pintles 229 pivoted on the outer frame member 220 and a flange 230 on a cylindrical shell 228. This shell is fixed to the adjacent frame member 220 and forms a housing for the levers 226 and 227. The lever 227 is provided with pintles 231 pivoted on the member 220 and a flange 232 on the shell 228.

The free ends of the levers 226 and 227 are engaged with shoulders 235 and 236 on opposite edges of a draw bar section 250 of the latch bolt 209, whereby upon the swinging of either lever in a direction away from the outer edge of the door, the bolt will be retracted.

As a means for actuating the levers 226 and 227, the spindles 201 and 202 have plates 242 and 244 fixed upon the inner ends thereof. The plate 242 has arms 238 and 239 thereon disposed in contact with the levers 226 and 227 respectively. The plate 244 is provided with arms 240 and 241 engaged with the levers 226 and 227. The arrangement of these arms and levers is such that upon turning either door knob in either direction, one of the levers will be rocked so as to retract the bolt 209. A spring 247 is arranged in the latch bolt casing 208 so as to maintain the bolt extended and to exert a force through the shoulders 235 and 236 such that the levers, arms 238, 239, 240 and 241, and shoulders 235 and 236 are engaged, thereby eliminating lost motion in retracting the latch bolt.

A push-button 248 connected with a locking bar 249 is operable on the inner knob 213 to move this bar against the action of a spring 250 in the inner spindle 201. This arrangement of the bar, push button and spring is the same as shown in Figs. 16 and 17.

The bar 249 extends through the spindle 201 into the spindle 202 for operating a locking member 251 corresponding to the locking member 151 shown in Figs. 16 and 17. The locking member 251 is provided with a lug 252 adapted to be extended through an opening 253 in the spindle 202 and into an opening 254 in the adjacent frame member 220 to lock the outer knob 214 against turning. A spring 255 on the lug 252 urges the member 251 and lug 252 out of locking position.

A cam portion 257 on the locking bar 249 defines a shoulder 258 which latter locks the bar against a latch plate 260 when the bar is pushed inwardly for operating

the locking member 251. As the bar 249 is pushed inwardly by actuation of the push button 248, the cam portion 257 rides upon an edge of the plate 260 thereby causing lateral movement of the bar. This lateral movement of the bar 249 causes the locking member 251 to be moved so that the lug 252 will enter the opening 254 and lock the outer knob. The member 251 is provided with an opening 256 through which the bar 249 extends, the bar contacting a side edge of this opening when moved laterally, thereby moving the locking lug 252 into locking position.

The shoulder 258 contacts the outer face of the latch plate 260 when the locking member 251 is moved into locking position, thereby locking the bar against retraction by the spring 250.

Release of the locking bar 249 may be effected by turning the inner knob 213. This causes the bar 249 to turn about its axis in the same manner as shown in Figs. 16 and 17, thereby moving the shoulder 258 out of contact with the plate 260. The spring 250 now retracts the bar whereby the spring 255 operates to retract the locking lug 252 from position locking the outer knob 214.

The key lock means 200 is mounted in the spindle 202 and exposed in an opening 265 in the outer knob 214. Thus, a key not shown may be inserted for actuation of the lock means 200 to move the locking bar 249 for releasing the outer knob after the latter has been locked by the push-button-actuated locking means.

Any suitable key operated lock may be employed, as a part of the lock means 200, provided it will include an element 266 which will turn responsive to insertion and turning of the key. As here shown, the lock includes a cylindrical casing 267 housing the rotative element 266. An offset portion 268 of the housing 267 is engaged in a slot 269 on the spindle to hold the lock in place. The rotative element 266 carries a crank arm 270 having a slot 271 therein through which the locking bar 249 extends so that the bar will be turned about its axis by the crank arm upon rotative movement of the element 266 of the lock. The crank arm 270 is hinged as at 273 to the element 266, whereby the crank arm will move sufficiently relative to the element 266 to permit the lateral movement of the locking bar 249.

