Oct. 7, 1958 C. L. EADS 2,854,839

LOCK MECHANISM FOR NARROW STILE DOORS

Filed Oct. 27, 1955 3 Sheets-Sheet 1

Fig. 1.

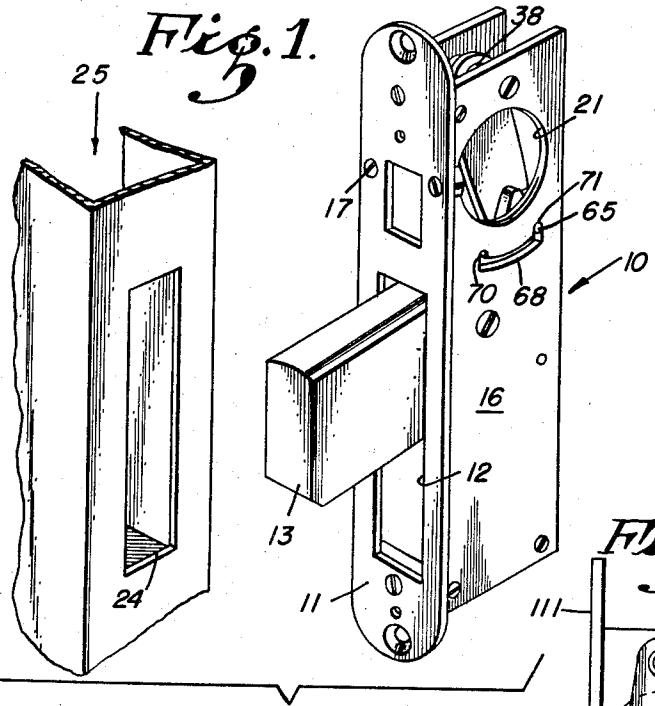


Fig. 5.

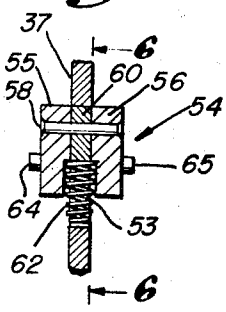


Fig. 8.

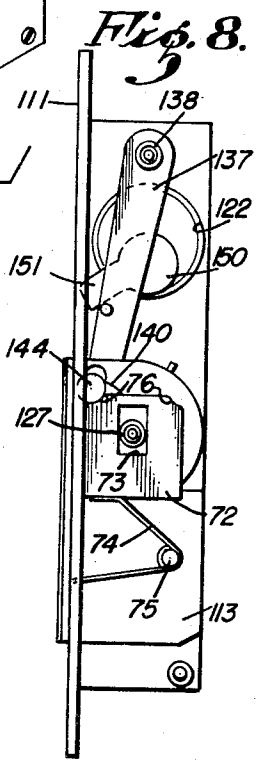


Fig. 3.

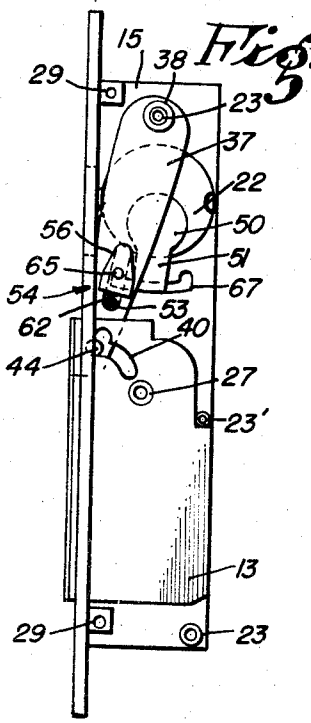
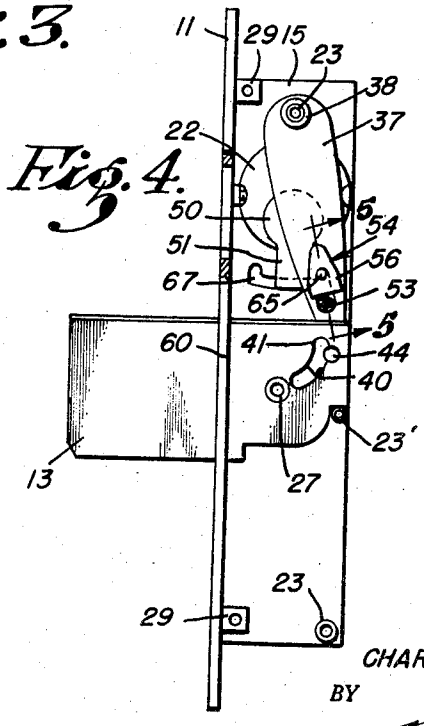


Fig. 4.



