Sept. 17, 1963 H. C. WOOD ETAL 3,103,804

LOCK CONSTRUCTION

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FIG. 1

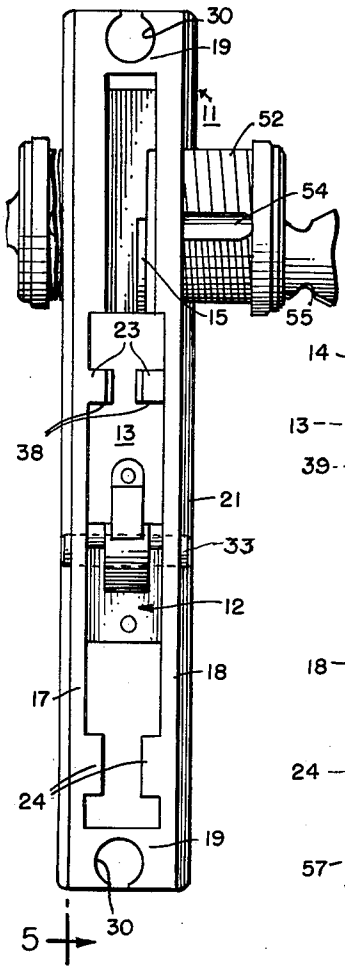


FIG. 2

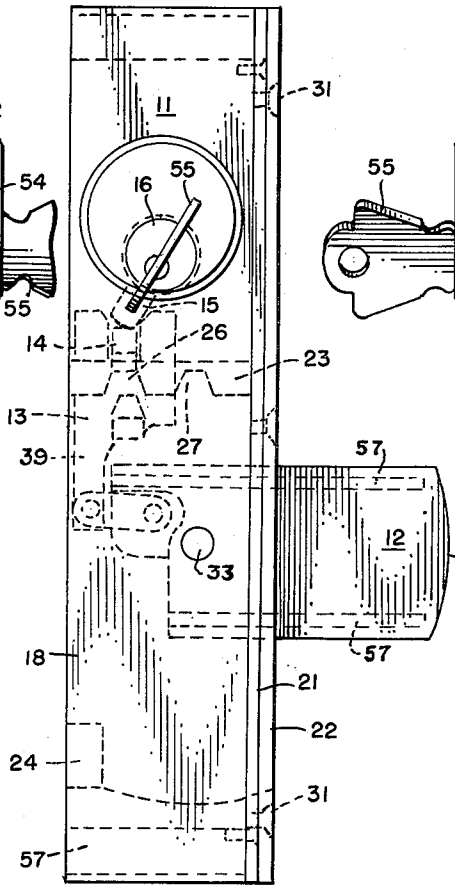


FIG. 3

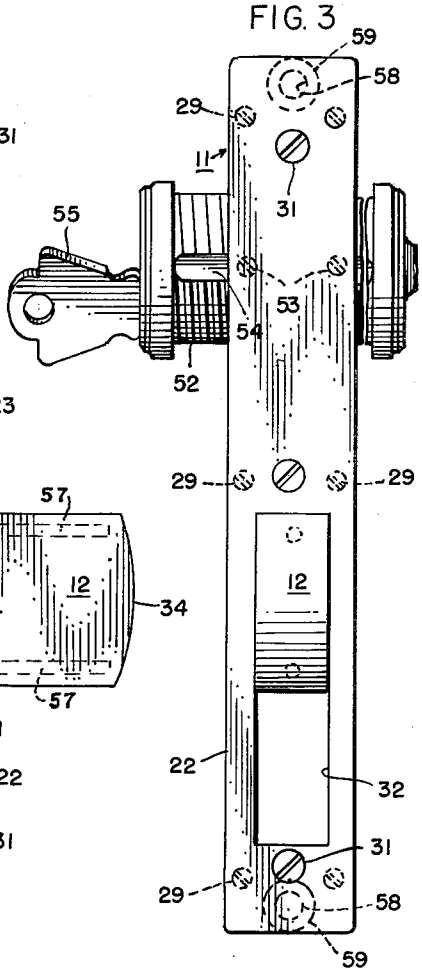


FIG. 4

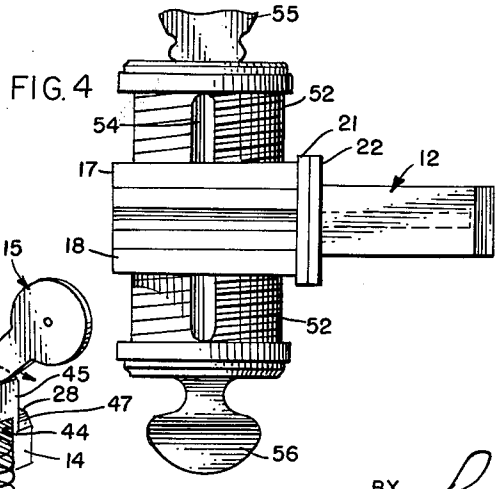
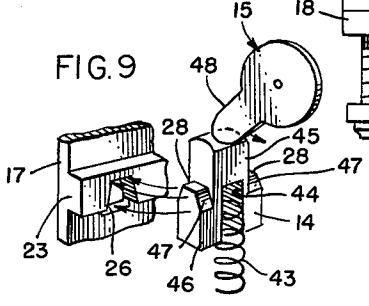


FIG. 9



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FIG. 5

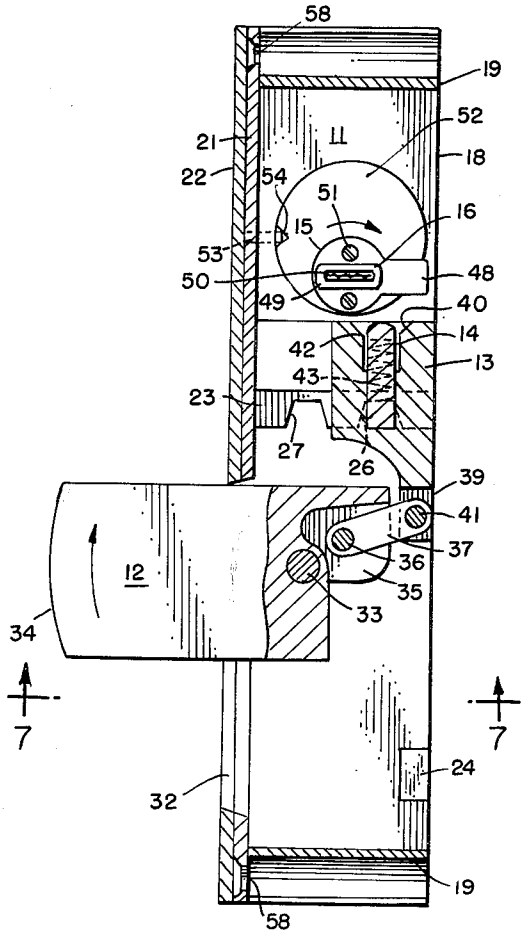


