Dec. 5, 1961 C. L. EADS 3,011,817

NARROW STILE DOOR LOCK

Filed Sept. 2, 1958

Fig. 1.

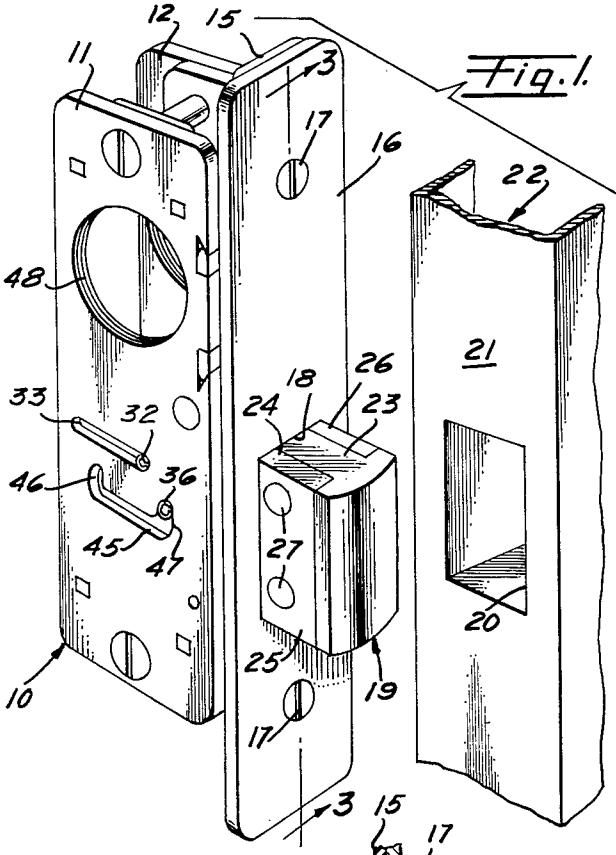


Fig. 3.

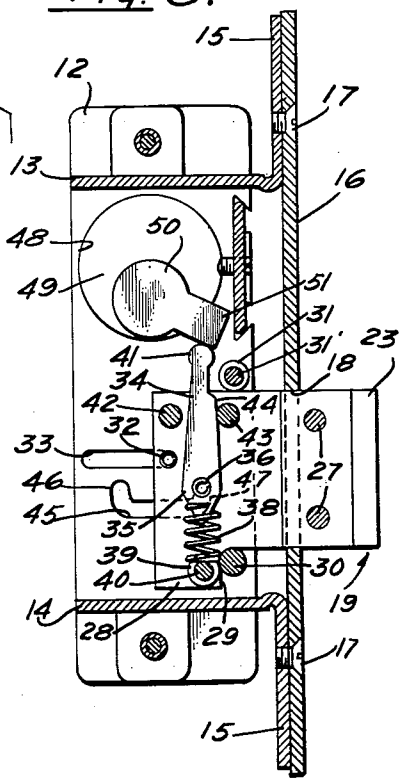


Fig. 4.

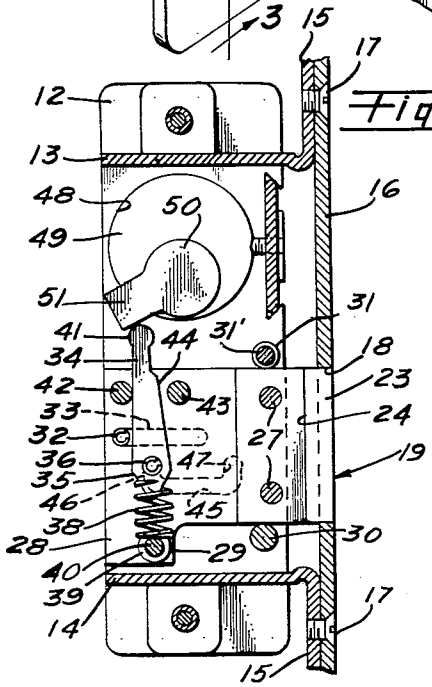
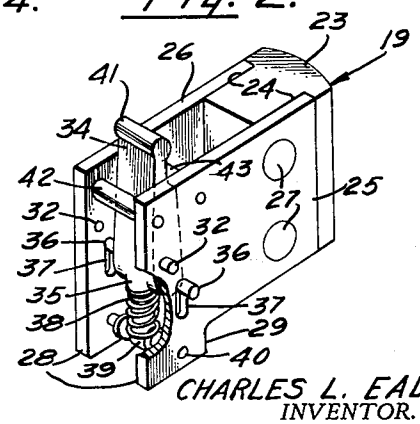


Fig. 2.