INVENTOR.
CHARLES L. EADS
BY
Attorney

Oct. 7, 1958 C. L. EADS 2,854,839

LOCK MECHANISM FOR NARROW STILE DOORS

Filed Oct. 27, 1955 3 Sheets-Sheet 2

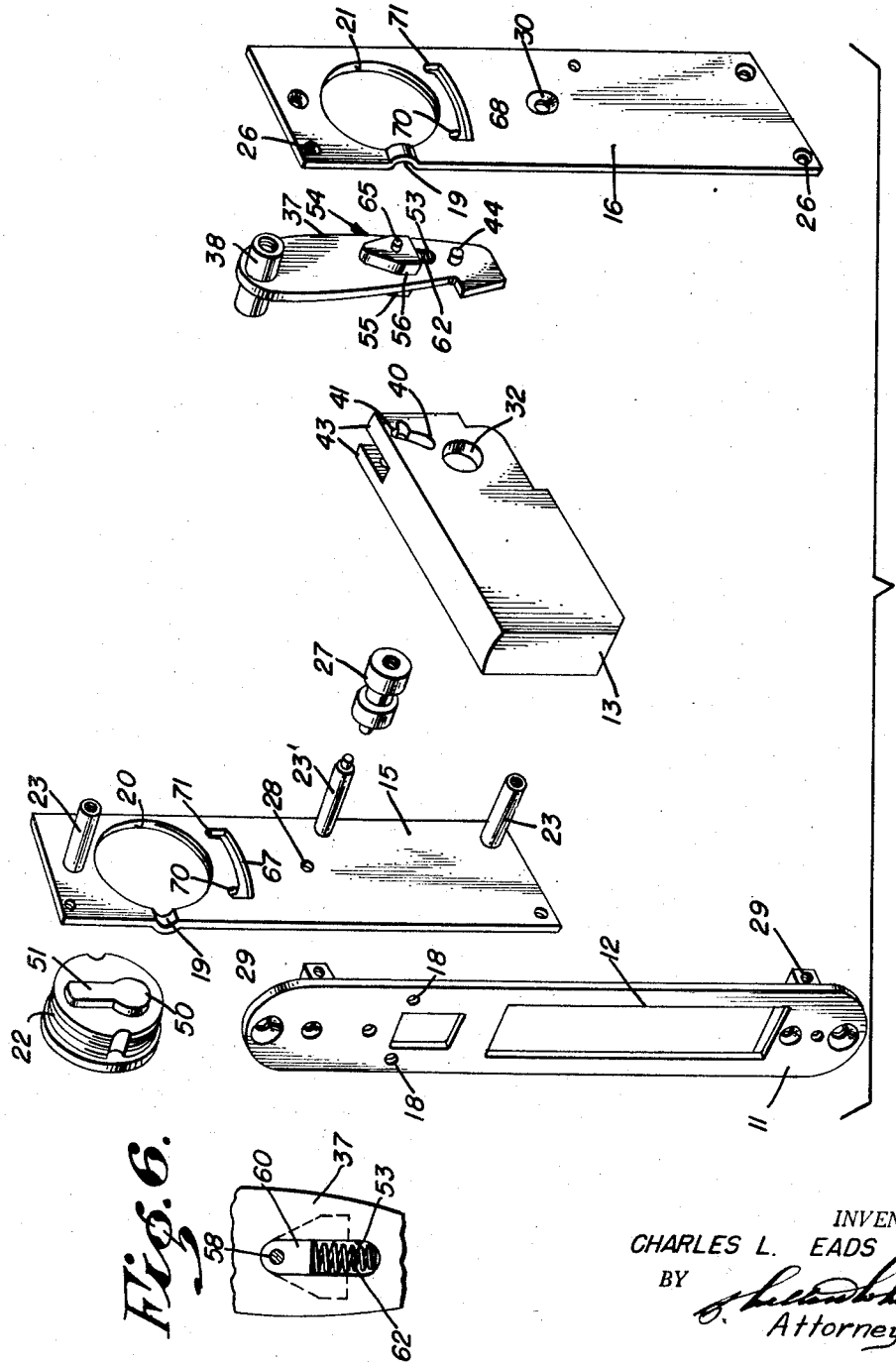


Fig. 2.