FIG. 6

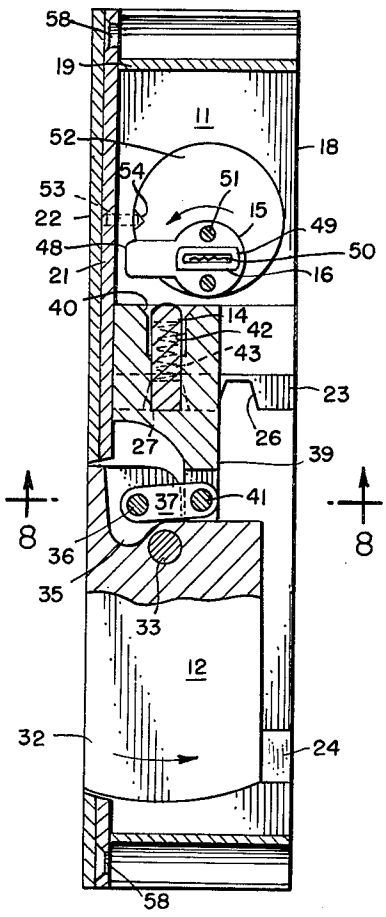


FIG. 7

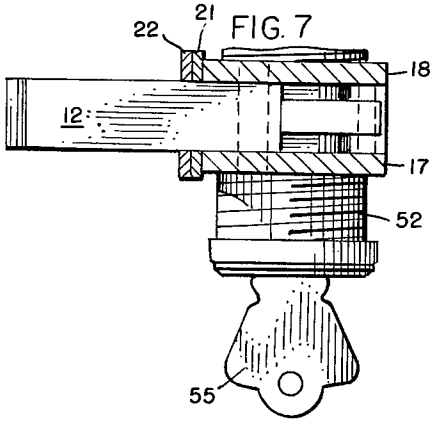
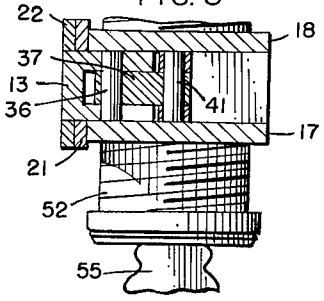


FIG. 8



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LOCK CONSTRUCTION

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Filed May 31, 1962, Ser. No. 198,930
4 Claims. (Cl. 70—139)

This invention relates to locks for narrow stile doors and particularly to such devices of the deadlock type.

