April 23, 1957 C. L. EADS 2,789,852

LOCK MECHANISM

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Fig. 1.

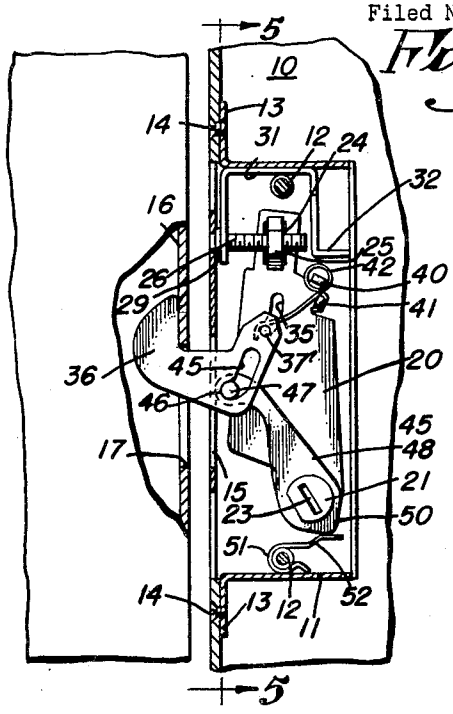


Fig. 2.

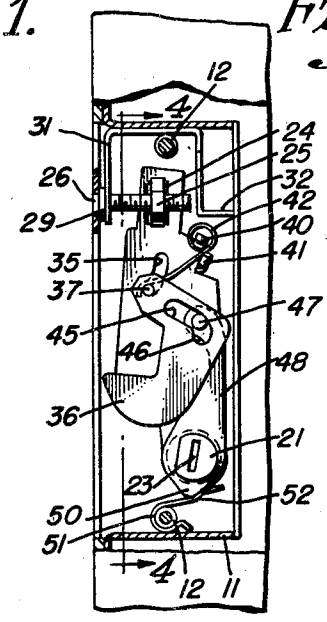


Fig. 3.

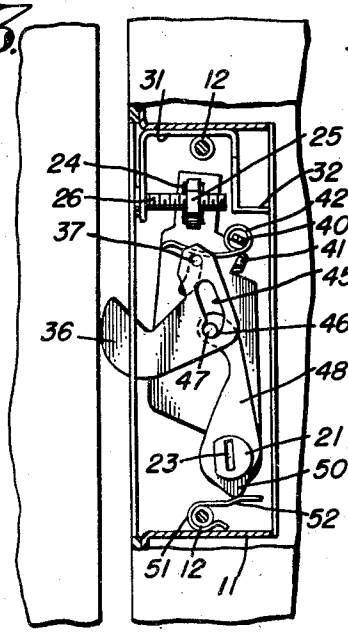


Fig. 4.

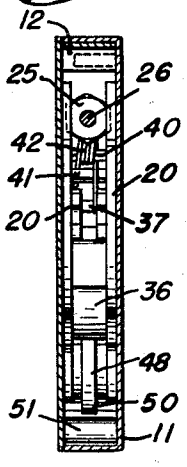
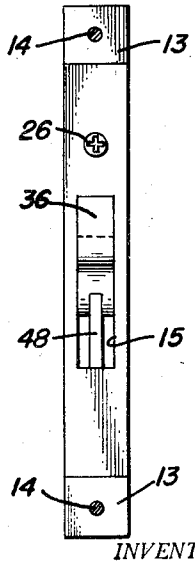


Fig. 5.



INVENTOR.
CHARLES L. EADS
BY
Attorney

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LOCK MECHANISM

Charles L. Eads, North Hollywood, Calif., assignor to Arthur R. Adams, Pasadena, Calif.

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4 Claims. (Cl. 292—110)

This invention relates to a latch mechanism adapted primarily for use with sliding doors and having particularly the feature that the latch is collapsible from latching position to its unlatched position.