Fig. 6.

INVENTOR.
CHARLES L. EADS
BY
Attorney

Oct. 7, 1958 C. L. EADS 2,854,839

LOCK MECHANISM FOR NARROW STILE DOORS

Filed Oct. 27, 1955 3 Sheets-Sheet 3

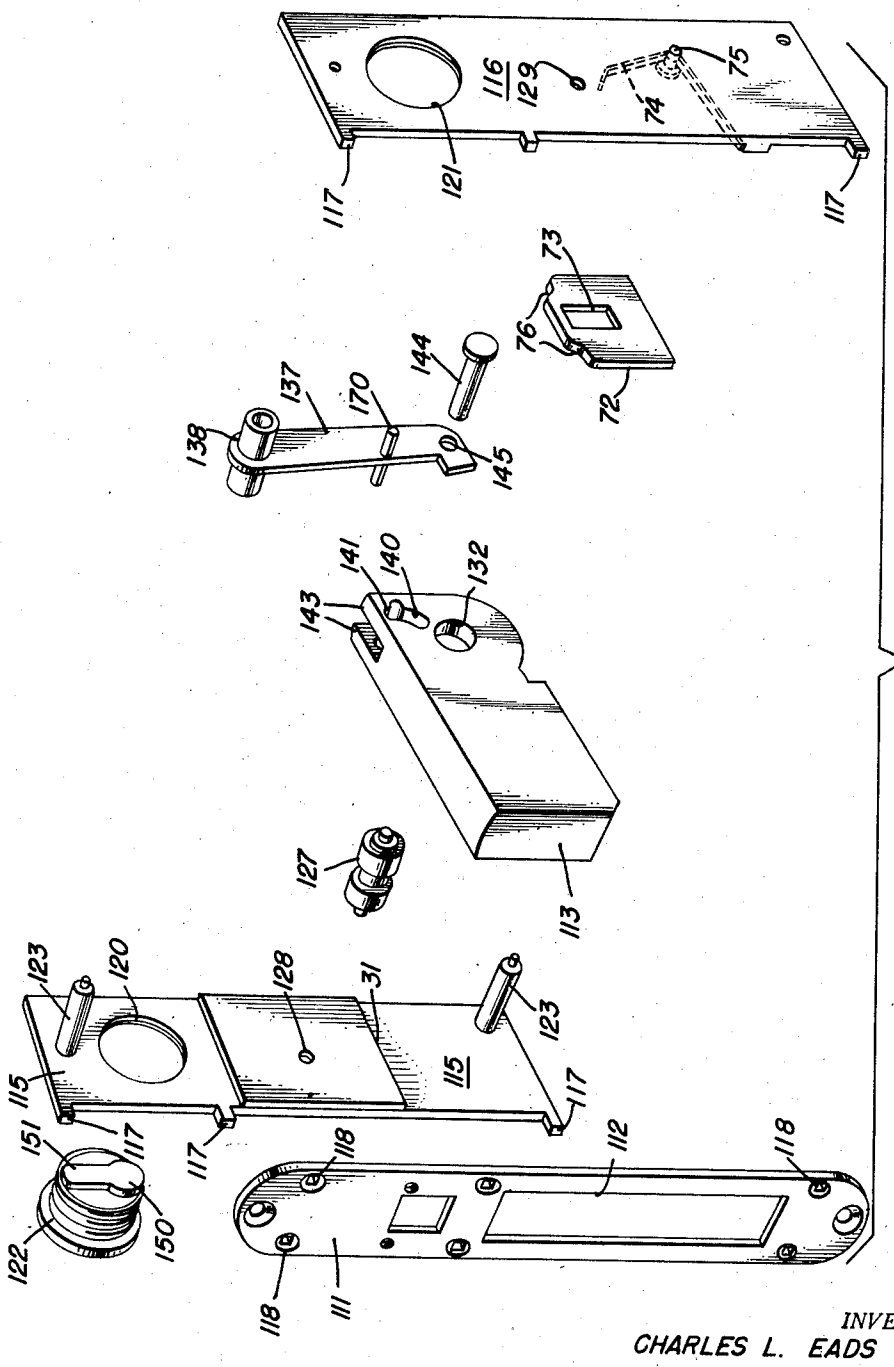


Fig. 7.