Assuming that the bar 249 has been manipulated by the push-button 248 to move the locking lug 252 into position locking the outer knob 214 against turning, this outer knob may be released by actuation of the key lock means from the outer side of the door, or it may be released by turning the inner knob 213. When the lock means 200 is actuated, the locking bar 249 is turned so that the shoulder 258 is moved clear of the locking plate 260, thereby permitting the spring 250 to retract the bar 249, whereby the spring 255 will retract the lug 252 from locking position. This same releasing action is effected when the inner knob is turned in either direction.

I claim:

1. In a door latch: a rotatable spindle; a normally extended spring-loaded latch bolt; a casing for said latch bolt; a supporting structure for said spindle and said casing; retracting members pivotally mounted on said supporting structure exteriorly of said casing and in operative connection with said bolt; and means actuated by said spindle for operating said retracting members to retract said bolt.

2. In a door latch: a rotatable spindle; a normally extended spring-loaded latch bolt; a casing for said latch bolt; a supporting structure for said spindle and said casing; retracting members mounted on said supporting structure exteriorly of said casing for movement in the direction of movement of said latch bolt; said retracting members contacting said bolt; and means on said spindle for moving said retracting members to retract the bolt responsive to turning of said spindle.

3. In a door latch: a rotatable spindle; a normally extended spring-loaded latch bolt; a supporting structure for said spindle and said bolt; a pair of retracting members

11

mounted on said supporting structure for movement in the direction of movement of said bolt; said retracting members having portions arranged to retract the bolt responsive to said movement of either of said retracting members; and actuating members contacting said retracting members and connected with said spindle for turning movement with the spindle to move one of said retracting members for retracting the bolt responsive to the turning of said spindle in either direction.

4. In a door latch: a rotatable spindle; a normally extended spring-loaded latch bolt; a supporting structure for said spindle and said bolt; a pair of retracting members mounted on said supporting structure for movement in the direction of movement of said bolt; said retracting members having portions arranged to retract the bolt responsive to said movement of either of said retracting members; and actuating members contacting said retracting members and connected with said spindle for turning movement with the spindle to move one of said retracting members for retracting the bolt responsive to the turning of said spindle in either direction; said spring-loaded bolt operating through said cooperable elements and said retracting members to maintain said retracting members in contact with said actuating members when said bolt is extended.

5. In a door latch: a rotatable spindle; a normally extended spring-loaded latch bolt; a supporting structure for said spindle and said bolt; a pair of retracting members pivoted on said supporting structure on opposite sides of said bolt for movement in the direction of movement of said bolt; said retracting members having free ends disposed to retract the bolt responsive to said movement of either of said retracting members; and a pair of actuating arms connected with said spindle and extended axially thereof for turning movement therewith; said arms contacting said retracting members so that one of said retracting members will swing and retract the bolt responsive to turning of said spindle in either direction.

6. In a door latch: a rotatable spindle; a spring-loaded normally extended latch bolt; a casing for said bolt; a structure supporting said spindle and said casing; said casing being open on upper and lower sides thereof; retracting members pivoted on said structure above and below said casing; said openings affording the engagement of said bolt with said retracting members for retracting said bolt responsive to movement of said retracting members, and a pair of arms connected with said spindle and engaged with said retracting members for moving the latter to retract the bolt upon rotative movement of said spindle.

7. In a door latch: a rotatable spindle; a spring-loaded normally extended latch bolt; a casing for said bolt; a structure supporting said spindle and said casing; said casing being open on upper and lower sides thereof; retracting members pivoted on said structure above and below said casing; said retracting members and said bolt being engaged through said open sides; and a pair of arms connected with said spindle and engaged with said retracting members for moving the latter to retract the bolt upon rotative movement of said spindle; said spring loaded latch bolt operating through contact thereof with said retracting members to urge said retracting members into engagement with said arms when said bolt is extended.