Latches for sliding doors normally operate between a latching and unlatched position and if the door is closed with the latch in latching position, the door will not close and the latch will strike against the jamb with possible injury to the mechanism. Various attempts have been made in the prior art to solve the problem, including the provision of means for restraining the latch member in retracted or unlatched position until the door is moved to closed position. This invention provides a latch mechanism having the characteristics that if the latch is in extended or latching position when the door is closed, the latch is able to collapse to its normal unlatched position. The invention features a particular mounting of the latch member such that normally it pivots about a fixed pivot position in operating between latching and unlatched position. The mounting of the latch member and its relationship to its actuating lever, is such that the latch member can collapse by translating from its latching to its unlatched position. Thus, the latch member translates only when it is being collapsed and otherwise during normal operation it simply pivots about its pivot position.

Accordingly, a primary object of this invention is to provide a latch member for sliding doors wherein the latch member is collapsible from latching position to its unlatched position.

Another object of the invention is to provide a latching mechanism for sliding doors having a latch member mounted for normal pivotal movement between latching and unlatching positions, and its mounting providing for translatory movement of the latch member whereby the latch member may be collapsed by translatory movement from latching position to its unlatched position.

Another object of the invention is to provide a latch mechanism for sliding doors adapted for collapsing to unlatched position wherein the latch member has pin and slot mountings providing for pivotal and translatory movement of the latch member, and the latch member has an actuating lever connected to it by way of pin and slot connections providing for the collapsing movement of the latch member.

Another object of the invention is to provide a latch mechanism comprising a latch member and an operating lever connected to it by pin and slot connections, the slot having a lateral portion providing for overtravel of the lever into a dead locked position requiring that movement be imparted directly to the operating lever to secure normal unlatching movement of the latch member.

Another object is to provide a latch mechanism as in the foregoing object wherein the latch member has mountings providing for translatory movement of the latch member whereby it is operable to collapse from latched to unlatched position.

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

Fig. 1 is a side elevational view of the working parts of the invention, with the latch in latched position;

Fig. 2 is a view similar to Fig. 1, showing the latch member in unlatched position;

Fig. 3 is a view similar to Figs. 1 and 2, showing the latch member in an intermediate position during collapsing;

Fig. 4 is a view taken along the line 4—4 of Fig. 2; and

Fig. 5 is a view taken along the line 5—5 of Fig. 1.

Referring now more in detail to the various figures of the drawings, numeral 10 designates a sliding door having a receptacle for receiving therein the casing 11 of the latch mechanism. The casing 11 has a side plate attached by screws engaging in posts 12. The casing 11 has extending tabs 13 which are attached to the door by screws 14, as shown. The casing has an opening as shown at 15 through which the latch member may extend to be received in a receptacle 16 in a door jamb, the receptacle having a receiving slot 17 adapted to form a keeper for the latch member, as will be described.

The latch member is mounted within the casing 11 between a pair of side plates, providing for adjustment of the amount of reach of the latch member. These two side plates have a shape as shown at 20 in Fig. 1, and at their lower ends they have circular openings and they are both journaled on an operating shaft 21, the ends of which are journaled in circular openings in the side walls of the casing 11. The operating shaft 21 for the mechanism has a slot 23 therein adapted to receive the stem of an operating handle or a key, as will be described. The two side plates 20 are adapted to be adjusted angularly about the shaft 21. In the upper end of these plates are slots as shown at 24 and disposed intermediate and between these slots is a nut 25 on a screw threaded stem 26. The screw 26 is a Phillips head screw and it extends through a washer 29 and through one leg of a supporting bracket 31, which is angular as shown, having a portion engaging the inner surface of the top of the casing 11, and having an extending foot engaging the back wall of the casing 11 as shown, the said foot being designated by the numeral 32. When the Phillips head screw 26 is adjusted, the nut 25 is adjusted in position and due to its engagement in the slots 24 it moves the plates 20 angularly about the shaft 21, and adjusts the amount of reach of the latch member, as will appear more clearly presently.

The side plates 20 have in them angular or arcuate slots as shown at 35. The latch member is operative to translate in these arcuate slots. The latch member is in the form of a hook, as designated at 36. The right-hand portion of the latch member 36 is bifurcated and extending through the bifurcated ends is a pivot pin 37, the ends of which engage in the arcuate slots 35 in the side or mounting plates 20. One of the mounting plates 20, as shown in Fig. 3, has extending lugs or fingers, as shown at 40 and 41, and wrapped around the finger 40 is a coiled biasing spring 42, one end of which engages the other finger 41 and the other end of which extends over the pivot pin 37 between the bifurcations of the latch member 36 and normally urges the latch member to the lower ends of the slots 35.