INVENTOR.
CHARLES L. EADS
BY
Attorney

United States Patent Office 2,854,839 Patented Oct. 7, 1958

2,854,839

LOCK MECHANISM FOR NARROW STILE DOORS

Charles L. Eads, North Hollywood, Calif., assignor to Adams Rite Manufacturing Company, Glendale, Calif., a corporation of California

Application October 27, 1955, Serial No. 543,220

13 Claims. (Cl. 70—139)

This invention relates to a lock mechanism particularly adapted for doors having a narrow stile, the lock being characterized in that it provides greater security than has been available in the prior art, particularly in connection with this type of door. The door involved may be a glass door having a surrounding frame, the stile, that is, the front frame member, being relatively narrow.

Doors may at times be mounted relative to the cooperating stationary frame or jamb such that there is considerable clearance between the door and jamb and with ordinary locks. In view of this clearance there may be considerably less than the desired degree of security. The lock of this invention features a bolt in the form of a relatively heavy bar having a relatively long throw, a relatively long projection back into the lock, but with full retractability of the bolt back into the lock casing. These characteristics are embodied in the lock within the limitations of the narrow stile, that is, the narrow casing, and also that the bolt is fully retractable in response to a simple turn of an operating handle or a lock cylinder. The bolt is in effect a relatively heavy bar extending from the door into the jamb or into another door and having considerable projection both into the door and into the jamb or into another door. The result is that the lock provides a greater degree of security than has previously been available.

In the preferred form of the invention the bolt operates through 90° from a fully extended position to a fully retracted position within the lock casing. The bolt is operative from a very simple operating mechanism, the arrangement of parts being such as to enable the operating mechanism to be embodied within the limitations of the narrow stile and lock casing, but the operation nevertheless being possible from only a simple turn of a handle or lock cylinder. The operating mechanism for the bolt is characterized in that an operating lever is mounted vertically relative to the bolt and engages therewith by way of pin and slot connections, the slot being of a shape to accommodate the relative movement as between the operating lever and the bolt.

The security provided by the lock is increased by a novel latching arrangement for the operating lever. This arrangement comprises a spring biased detent latch for the lever which latches the lever at the extremities of its travel, that is, in its locked and unlocked positions. Thus, to lock or unlock the mechanism, the lever must be unlatched before it can move in locking or unlocking direction. This provides additional security in that, for example, it would not be possible to reach into the lock casing through the clearance around the lock bar with a hooked wire or the like and engage and operate the lever. The lever must first be unlatched and this cannot easily be done by surreptitious methods.

In accordance with the foregoing, it is a primary object of the invention to provide an improved lock mechanism particularly adaptable for doors having a narrow stile and characterized in that a relatively heavy bar is extended from the door to the jamb and having considerable projection both into the door, that is, the lock casing, and into the jamb.

Another object is to provide a lock mechanism as in the foregoing object, wherein full extension of the bolt or bar and retraction into the casing is effected in response to a simple limited turn of an operating handle or lock cylinder.

Another object of the invention is to provide a lock mechanism as in the foregoing, wherein the bolt or bar is operated by a lever through pin and slot connections, the slot having a particular shape to accommodate the relative movements during operation as between the operating lever and the bolt or bar.

Another object is to provide a lock mechanism of the type described offering increased security wherein the operating lever has a latch associated therewith requiring unlatching of the lever before it can be moved in unlocking direction.

Another object is to provide a mechanism as in the foregoing object, wherein the latch is a biased latch means carried by the operating lever cooperating with a guide slot having latch retaining positions.