8. In a door latch: a pair of independently rotatable spindles; a normally extended spring-loaded latch bolt; a casing for said bolt; a supporting structure for said spindle and said bolt; retracting means mounted on said supporting structure exteriorly of said casing and in operative connection with said bolt; and means actuated by either of said spindles for operating said retracting means to retract said bolt.

9. In a door latch: a pair of independently rotatable spindles; a normally extended spring-loaded latch bolt; a supporting structure for said spindles and said bolt; a

12

pair of retracting members pivoted on said structure so that one retracting member is above the bolt and the other retracting member is below the bolt; said retracting members contacting upper and lower sides of said bolt for retracting the bolt responsive to movement of either retracting member; and a pair of actuating members carried by each of said spindles for movement in the path of said retracting members upon turning of either spindle; one of said actuating members contacting and moving one of said retracting members responsive to rotation of either spindle in either direction.

10. In a door latch: a pair of independently rotatable spindles; a spring-loaded normally extended latch bolt; a supporting structure for said spindles and bolt; retracting members pivoted on said supporting structure to swing in the direction of movement of said bolt; said retracting members having end portions disposed to retract said bolt responsive to said swinging of either of said retracting members; and a pair of actuating members connected with each spindle for rotation therewith in the path of movement of said retracting members, said actuating members contacting said retracting members so that one of said actuating members will swing one of said retracting members to retract said bolt responsive to turning of either spindle in either direction.

11. In a door latch: a pair of independently rotatable spindles; a spring-loaded normally extended latch bolt; a supporting structure for said spindles and bolt; said latch bolt including a draw bar having shoulders on upper and lower sides thereof; said shoulders facing in the direction of said extension of said bolt; a pair of retracting members pivoted on said supporting structure so as to engage said shoulders; and means connected with said spindles for moving said retracting members to retract said bolt responsive to rotative movement of said spindles.

12. In a door latch: a pair of independently rotatable opposed spindles; a normally extended spring-loaded latch bolt; a casing for said bolt; a supporting structure for said spindles and said casing including means providing a housing into which said casing extends; said housing being disposed between the inner ends of said spindles; said casing being open on opposite sides thereof; a pair of retracting members pivoted in said housing so that one retracting member is above said casing and the other is below said casing; said bolt having shoulders exposed at shoulders for retracting the bolt responsive to movement said open sides; said retracting members contacting said of said retracting members in one direction; and arms extending from the inner ends of said spindles for moving said retracting member in said one direction responsive to the turning of said spindles.

13. In a door latch: a pair of independently rotatable opposed spindles; a latch bolt casing; a latch bolt in said casing; said latch bolt including a draw bar having a slot therein; a spring in said slot and engaged with the casing and the draw bar to extend the bolt; said casing being open on opposite sides thereof; shoulders on said draw bar facing in the direction of extension of said bolt and accessible through said open sides; a supporting structure for said spindles and casing; a pair of retracting members pivotally mounted on said structure with one end of each retracting member engaged with one of said shoulders; the movement of either retracting member in one direction retracting said bolt; and arms projecting from the inner ends of said spindles for moving said retracting members in said one direction responsive to rotation of said spindles.

14. In a door latch: a pair of independently rotatable opposed spindles; a latch bolt casing; a latch bolt in said casing; said latch bolt including a draw bar having a slot therein, a spring in said slot and engaged with the casing and the draw bar to extend the bolt; said casing being open on opposite sides thereof; shoulders on said draw bar facing in the direction of extension of said bolt and

13

accessible through said open sides; a supporting structure for said spindles and casing; a pair of retracting members pivotally mounted on said structure with one end of each retracting member engaged with one of said shoulders; the movement of either retracting member in one direction retracting said bolt, and arms projecting from the inner ends of said spindles for moving said retracting members in said one direction responsive to rotation of said spindles; said spring operating through said shoulders to hold said retracting members in contact with said arms while said bolt is extended.