The main objects of this invention are to provide an improved lock mechanism for swinging doors; to provide an improved door lock of the type wherein the locking bolt is hinged in a housing to swing into and out of locking position by the turning of a conventional key-rotated cylinder; to provide a lock of this kind with improved latch means for securing the locking bolt in either of its positions against any possible movement other than by the key-rotated cylinder; to provide an improved door lock of this kind especially adapted for recessed positioning in the stile of comparatively narrow stile doors; and to provide a lock mechanism of this kind of such simple construction as to make its manufacture very economical.

A specific embodiment of this invention is shown in the accompanying drawings wherein:

FIGURE 1 is a rear elevation of a door lock constructed in accordance with this invention, with the locking bolt shown in its door-locking position;

FIG. 2 is a side elevation of the lock shown in FIG. 1;

FIG. 3 is a front elevation of the same;

FIG. 4 is a bottom view of the lock as shown in FIG. 2;

FIG. 5 is a vertical sectional view taken on the plane of the line 5—5 of FIG. 1;

FIG. 6 is a view similar to FIG. 5 but showing the parts shifted and the bolt in retracted position;

FIG. 7 is a transverse sectional view of the lock as shown in FIG. 5, taken on the plane of the line 7—7 of that figure;

FIG. 8 is a similar view taken on the plane of the line 8—8 of FIG. 6; and

FIG. 9 is an exploded, fragmentary perspective detail of the deadlock latch whereby the locking bolt is secured in its oppositely-shifted positions.

The essential concept of this invention involves the provision of a vertically-swinging locking bolt pivoted in a door-recessed housing and connected by simple linkage to a slide member reciprocable in the housing and mounting a spring-biased detent engageable with the housing to latch the slide member at the opposite limits of its movement, the detent being retractable by a cam, mounted on and directly actuated by a conventional key-operated cylinder secured on the housing, for reciprocating the slide member.

As shown in the drawings, a door-lock embodying the foregoing concept comprises a case or housing 11 swingably mounting therein a locking bolt 12 actuatable by a reciprocable slide member 13 which is latched at the opposite limits of its movement by a spring-biased tumbler or detent 14 retractable by a cam 15 fixed on the key-rotatable cylinder 16, of a conventional tumbler lock mechanism, for effecting the opposite shifting of the slide member 13 to swing the locking bolt 12 into and out of its door-locking position.

The housing 11, as here shown, is one-piece open structure having sides 17 and 18, end members 19, and a back plate 21 on which is mounted a conventional face plate 22. The housing sides 17 and 18 have rails or tracks 23, formed along the opposed inner faces and extending from front to rear thereof, for the support of the reciprocable slide member 13, and lugs 24 adjacent the bottom end of the housing for the abutment of the locking bolt 12 in its retracted position within the housing. Each of the tracks

or rails 23 is formed with longitudinally spaced notches 26 and 27 on the under side thereof for the seating of detent shoulders 28 on the tumbler 14, as will be described presently. The end members 19 have longitudinal bores 30 formed therein for the reception of the conventional leveling screws and springs not shown.

The two plates 21 and 22, as here shown, are of the same general form and dimension with the lower portions thereof recessed to provide a slot 32 for the swinging therein of the locking bolt 12. The back plate 21 is secured to the housing sides 17 and 18 by screws 29; and the face plate 22 is secured to the back plate 21 by screws 31 (FIG. 3) thus concealing the screws 29 and the cylinder set screws 53.

The locking bolt 12 is a length of metal bar stock, preferably steel or brass, pivotally hinged on a pin 33 to swing through the slot 32 between a retracted position within the housing 11 (FIG. 6) and an outwardly-extending locking position (FIGS. 2 and 5). The forward end of the locking bolt is curved slightly, as shown at 34, to insure its proper movement into a slot in the doorway frame (not here shown) when the door is to be locked in its closed position. At its rear end, the locking bolt 12 is recessed at 35 on its under side wherein a pin 36 pivots a link 37 operatively connected to the slide member 13.