Further objects and numerous advantages of the invention will become apparent from the following detailed description and annexed drawings, wherein:

Fig. 1 is a perspective view of the lock mechanism of the invention and a cooperating receptacle into which the bolt moves;

Fig. 2 is an exploded view of the various parts of the invention;

Fig. 3 is an elevational view showing the assembled working parts of the invention;

Fig. 4 is a view similar to Fig. 3, with the parts shown in their other operative position;

Fig. 5 is a detail view taken along line 5—5 of Fig. 4;

Fig. 6 is a detail view taken along line 6—6 of Fig. 5;

Fig. 7 is an exploded view of another form of the invention; and

Fig. 8 is an elevational view of the assembled working parts of the form of the invention shown in Fig. 7.

Referring now more particularly to the drawings, in Fig. 1 numeral 10 designates generally the lock casing. It has a front panel or face plate 11 having openings as shown, for attaching the casing to the edge face of a door. The panel 11 has a longitudinal slot 12 therein from which the bolt or bar 13 of the lock extends. The casing 10 may be formed of side plates 15 and 16 as shown in Fig. 2, which may be attached to the panel 11 by means of screws 17, engaging in appropriate openings, for example 18, in the panel 11 and 19 in plates 15 and 16. The side plates 15 and 16 may be attached by posts extending therebetween as shown at 23 the posts being adapted to receive screws extending through openings in side plate 16. Side plates 15 and 16 are further attached by screws extending through openings 26 into transverse pieces 29 which are also attached to panel 11 by screws. The side plates 15 and 16 have openings as shown at 20 and 21, adapted to receive a conventional lock cylinder 22 which will be referred to again presently.

The bolt 13 is in the form of a relatively heavy bar which is adapted to be fully extended into a receptacle or slot 24 in a jamb or another door 25. The bolt or bar 13 is fully retractable by rotation into the casing 10. The casing 10 is relatively narrow, that is, in depth, since as pointed out in the foregoing, it is to be adapted for use in a door having a narrow stile, not permitting the use of a lock casing having greater depth. The bolt 13 is pivotally mounted on a pivot pin or shaft 27 having enlarged cylindrical portions as shown, and one end of which is journaled in an opening 28 and the other end

of which receives a screw extending through opening **30** in side plate **16**. The bolt **13** has an opening or aperture **32** for mounting it on the pivot or shaft **27**. As can be seen, the mounting of the bolt **13** provides for its projection well back into the casing **10**.

The bolt **13** rotates through 90° to fully retracted position as shown in Fig. 3. The operating mechanism for the bolt **13** includes a lever **37** having a hollow shaft **38** at its upper end, which is journaled on the upper post **23'**.

The inner end of the bolt **13** is bifurcated as shown, and the legs thus formed have openings therein having a shape as shown at **40**. The openings **40** are generally arcuate, having an intermediate lobe as shown at **41**, the particular shape of the openings being such as to accommodate the relative movement as between the lever **37** and the bolt **13** as will be described. The bifurcations or legs of the bolt **13** are designated by the numeral **43**. The lower end of the lever **37** fits between these legs and is pivotally attached thereto by a pin **44** which extends through the lower end of the lever **37**.

The lever **37** and the bolt **13** operate between the positions shown in Fig. 3 and Fig. 4. As may be seen, the lever **37** is above the bolt **13** and it is adjacent to the lock cylinder **22** previously referred to. The lock cylinder is of conventional type operable by a key, and it carries a member **50** having an extending cam portion **51** as shown. The member **50** may be rotated either clockwise or counterclockwise as may be observed, for operating the mechanism to locked and unlocked positions.

The lever **37** has in it a slot **53** in which is mounted a detent latch member **54** for the lever **37**. This member comprises two similar cam members **55** and **56** having tapered upper portions. They are attached by a rivet **58**, (see Fig. 5) extending through them and a separator **60** which fits in and forms a guide in slot **53**. Also in slot **53** is a coil spring **62** which presses against separator **60** and urges latch member **54** upwardly.

Cam members **55** and **56** have extending pins **64** and **65** respectively which operate in slots **67** and **68** in the side plates **15** and **16**. Each of these slots is arcuate and at its ends has upwardly extending grooves or detent notches as shown at **70** and **71**.