15. In a door latch: a pair of opposed relatively rotatable spindles; a spring-loaded normally extended latch bolt assembly; a supporting structure for said spindles and said latch bolt assembly; a pair of retracting members; each of said retracting members being pivoted on said supporting structure to swing about an axis substantially parallel to the axis of said spindle; one of said retracting members being above said latch bolt assembly and the other below said assembly; elements on the latch bolt of said assembly engaged with said retracting members under the urge of the spring in said assembly; and members on said spindles engaged with said retracting members for swinging said retracting members to retract the bolt responsive to the turning of said spindles.

16. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure, operable responsive to the turning of either of said spindles; a locking bar longitudinally and laterally movable in said spindles; spring means normally retracting said bar; means operable from the exterior of the inner spindle for moving said bar longitudinally against the action of said spring means; means on said bar and said supporting structure respectively, cooperable for shifting said bar laterally during said longitudinal movement; and locking means on said outer spindle operating responsive to said movements of said bar to releasably lock said outer spindle against turning; and means releasably latching said bar against retraction from position for actuating said locking means; said last named means releasing said bar responsive to the turning of the inner knob.

17. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure operable responsive to the turning of either of said spindles; a locking bar longitudinally and laterally movable in said spindles; spring means normally retracting said bar; means operable from the exterior of the inner spindle for moving said bar longitudinally against the action of said spring means; a cam element and a shoulder on said bar; a latch member on said structure engageable by said cam element to shift said bar laterally; locking means on said outer spindle movable to lock the outer spindle against rotation responsive to longitudinal and lateral movement of said bar; said shoulder being engageable with said latch member to latch said bar in locking position; relative movement between said shoulder and latch member releasing said bar; and means for effecting said relative movement responsive to the turning of the inner spindle.

18. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of

14

the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure operable responsive to the turning of either of said spindles; a locking bar longitudinally and laterally movable in said spindles; spring means normally retracting said bar; means operable from the exterior of the inner spindle for moving said bar longitudinally against the action of said spring means; means on said bar and said supporting structure respectively, cooperable for shifting said bar laterally during said longitudinal movement; locking means on said outer spindle operating responsive to said movement of said bar to releasably lock said outer spindle against turning; spring means urging said locking means out of locking position; and means latching said bar in position for actuating said locking means; said last named means releasing said bar responsive to the turning of said inner spindle.

19. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure, operable responsive to the turning of either of said spindles; a locking bar movable within said spindles; knobs on said spindles; a push button on the inner knob and inner spindle operable to move said bar relative to said spindles; locking means on said outer spindle movable to lock said outer spindle against turning responsive to movement of said bar; spring means resisting said movement of said bar; spring means resisting movement of said locking means into locking position; and means operable to latch said bar in position for holding said locking means in locking position; said last named means releasing said bar responsive to turning of said inner spindle.

20. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure operable responsive to the turning of either of said spindles; a locking bar movable within said spindles; knobs on said spindles; a push button operable in the inner knob and inner spindle to move said bar relative to said spindles; a locking member shiftable laterally in said outer spindle; a locking lug on said locking member; said spindle having an opening therein through which said lug is extensible to engage said supporting structure for locking said outer spindle against turning; a spring normally holding said lug out of locking engagement with said structure; said locking member having an opening therein; said bar extending through said opening in said locking member for moving said member to extend said lug into locking position responsive to movement of locking bar; spring means resisting movement of said bar in a direction for actuating said locking member; and latch means operable to hold said bar in position actuating said locking means; said latch means releasing said bar responsive to the turning of said inner spindle.

21. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure operable responsive to the turning of either of said spindles; a locking bar mounted within said spindles for longitudinal and lateral movement relative thereto; means operable at the outer end of the inner spindle

15

for moving said bar longitudinally of said spindles; spring means resisting longitudinal movement of said bar; a locking member mounted in the outer spindle for lateral movement; said spindle having an opening therein; a locking lug on said locking member extensible through said opening for engaging said supporting structure to lock the outer spindle; means shifting said bar laterally during longitudinal movement of the bar; said bar engaging and shifting said locking member into locking position responsive to said lateral movement; means whereby said bar is turned about its axis responsive to the turning of the inner spindle; means latching said bar in position for actuating said locking member and releasing said bar upon the turning of said inner spindle; and spring means moving said locking member out of locking position responsive to said release of said bar.

22. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of said spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure operable responsive to the turning of either of said spindles; a locking bar movable within said spindles; means operable at the outer end of the inner spindle for moving said bar; locking means in the outer spindle engageable with said supporting structure to lock the outer spindle against turning responsive to movement of said bar; a latch member mounted on said supporting structure for movement to engage and hold said bar in position for actuating said locking member; spring means urging latch member into position for said holding of said bar; and means on said latch member engageable by said latch bolt for moving said latch member out of position holding said bar, responsive to the inward movement of said bolt as occasioned in closing the door.

23. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure operable responsive to the turning of either of said spindles; a locking bar movable within said spindles; means operable at the outer end of the inner spindle for moving said bar; locking means in the outer spindle operable to lock the outer spindle against turning responsive to movement of said bar; a latch member mounted on said structure for movement to engage and hold said bar in position for actuating said locking member; spring means urging said latch member into position for said holding of said bar; and means on said latch member engageable by said latch bolt for moving said latch member out of position holding said bar responsive to the movement of said bolt as occasioned in closing the door, as well as responsive to retraction of said bolt by the turning of said inner spindle.

24. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure operable responsive to the turning of either of said spindles; a locking bar movable within said spindles; means operable at the outer end of the inner spindle for moving said bar; locking means on the outer spindle operable to lock the outer spindle against turning responsive to movement of said bar; a latch member mounted on said structure for movement to engage and hold said bar in position

16

for actuating said locking member; spring means urging said latch member into position for said holding of said bar; means on said latch member engageable by said latch bolt for moving said latch member out of position holding said bar responsive to the movement of said bolt as occasioned in closing the door; and a knob on said outer spindle having an opening therein through which an instrument may be inserted for engaging and moving said bar; said bar being movable by such an instrument to effect release of the bar from said latch member.

25. In a door latch: a pair of independently rotatable tubular spindles; a normally extending spring loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure operable responsive to the turning of either of said spindles; a locking bar mounted within said spindles for longitudinal and lateral movement relative thereto; means operable at the outer end of the inner spindle for moving said bar longitudinally of said spindles in one direction; spring means resisting said longitudinal movement of said bar; a locking member carried by the outer spindle for lateral movement; said outer spindle having an opening therein; a locking lug on said locking member extensible through said opening for engaging said supporting structure to lock the outer spindle; means shifting said bar laterally during longitudinal movement of the bar; said bar engaging and shifting said locking member into locking position responsive to said lateral movement; means whereby said bar is turned about its axis responsive to the turning of the inner spindle; means latching said bar in position for actuating said locking member; said last named means releasing said bar upon the turning of said inner spindle; spring means moving said locking member out of locking position responsive to said release of said bar; said latching means including a latch member pivoted on said supporting structure; spring means urging said latch member into position for holding said bar; and a member on latch member engageable by said latch bolt on inward movement of the latch bolt as effected in closing of the door, for moving said latch member to release said bar.

26. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure operable responsive to the turning of either of said spindles; a locking bar mounted within said spindles for longitudinal and lateral movement relative thereto; means operable at the outer end of the inner spindle for moving said bar longitudinally of said spindles; spring means resisting longitudinal movement of said bar; a locking member mounted in the outer spindle for lateral movement; said outer spindle having an opening therein; a locking lug on said locking member extensible through said opening for engaging said supporting structure to lock the outer spindle; means shifting said bar laterally during longitudinal movement of the bar; said bar engaging and shifting said locking member into locking position responsive to said lateral movement; means whereby said bar is turned about its axis responsive to the turning of the inner spindle; means latching said bar in position for actuating said locking member; said last named means releasing said bar upon the turning of said inner spindle; spring means moving said locking member out of locking position responsive to said release of said bar; said latching means including a latch member pivoted on said supporting structure; spring means urging said latch member into position for holding said bar; a member on said latch member engageable by said latch bolt

on inward movement of the latch bolt as effected in closing of the door, for moving said latch member to release said bar; said bar being laterally movable out of engagement with said latch member when the bar is in locking position; and a knob on said outer spindle having an opening through which an instrument may be inserted to engage and move said bar out of latching engagement with said latch member.

27. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure, operable responsive to the turning of either of said spindles; a locking bar movable longitudinally and laterally in said spindles; means whereby said bar is turned about its axis responsive to the turning of said inner spindle; means operable on the inner spindle for moving said bar longitudinally relative to said spindles; a fixed latch member on said supporting structure; a cam portion on said bar engageable with said fixed latch member to shift said bar laterally; locking means movable to lock said outer spindle against turning responsive to said longitudinal and lateral movement of said bar; a shoulder on said bar engageable with said fixed latch member to hold said bar in locking position; said shoulder being movable out of engagement with said fixed latch member on the turning of said bar about its axis; and spring means for retracting said bar when said bar is released from said fixed latch member.

28. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure, operable responsive to the turning of either of said spindles; a latch bar movable longitudinally and laterally in said spindles; means whereby said bar is turned about its axis responsive to turning of said inner spindle, means operable on the inner spindle for moving said bar longitudinally relative to said spindles; a fixed latch member on said supporting structure; a cam portion on said bar engageable with said fixed latch member to shift said bar laterally; locking means movable to lock said outer spindle against turning responsive to said longitudinal and lateral movement of said bar; a shoulder on said bar engageable with said fixed latch member to hold said bar in locking position; said shoulder being movable out of engagement with said fixed latch member on the turning of said bar about its axis; spring means for retracting said bar when said bar is released from said fixed latch member; said locking means including a locking member movable laterally in said outer spindle; a locking lug on said member engageable with said supporting structure to lock the outer spindle; said locking member having an opening therein through which said bar extends; and spring means urging said locking member out of locking position.

29. In a door latch: a pair of independently rotatable spindles; a normally extended spring-loaded latch bolt; a supporting structure for said spindles and said bolt; a pair of retracting members pivoted on said structure so that one retracting member is above the bolt and the other retracting member is below the bolt; said retracting members contacting upper and lower sides of said bolt for retracting the bolt responsive to movement of either retracting member; a pair of actuating members carried by each of said spindles for movement in the path of said retracting members upon turning of either spindle; one of said actuating members contacting and moving one of

spindle in either direction; said spindles being tubular; a locking bar movable in said spindles between said retracting members and said actuating members; means for moving said bar relative to said spindles; means for turning said bar about its axis responsive to rotation of one of said spindles; means movable into and out of a position locking the other of said spindles against rotation responsive to longitudinal movement of said bar; means for latching said bar in position for holding said locking means in locking position; said last named means releasing said locking bar only in response to the turning of said bar about its axis; and spring means for retracting said bar from locking position responsive to release of said bar.

30. In a door latch: a pair of independently rotatable spindles; a normally extended spring-loaded latch bolt; a supporting structure for said spindles and said bolt; a pair of retracting members pivoted on said structure so that one of the retracting members is above the bolt and the other retracting member is below the bolt; said retracting members contacting upper and lower sides of said bolt for retracting the bolt responsive to movement of either retracting member; a pair of actuating members carried by each of said spindles for movement in the path of said retracting members upon turning of either spindle; one of said actuating members contacting and moving one of said retracting members responsive to rotation of either spindle in either direction; said spindles being tubular, a locking bar movable in said spindles; means for moving said bar relative to said spindles; means for turning said bar about its axis responsive to rotation of one of said spindles; means locking the other of said spindles against rotation responsive to movement of said bar; means for latching said bar in position for actuating and locking means; said last named means releasing said locking bar only in response to the turning of said bar about its axis; and spring means for retracting said bar from locking position responsive to release of said bar; said bolt having a slot therein in which said bar is movable; said bar being disposed between said pivoted retracting members.

31. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure, operable responsive to the turning of either of said spindles; a locking bar movable within said spindles; means for moving said bar relative to said spindles; locking means on the outer spindle movable responsive to movement of said bar to lock the outer spindle against turning; spring means resisting movement of said locking means into locking position; latching elements on said bar and said supporting structure respectively, cooperable to latch said bar in position for actuating said locking means; relative movement between said latching elements releasing said bar, a key actuated lock in said outer spindle; means operatively connecting said lock with said bar for effecting said relative movement of said latch elements responsive to key actuation of said lock; and means whereby said bar is turned to effect said relative movement between said elements responsive to the turning of said inner spindle.

32. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure, operable responsive to the turning of either of said spindles; a locking bar movable longitudinally and laterally in said spindles; means whereby said bar is turned

about its axis responsive to the turning of said inner spindle; means on the inner spindle for moving said bar longitudinally relative to said spindles; a latch member on said supporting structure; a cam portion on said bar engageable with said latch member to shift said bar laterally; locking means movable to lock said outer spindle against turning responsive to said movements of said bar; a shoulder on said bar engageable with said latch member to hold said bar in locking position; said shoulder being movable out of engagement with said latch member on the turning of said bar about its axis; spring means for retracting said bar when said bar is released from said latch member; a key actuated lock carried by said outer spindle; means connecting said lock with said bar for turning said bar about its axis to release the bar responsive to key actuation of said lock.

33. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles, said bolt and said supporting structure, operable responsive to the turning of either of said spindles; a locking bar movable longitudinally and laterally in said spindles; means whereby said bar is turned about its axis responsive to the turning of said inner spindle; means operable on the inner spindle for moving said bar longitudinally relative to said spindles; a latch member on said supporting structure; a cam portion on said bar engageable with said latch member to shift said bar laterally; locking means movable to lock said outer spindle against turning responsive to said longitudinal and lateral movement of said bar; a shoulder on said bar engageable with said latch member to hold said bar in locking position; said shoulder being movable out of engagement with said latch member on the turning of said bar about its axis; spring means for retracting said bar when said bar is released from said latch member; and means on said outer spindle operable for turning said bar to release the bar and the outer spindle.

34. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles; said bolt and said supporting structure, operable responsive to the turning of either of said spindles; a locking bar movable longitudinally and laterally in said spindles; means whereby said bar is turned about its axis responsive to the turning of said inner spindle; means on the inner spindle for moving said bar longitudinally relative to said spindles; a latch member on said supporting structure; a cam portion on said bar engageable with said latch member to shift said bar laterally; locking means movable to lock said outer spindle against turning responsive to said longitudinal and lateral movement of said bar; a shoulder on said bar engageable with said latch member to hold said bar in locking position; said shoulder being movable out of engagement with said latch member on the turning of said bar about its axis; spring means for retracting said bar when said bar is released from said latch member; and means within said outer spindle operable for turning said bar to release the outer spindle.

35. In a door latch: a pair of independently rotatable tubular spindles; a normally extended spring-loaded latch bolt; a supporting structure for mounting said latch bolt and said spindles with one of the spindles on the outer side of a door and the other spindle on the inner side of the door; bolt retracting means operatively connected with said spindles; said bolt and said supporting structure, operable responsive to the turning of either of said spindles; a locking bar movable longitudinally and

laterally in said spindles; means whereby said bar is turned about its axis responsive to the turning of said inner spindle; means on the inner spindle for moving said bar longitudinally relative to said spindles; a fixed latch member on said supporting structure; a cam portion on said bar engageable with said fixed latch member to shift said bar laterally; locking means movable to lock said outer spindle against turning responsive to said longitudinal and lateral movement of said bar; a shoulder on said bar engageable with said fixed latch member to hold said bar in locking position; said shoulder being movable out of engagement with said fixed latch member on the turning of said bar about its axis; spring means for retracting said bar when said bar is released from said fixed latch member; a key actuated lock in said outer spindle; and means connecting said lock with said bar operable to turn said bar about its axis to release the bar and outer spindle responsive to actuation of said lock; said connecting means permitting said bar to move longitudinally and laterally relative thereto.