The slide member 13 is shown as a short metal block with guideways 38 (FIG. 1) for slidably supporting the member 13 on the housing rails 23. The lower end of the member 13 is cut away to provide swing clearance for the inner or rear end of the bolt 12 and forms a stem 39 to which the link 37 is pivoted by a pin 41 (FIG. 5). A vertical, upwardly opening slot 42 is formed in the member 13 wherein the tumbler or latch 14 is reciprocably supported on a spring 43 seated in a slot 44 formed in the tumbler body (FIG. 9). The top edges of the member 13 defining the upper end of the slot 42 are chamfered at 40 (FIGS. 5 and 6) to form approaches for the cam 15 to the member 13 and the tumbler 14, as will be explained presently.

The form of the latch tumbler 14 is best shown in FIG. 9. It is of stubby, rectangular cross-section with a stem part 45 extending up from a base part 46 between the shoulders 28. The shoulders 28 have angled sides 47 to fit the angled form of the track notches 26 and 27, into which the shoulders 28 are normally urged by the spring 43.

The cam 15 is disk-shaped with a stem or finger lobe 48 extending radially outward from a circular part which is recessed to seat over a rectangular hub 49 on the key cylinder 16. As shown, the stem 48 of the cam 15 is alined with a key slot 50 in the hub 49. The cam 15 is secured to the cylinder 16 by screws 51 (FIGS. 5 and 6).

The cylinder 16, as here shown, is rotatively supported in a cylindrical body 52, of a conventional key-actuated tumbler mechanism, and the body 52 has external threads for screwing the body into one of the housing side walls 17 or 18. Such an element 52 is secured in fixed position on the side wall 17 or 18 by a threaded screw 53 having a pointed inner end seated in a V-shaped groove 54 formed in the body 52 (FIGS. 5 and 6). A pair of such oppositely-arranged elements 52 may be structured both for the insertion of a key 55 in the cylinder 16, or one may have a turn-piece 56 integrated with the cylinder 16 for rotating it (FIG. 4).

In order to lessen the likelihood of the locking bolt 12 being sawed through by one attempting to illegally open the locked door, rods 57 of highly-hardened steel are inserted lengthwise in the locking bolt 12 from the rear thereof (see FIG. 2). Preferably, these rods 57 terminate inwardly of the outer end 34 of the bolt 12 so as to conceal the fact of their presence in the bolt.

The installation of a lock, constructed in accordance with this invention is as follows:

A recess is formed in the door stile dimensioned to receive the housing **11**. With the face plate **22** removed, the otherwise assembled lock is set in the door recess and secured in place by a conventional combination of leveling screws and springs inserted through the apertures **58** in the back plate **21** and through the bores **30** in the end members **19** to anchor the lock in the door recess. The cylinder lock elements **52** then are screwed into the respective sides **17** and **18** of the case **11** and fixed in functioning position by seating the screws **53** in the respective grooves **54**. The face plate **22** then is set onto the back plate **21** and secured by screws **31** (FIG. 3). The face plate **22** thus conceals the screws (not shown), which anchor the lock in the door recess, and the screws **53**, which fix the position of the elements **52** in the sides **17** and **18**.

The lock, constructed in accordance with this invention, is operated as follows:

Assume the locking bolt **12** is retracted in the housing **11** and the key **55** is inserted into the cylinder **16**. In such position the bolt **12** abuts the lugs **24** so that its opposite face is flush with the outer face plate **22**. The turning of the key in the direction of the arrow shown in FIG. 6 will move the cam stem **48** down into the chamfered end **40** of the slide member slot **42** and into contact with the upper end of the tumbler **14**. The continuing turning of the key **55** causes the cam stem **48** to depress the tumbler **14** against the spring **43** to the point of retracting the detent shoulders **28** from the track notches **27**. Such unseating of the shoulders **28** from the notches **27** permits the continued rotation of the cam stem **48** to shift the slide **13** rearwardly along the housing rails or tracks **23** to the opposite limit of its movement, as shown in FIG. 5. Such shifting of the tumbler **14**, through the action of the link **37**, causes the locking bolt **12** to swing outwardly and upwardly about the pivot pin **33** from its retracted position, as shown in FIG. 6, to the outwardly-extending door-locking position as shown in FIG. 5. As the cam stem **48** completes this inward shifting of the slide member **13**, it recedes from contact with the tumbler **14** whereupon the spring **43** snaps the tumbler **14** to seat the detent shoulders **28** in the track recesses **26**.

With the removal of the key **55** from the cylinder **16** the bolt **12** is latched in its door-locking position. Thereupon it becomes impossible to retract the bolt **12** from its door-locking position until a key **55** has been inserted into the cylinder slot **50** to turn the cylinder **16**.