At the extremities of movement of lever **37** the pins **64** and **65** move into notches or detents **70** and **71**, that is member **54** moves upwardly under the influence of spring **62**. It can be seen therefore that lever **37** must be unlatched from its extreme positions before it can be moved.

In operating lever **37** cam portion **51** of member **50** engages the tapered upper portion of cam member **55** forcing member **54** downwardly first to unlatch it. Portion **51** then engages the side of member **55** to move lever **37** angularly with pins **64** and **65** riding in the arcuate slots **67** and **68**. Thus it is seen that lever **37** is latched at each end of its travel and must be unlatched before unlocking or locking can take place. For example, when the member **50** is rotated counterclockwise as shown in Fig. 3, cam portion **51** engages member **55** first unlatching and then moving lever **37** counterclockwise to move the bolt **13** into locked position as shown in Fig. 4. In unlocked position the pin **44** is in a position in slot **40** as shown in Fig. 3. In locked position the pin **44** moves into the right extremity or limit of the slot **40** and the lock is then in a deadlocked position, with the lever **37** in a latched position as described above. In moving to unlocked position the pin **44** moves over to the lobe **41** of slot **40**, engages the side of the slot, and as the bolt **13** rotates downwardly the pin **44** moves down into the left end of slot **40**, and as the movement is completed the pin **44** moves back up into the position shown in Fig. 3. As can be observed therefore, the shape of the slot **40** is such as to accommodate the relative movements as between the pin **44** and the bolt or bar **13**, the locked position being a deadlock position.

Figs. 7 and 8 of the drawings show a slightly different form of the invention wherein similar parts are numbered **100** higher. This form of the invention is slightly simpler in that the operating lever **137** is not latched at the end of its stroke.

As may be seen in Figs. 7 and 8 lever **137** carries an intermediate pin **170** which is engaged by cam portion **151** to move lever **137** between locked and unlocked positions.

Lever **137** engages bar **113** by way of transverse pin **144** extending through slots **140** and opening **145** in lever **137**.

Plates **115** and **116** are attached to panel **111** by tongues **117** extending into openings **118**.

Lever **137** is not latched in its extreme positions but a spring detent is provided to establish positive extreme positions of the lever.

The spring detent mechanism comprises a generally rectangular detent plate **72**, having an opening therein as shown at **73**. The shaft or pivot pin **127** extends through the opening **73**. The plate **72** slides against the inner face of side plate **116** and it is normally urged upwardly by a leaf spring **74** having an arm portion which presses against the lower edge of plate **72**. The spring **74** is mounted from a pin **75** extending from the side plate **116**. The two upper corners of the plate **72** are rounded inwardly as shown at **76** and the pin **144** normally engages with one or the other of these inwardly rounded portions as may be seen in Fig. 8. In other words, as the lock is operated between locked and unlocked positions the pin **144** moves from one rounded corner **76** to the other riding over the top of the plate **72**, the plate being pressed downwardly against the spring **74**. Thus, a spring detent mechanism is formed with the lever **137** and the lock having positive locked and unlocked positions. The plate **72** is held against the inner face of side plate **116** by one of the enlarged portions on the shaft or pivot **127**.

From the foregoing those skilled in the art will observe that I have provided a lock particularly adapted for doors having a narrow stile wherein a relatively heavy lock bar is operated to a locked position wherein it has a relatively long projection both into the jamb and back into the lock casing or door. The operating mechanism is incorporated within the limitations of the narrow casing and is operative from a simple turn of a lock cylinder or equivalent. The movements are relatively simple but yet providing positive operation and positive locking. A high degree of security is accordingly provided even though there may be considerable clearance between the edge of the door and the jamb, the nature of the lock being such that even with this clearance the lock is not susceptible to being defeated by prying or similar tampering. The lock is characterized in that it lends itself to ease of manufacture, fabrication, assembly and installation. The security provided by the lock is additionally increased by the arrangement for latching the operating or actuating lever which is inside the casing at the extremities of its travel requiring unlatching before it can be operated. The lock thus cannot be defeated by attempting to reach in with wires or the like.

The foregoing disclosure is illustrative of preferred forms of the invention and it is to be understood that various modifications and alternatives may be adopted by those skilled in the art, all of which come within the spirit and scope of the invention. The boundaries of the invention are accordingly intended to be in accordance with the scope of the claims appended hereto.