The bifurcated portion of latch member 36 has slots formed therein, as indicated at 45 in Fig. 1. These slots have a straight portion as shown in Fig. 1, having a short angularly or laterally extending portion as shown at 46. The purpose and function of the portion 46 of the slots will become apparent as the description proceeds.

Numeral 48 designates an operating or actuating lever

for the latch member 36, and it is rotatable by the operating shaft 21. The end of the operating lever 48 extends between the bifurcations of the latch member 36 and it has a transversely extending pin 47, the ends of which engage in the slots 45 in the bifurcations of the latch member 36. The operating lever 48 has an extending toe 50 which cooperates with a detent spring 51 mounted from one of the posts 12, as shown. The spring 51 has an offset 52 therein, and the toe 50 cooperates with one of the shoulders of this offset to provide a spring detent, such that the operating lever 48 has a snap action. Furthermore the lever 48 has a small amount of overtravel under the influence of spring 51. That is, after latch member 36 has essentially completed its latching movement, lever 48 continues to move slightly, moving pin 47 into slot portions 46. Latch member 36 is now in a dead locked position; (i. e.) to rotate it about pin 37 toward unlatched position movement must be imparted directly to lever 48. When pin 47 is in slot portions 46 the force it exerts is along a radius through pin 37 as a center so there is no further tendency to rotate latch member 36. Latch member 36 cannot now be forced inwardly or collapsed without translating in its mountings. As can be seen if an inward or collapsing force is applied to latch member 36, this force is applied to pin 47. Lever 48 is past center relative to such force and so it tends toward rotating lever 48 counterclockwise rather than clockwise. The result is that pivoting movement of the latch member 36 shifts from pin 37 to pin 47 and the latch member collapses by translation in its mountings as described more fully hereinafter.

The parts are shown in unlatched position of the latch in Fig. 2. If in this figure the lever 48 is rotated in a counterclockwise direction, the pin 47 engages in the slots 45 and moves the latch member 36 in a clockwise direction so that it engages in the slot 17 of the jamb and latches the door in closed position. For unlatching the lever 48 is rotated in the opposite direction and the latch member 36 rotates in the opposite direction to the unlatched position, as shown in Fig. 2. In normal latching and unlatching movements, the latch member 36 simply pivots, the pivot pin 37 pivoting in the lower end of the slots 35 without any translatory movement of the latch member.

If the door is closed with the latch member in extended, that is, latching position, such that it strikes the jamb, the latch member is able to collapse. In the collapsing movement the pin 47 is engaged in the angular portion 46 of the slots 45 as described above. The latch member 36 translates inwardly with the pivot pin 37 moving to the upper end of the slots 35 against the force of the biasing spring 42. The latch member 36 pivots at the same time about the pin 47. The latch member collapses to unlatched position, as shown in Fig. 2, the pin 37 then having moved back to the lower end of the slots 35 under the influence of the biasing spring 42. Thus, it is seen that the latch member 36 is collapsible from latching to unlatched position by translatory and pivotal movement.

It is obvious, of course, that in normal latching and unlatching movement of the latch member 36, that the pin 47 on the lever 48 moves in the slots 45 in the latch member 36. That is, it moves upwardly relative to these slots and then back down to a position in portion 46 as shown in Fig. 1.

As can be seen, if the screw 26 is adjusted, the upper ends of the plates 20 are adjusted inwardly or outwardly relative to the casing 11, so that the reach of the latch member 36 is adjustable.

From the foregoing, those skilled in the art will observe this this invention provides a simple and effective latch mechanism for sliding doors which is able to collapse inwardly to prevent damage of the mechanism if the door is closed with the latch in extended position. The latch mechanism collapses from latched to its normal unlatched

position. The mechanism has the advantage of having only the two positions. That is, it does not have an additional position resulting from collapsing out of which it would have to be moved to either latching or unlatched position. Thus an operation such as moving from collapsed position to latching position and back to unlatching position is obviated. The latch member normally simply operates with pivotal movement between latching and unlatched positions and translates only when it is being collapsed to unlatched position. The latch is dead locked when in normal latching position. The mechanism is formed of simple, uncomplicated, and unusually compact parts and very readily adapts itself to ease of manufacture, fabrication and assembly.