To unlock the door, the key **55** upon being inserted in the cylinder slot **50** may be exerted to turn the cylinder **16** in the direction of the arrow shown in FIG. 5. This causes a reverse sequence of the operations above explained to the point of shifting the slide member **13** forwardly in the housing **11** and causing the bolt **12** to be shifted from its outwardly-extending position to its retracted position in the housing **11** in abutment against the lugs **24**, as shown in FIG. 6. In such retracted position the detents **28** on the latch element **14** become seated in the track notches **27** and the bolt **12** is latched in its retracted position.

The main advantages of the improved lock herein disclosed reside in the simplicity of its construction whereby the slide is directly actuated by a conventional cylinder cam, usually provided with cylinder door locks, and the bolt is directly actuated by a simple link connection with the slide; in the fact that the improved construction permits a smaller, more compact, yet rugged deadlock for narrow stile doors which requires fewer moving parts to accomplish a positive locking action; and in the arrangement of the operating parts whereby the cylinder cam can rotate through a full 360° in both locking and unlocking directions thereby permitting the cam to be disposed in a middle, neutral, and disengaged position when the key is removed from the lock cylinder.

Although but one specific embodiment of this invention is herein shown and described it will be understood that details of the construction shown may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

We claim:

1. A door lock comprising,
   a. a housing for recession in the edge of a door and having a longitudinal slot in the normally exposed face of the housing,
   b. a locking bolt pivoted in the housing for swinging movement between a retracted position within the housing and a locking position extending outward from said slot,
   c. a slide member mounted for reciprocable movement in the housing in a direction normal to the pivot axis of said bolt,
   d. a link member pivotally connected to the slide member and to the locking bolt whereby the movement of the slide member effects the swinging of the bolt between a retracted position within the housing and an outwardly-extending locking position,
   e. a rotatable cylinder mounted on the housing,
   f. latch means on the slide member spring-biased to engage the housing and secure the slide member at its oppositely-shifted positions, and
   g. a cam on the said cylinder positioned to engage and retract the latch means upon rotation of the cylinder and effect the opposite shifting of the slide member to swing the locking bolt between its retracted and extended positions.

2. A door lock as set forth in claim 1 wherein the slide member is laterally recessed to slide on an internal track on the housing side wall which track has longitudinally spaced notches for the seating of the spring-biased latch means.

3. a door lock comprising,
   a. a hollow housing for recession in the edge of a door and having a longitudinal slot in the normally exposed face of the housing,
   b. a locking bolt pivoted in the housing for swinging movement between a retracted position within the housing and a locking position extending outward from said slot,
   c. opposed tracks on the internal side wall surfaces of the housing and having longitudinally spaced notches on the under sides thereof,
   d. a slide member mounted on said tracks for reciprocable movement therealong and having an upwardly opening recess between its ends,
   e. a link having one end pivotally connected to the slide member and its other end pivotally connected to the locking bolt whereby the movement of the slide member effects the swinging of the bolt between its retracted position within the housing and its outwardly-extending locking position,
   f. a rotatable cylinder mounted on a side wall of said housing and extending thereinto normal to the path of said slide member,
   g. a latching tumbler mounted in the recess of said slide member for reciprocation movement parallel with the side wall surfaces of said housing and transversely of said tracks,
      (1) said tumbler having lateral shoulders engageable with the notches of said tracks,
      (2) and means normally biasing said tumbler in the direction to engage said shoulders in said notches,
   h. a radial cam on the inner end of said cylinder adapted to engage and depress said tumbler against its biasing means and to engage a wall of said recess for disengaging the tumbler shoulders from the track

notches and shifting said slide member along said tracks to swing said locking bolt.

4. A closure lock adapted to be actuated by a conventional cylinder lock cam, said lock comprising

a. a case having opposed side walls and a front plate having an elongate slot therein extending parallel with said side walls,

b. a locking bolt pivoted in said case for swinging movement parallel with the side walls thereof between a retracted position wholly within the case and a locking position projecting outwardly from said slot,

(1) said bolt being pivoted adjacent one of its ends,

c. a slide member mounted within said case for reciprocative movement between the side walls thereof;

(1) said slide member being in spaced relation with said one end of the bolt when the bolt is in retracted position and having a transversely disposed recess engageable with said cam upon

rotation of said cylinder for reciprocatively shifting said slide member,

d. latch means disposed in the said slide member recess and spring biased to normally engage a side wall of the case for latching the slide member at oppositely shifted positions,

(1) said latch means being engageable by said cam to release said slide member as the cam engages said recess to shift the slide member,

e. and a link having one end pivotally connected to said slide member and its other end pivotally connected to the said one end of said bolt for swinging said bolt between its retracted and locking positions upon shifting of said slide member.

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