I claim:

1. In a locking mechanism for use in a door having a relatively narrow stile, in combination: a lock casing including mutually perpendicular side and face plates positionable with said side plate within the stile and said face plate lying along the vertical outside edge of the

stile; a lock bar having a pivotal mounting in said casing, the bar being rotatably movable through substantially 90° from a locking position to a fully retracted position within the casing, the bar being substantially transverse to the casing and projecting into the casing substantially coextensively with the depth thereof when in locking position; actuating means for the lock bar comprising a lever arm connected to the lock bar; and operating mechanism for the lever arm, including means for latching it in locked position of the lock bar.

2. The structure of claim 1, wherein said operating means comprises biased latch means carried by the lever arm and fixed latch retainers cooperating with the latch means.

3. In a locking mechanism adapted for use in a door having a relatively narrow stile, in combination: a lock casing including mutually perpendicular side and face plates positionable with said side plate within the stile and said face plate lying along the vertical outside edge of the stile; a lock bar having a pivotal mounting in said casing, the bar being rotatably movable through substantially 90° from a locking position to a fully retracted position within the casing, the bar being substantially transverse to the casing and projecting into the casing substantially coextensively with the depth thereof when in locking position; and actuating means for the lock bar disposed relatively vertically thereto in the casing, said actuating means comprising a lever arm pivotally mounted in said casing to have a movement of substantially less than 90°, the lever arm having a pin engaging in a slotted opening in said lock bar, the opening being shaped to accommodate relative movements of the said pin and lock bar during operative movements of said lever arm in moving said lock bar between said retracted and locking positions.

4. In a locking mechanism adapted for use in a door having a relatively narrow stile, in combination: a lock casing including mutually perpendicular side and face plates positionable with said side plate within the stile and said face plate lying along the vertical outside edge of the stile; a lock bar having a pivotal mounting in said casing, the bar being rotatably movable through substantially 90° from a locking position to a fully retracted position within the casing, the bar being substantially transverse to the casing and projecting into the casing substantially coextensively with the depth thereof when in locking position; actuating means for the lock bar disposed relatively vertically thereto in the casing, said actuating means comprising a lever arm pivotally mounted in said casing to have a movement of substantially less than 90°, the lever arm having a pin engaging in a slotted opening in said lock bar, the opening being shaped to accommodate relative movements of the said pin and lock bar during operative movements of said lever arm in moving said lock bar between said retracted and locking positions; and detent mechanism associated with said pin biased to provide positive locked and unlocked positions.

5. The structure of claim 3, wherein said lever arm has a relatively short throw compared to its length; and operating means for the lever arm engageable with an intermediate point thereof.

6. In a locking mechanism adapted for use in a door having a relatively narrow stile, in combination: a lock casing including mutually perpendicular side and face plates positionable with said side plate within the stile and said face plate lying along the vertical outside edge of the stile; a lock bar having a pivotal mounting in said casing, the bar being rotatably movable from a position fully retracted within the casing to an extended position, the bar projecting substantially to the rear of the casing when in extended position and having a substantially equal projection from the casing; and actuating means for the locking bar disposed in the casing, said actuating means comprising a lever arm having a movement of substantially less than 90°, the lever arm having a pin engaging in a slotted opening in said lock bar, the opening being shaped to accommodate relative movements of the said pin and lock bar during operative movements thereof.

7. The structure of claim 6 wherein said lever arm has a relatively short throw compared to its length, and operating means for the lever arm engageable with an intermediate point thereof.

8. In combination in a swinging door having a narrow hollow metal stile: a lock casing having substantially the same depth and thickness as the stile including mutually perpendicular side and face plates positionable with said side plate within the stile and said face plate lying along the vertical outside edge wall of the stile; and a lock bar having a pivotal mounting in said casing, the bar being rotatably movable through substantially 90° from a fully retracted position within the casing to a fully extended position, the lock bar having a thickness substantially equal to that of the casing and having a width substantially equal to the depth of the casing whereby in retracted position the lock bar occupies the full thickness and depth of the casing, the lock bar having a length equal to approximately twice its width with such bar when in extending position projecting into the casing to the full depth thereof and having an extending portion substantially equal in extent to the depth of the casing, the lock bar having a rounded corner permitting it to be rotated into and out of said extending position whereby the lock bar possesses maximum size and strength for the stile in which it is mounted.