The foregoing disclosure is representative of a preferred form of the invention and it is intended that it be interpreted in an illustrative rather than a limiting sense. Various modifications and alternatives in the invention may be adopted by those skilled in the art and it is intended that the scope of the invention be in accordance with the claims annexed hereto.

I claim:

1. In a latch mechanism, in combination: means comprising a latch member movable between latching and unlatched positions; an operating lever for the latch member operable about a center; mounting means for the latch member including a pivot pin providing for pivotal movement of the latch member and having means providing for translatory movement of the pivot pin in a direction away from the operating center of said lever; and biasing means whereby force is normally applied urging the pivot pin toward the said operating center of the lever, the position and arrangement of the mounting means for the latch member being such that upon applying a collapsing force to the latch member the said pivot pin translates in a direction away from the operating center of the said lever and the latch rotates in normal unlatching direction toward unlatched position, and the mounting means for the latch member providing for freedom of the pivot pin to return to normal operating position toward the operating center of the lever when the collapsing force is removed and the latch member has been collapsed to unlatched position.

2. In a latch mechanism, including a housing having an opening, in combination: a latch member movable between latched and retracted positions; actuating means for the latch member, including an operating lever operable about a center; mounting means for the latch member including a pivot pin carried by the latch member adapting it for translatory movement toward and away from the operating center of said lever, the actuating means including means having a pin and slot connection between the operating lever and the latch member, the connection including a means having a slot having a portion providing for overtravel of the lever into a deadlocked position of the parts; and biasing means associated with the mounting means whereby the latch is normally urged to a normal operating position which is toward the said operating center of said lever, the said mounting means being structurally arranged for such directional translatory movement of the latch member that upon applying collapsing force to the latch member it translates in a direction away from the said operating center of said lever against the force of said biasing means and also rotates in unlatching direction toward unlatched position of the latch member, the mounting means for the latch member having freedom to return to normal operating position when the collapsing force is removed.

3. In a latch mechanism, in combination: means comprising a latch member movable between latching and unlatched positions; an operating lever for the latch member operable about a center; and mounting means for the latch member providing for pivotal movement of the latch member and translatory movement of the pivot point of the

latch member away from the center of operation of said operating lever, the mounting means for the latch member comprising a pin and means having a slot, one of which is fixed in position, the position and arrangement of the mounting means for the latch member being such that upon applying a collapsing force to the latch member the pivot point of the latch member translates away from the center of operation of the lever member, whereby the latch member pivots in unlatching direction toward unlatched position, and the mounting means for the latch member providing for freedom of the pivot point of the latch member to return to normal operating position toward the operating center of the operating lever when the collapsing force is removed and the latch member has been collapsed to unlatched position.

4. In a latch mechanism, in combination: means comprising a latch member movable between latching and unlatched positions; an operating lever for the latch member operable about a center; and mounting means for the latch member providing for pivotal movement of the latch member and translatory movement of the pivot point of the latch member away from the center of operation of said operating lever, the mounting means for the latch member comprising a pin carried by the latch member and a fixed member having a slot in which the pin

operates, the slot having a direction generally to provide for translatory movement of the latch member toward and away from the operating center of the said lever, and means normally biasing the latch member toward the end of the slot nearer to the operating center of said lever, the position and arrangement of the mounting means for the latch member being such that upon applying a collapsing force to the latch member the pivot point of the latch member translates away from the center of operation of the lever member whereby the latch member pivots in unlatching direction toward unlatched position, and the mounting means for the latch member providing for freedom of the pivot point of the latch member to return to normal operating position toward the operating center of the operating lever when the collapsing force is removed and the latch member has been collapsed to unlatched position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,701,156	Palmer	Feb. 1, 1955
2,701,157	Le Bon	Feb. 1, 1955
2,736,185	Collar	Feb. 28, 1956