36. In a door latch: a rotatable spindle, a shiftable latch bolt; a supporting structure for said spindle and said bolt; a pair of latch bolt actuating members mounted on said supporting structure for independent movement in the direction of movement of said bolt; said actuating members being engaged with said bolt; and means on said spindle for moving said actuating members to shift said bolt responsive to the turning of said spindle.

37. In a door latch: a supporting structure; a spindle rotatably supported on said structure; a latch bolt operatively connected with said structure for movement relative thereto; a pair of latch bolt-actuating members independently swingably mounted on said structure; said actuating members engaging said latch bolt; and a pair of members connected with said spindle operable selectively to swing either of said actuating members for moving said latch bolt responsive to the turning of said spindle.

38. In a door latch: a rotatable spindle; a shiftable latch bolt; a supporting structure for said spindle and said bolt; a shell secured to said structure and surrounding said spindle; said bolt having a portion opposite an end of said shell; a pair of bolt-actuating members movably supported in said shell and having portions engaging said bolt for shifting the bolt responsive to movement of said actuating members; and a pair of arms carried by said spindle extending axially from an end thereof into said shell; said arms engaging and moving said actuating members for shifting said bolt responsive to the turning of said spindle.

39. In a door latch: a rotatable spindle; a shiftable latch bolt; a supporting structure for said spindle and said bolt; a shell secured to said structure and surrounding said spindle; said bolt having a portion opposite an end of said shell; a pair of bolt-actuating members movably supported in said shell and having portions engaging said bolt for shifting the bolt responsive to movement of said actuating members; a pair of arms carried by said spindle extending axially from an end thereof into said shell; said arms engaging and moving said actuating members for shifting said bolt responsive to the turning of said spindle; and spring means operatively connected with said supporting structure and said actuating members urging said actuating members into contact with said arms.

40. In a door latch: a pair of independently rotatable spindles; a shiftable latch bolt; a supporting structure for said spindles and bolt; a shell secured to said structure and surrounding one of said spindles; said bolt having a portion opposite an end of said shell; a pair of bolt-actuating members mounted in said shell for swinging movement; said actuating members having portions engaging said portion of said bolt for shifting the bolt responsive to swinging of the actuating members; said bolt-actuating members extending outwardly from said

21

end of said shell; and arms on said spindles for engaging and swinging said actuating members to shift said bolt responsive to the turning of said spindles.

41. In a door latch: a pair of independently rotatable spindles; a shiftable latch bolt; a supporting structure for said spindles and bolt; a shell secured to said structure and surrounding one of said spindles; said bolt having a portion opposite an end of said shell; a pair of bolt-actuating members mounted in said shell for swinging movement; said actuating members having portions engaging said portion of said bolt for shifting the bolt responsive to swinging of the actuating members; said bolt-actuating members extending outwardly from said end of said shell; a pair of arms extending axially from an end of each spindle; the arms on each spindle engaging the same side of each of said actuating members; said arms operating to swing said actuating members for shifting said bolt responsive to the turning of said spindles.

15

20

22

42. In a door latch: a pair of independently rotatable spindles; a spring-loaded normally extended latch bolt; a supporting structure for said bolt and said spindles; a shell secured to said structure between said spindles; a pair of latch bolt retracting members swingably mounted in said shell; one of said retracting members being above and the other below said latch bolt; each of said retracting members engaging said bolt for retracting the bolt responsive to swinging movement of the retracting member; and members extending axially from an end of each spindle contacting said retracting members for swinging the actuating members upon turning of either spindle.

References Cited in the file of this patent

UNITED STATES PATENTS

1,991,031	Schlage	Feb. 12, 1935
2,086,982	McCarter	July 13, 1937