9. The structure of claim 8 including actuating means for the lock bar vertically disposed in the casing relative to the lock bar when in its retracted position.

10. In a locking mechanism for a door having a relatively narrow stile of limited thickness, in combination: a vertically elongated lock casing positionable within the stile and having a side plate to be disposed within the stile and a face plate connected to the longitudinal edge of said side plate to lie along the vertical outside edge wall of the stile, said side plate having an opening therein, said face plate having an elongated slot therein to accommodate movement of a lock bar into and out of said casing, an elongated lock bar within said casing, means pivotally mounting said lock bar to be generally vertically disposed within said casing in its retracted position and be swingable through said slot in an arc of substantially 90° to its locking position with said bar in said locking position being substantially transverse to said casing and projecting outwardly from said casing, actuating means for said lock bar vertically disposed within said casing relative to said lock bar, said actuating means including an actuating arm, means connecting said arm to said lock bar for actuation of said lock bar between said retracted position and said locking position by moving said arm, means mounting said arm within said casing with a portion thereof disposed adjacent the side plate opening whereby said arm may be engaged by an operating member positionable in said opening.

11. In a locking mechanism as recited in claim 10 further including a lock cylinder in the side plate opening having an operating member engageable with said actuating arm.

12. In a locking mechanism for a door having a hollow relatively narrow stile of limited thickness, in combination: a vertically elongated lock casing positionable within the stile and having spaced side plates to be disposed between the side walls of the stile and a face plate connected to the longitudinal edges of said side plates to be disposed generally normal to said side plates and lie along the vertical outside edge wall of the stile, at least one of said side plates having an opening therein, said face

plate having an elongated slot therein to accommodate movement of a lock bar into and out of said casing, an elongated lock bar within said casing, means pivotally mounting said lock bar to be generally vertically disposed within said casing in its retracted position and be swingable through said slot in an arc of substantially 90° to its locking position with said bar in said locking position being substantially transverse to said casing and projecting into and out of the casing for distances substantially equal to the depth of said casing, actuating means for said lock bar vertically disposed within said casing relative to said lock bar, said actuating means including an actuating arm, means connecting said arm to said lock bar for actution of said lock bar between said retracted position and said locking position by moving said arm, means mounting said arm within said casing with a portion thereof disposed adjacent the side plate opening whereby said arm may be engaged by an operating member positionable in said opening.

13. In a locking mechanism for a door having a relatively narrow stile of limited thickness, in combination: a vertically elongated lock casing positionable within the stile and having spaced side plates to be disposed between the side walls of the stile and a face plate connected to the longitudinal edges of said side plates to be disposed generally normal to said side plates and lie along the vertical outside edge of the stile, at least one of said side plates having an opening therein, said face plate having an elongated slot therein to accommodate movement of a lock bar into and out of said casing, an elongated lock

bar within said casing, means pivotally mounting said lock bar to be generally vertically disposed within said casing in its retracted position and be swingable through said slot in an arc of substantially 90° to its locking position with said bar in said locking position being substantially transverse to said casing and projecting outwardly from said casing, actuating means for said lock bar vertically disposed within said casing relative to said lock bar, said actuating means including an actuating lever arm, means connecting said arm to said lock bar for actuation of said lock bar between said retracted position and said locking position by moving said arm, means pivotally mounting said arm within said casing with a portion thereof disposed adjacent the side plate opening whereby said arm may be engaged by an operating member positionable in said opening.

References Cited in the file of this patent

UNITED STATES PATENTS

321,143	Seely	June 30, 1885
1,646,181	Babekuhl	Oct. 18, 1927
1,792,173	Langley	Feb. 10, 1931
2,666,321	Collar et al.	Jan. 19, 1954
2,731,821	Lloyd	Jan. 24, 1956

FOREIGN PATENTS

115,445	Sweden	Nov. 27, 1945
401,103	Germany	Aug. 25, 1924
515,054	Great Britain	Nov. 24, 1939
806,211	Germany	June 11, 1951