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by

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NARROW STILE DOOR LOCK

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The present invention relates generally to lock mechanisms, and is more particularly concerned with a lock mechanism of the type having a rectilinearly movable bolt, which may be utilized with doors having a narrow stile.

Heretofore, conventional lock mechanisms having rectilinearly movable bolts have been unsuited for mounting on doors having narrow stiles, due to the limited mounting space and the difficulty of being able to convert the rotary motion of the conventional key cylinder into rectilinear motion for moving the bolt.

Having the foregoing in mind, it is one object of the present invention to provide in a lock mechanism of the herein described character, a simplified construction which may be utilized for doors having narrow stiles with limited mounting space for the locking mechanism, and in particular where the rectilinear movement of the bolt is restricted to the width of the narrow stile.

A further object is to provide in a narrow stile lock mechanism, improved means for locking the bolt in both its retracted and extended positions.

A still further object is to provide a lock mechanism with a rectilinearly movable bolt structure having a floatingly mounted actuated member which is arranged to provide within the limited confines of a narrow door stile a better distribution of the actuating forces, to the end that more dependable operation may be obtained.

Another object is to provide in a lock mechanism of the herein described type having a rectilinearly movable bolt, an actuating mechanism which permits use of a bolt the length of which may correspond substantially to the width of the door stile.

Still another object is to provide a lock mechanism as in the foregoing, wherein a single member is utilized as a bolt actuator and detent for locking the bolt in both its extended position and its retracted position.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations thereon.

Referring to the accompanying drawings, which are for illustrative purposes only:

FIG. 1 is a perspective view of a lock mechanism embodying the features of the present invention, and an associated door jamb;

FIG. 2 is a perspective view of the lock bolt structure, showing the details of its various elements;

FIG. 3 is a sectional view, taken substantially on line 3—3 of FIG. 1, showing the cooperative relationship of the lock components, the bolt being in extended position; and

FIG. 4 is a view similar to FIG. 3, except that the bolt is shown in retracted position.

Referring more specifically to the drawings, for illustrative purposes there is disclosed in FIG. 1 a lock casing which is designated generally by the numeral 10. This casing comprises a pair of side plates 11 and 12 which are secured in spaced apart relation by means of upper and lower end brackets 13 and 14, these brackets being secured by appropriate conventional means to the side plates and respectively provided with right angled end portions 15—15 for a face plate 16 which may be attached thereto as by screws 17—17. This face plate is formed with a rectangular opening 18 within which a bolt structure 19 is movable to retracted and extended positions as will hereinafter be explained more fully.

The bolt 19 in its locked or extended position is adapted to extend into a suitable opening 20 formed in an edge face 21 of a jamb or another door 22. As best shown in FIG. 2, the bolt 19 is constructed with a T-shaped nose member 23 which is provided with lateral grooves 24—24 in which the ends of side plates 25 and 26 are seated and anchored by suitable means such as rivets 27. The side plates 25 and 26 at their opposite ends have downwardly extending projections 28—28 which form in each case an abutment shoulder 29 which is inwardly spaced from the adjacent end of the side plate.

The bolt 19 is supported in the casing for rectilinear movement through the opening 18. The bolt is supported for rectilinear movement between a lower spacing pin 30 and an upper spacing pin 31, these pins having their ends respectively supported in the casing side plates 11 and 12, and the latter spacing pin being further provided with roller sleeves 31′ which are so positioned as to make roller engagement with the uppermost edges of the bolt side plates 25 and 26 respectively. The innermost ends of the side plates 25 and 26 carry laterally projecting guide pins 32—32 which are arranged to travel between the ends of elongate slots 33—33 respectively formed in the casing side plates 11 and 12. It will be observed in FIG. 3 that the extended position of the bolt is limited by the engagement of the abutment shoulders 29—29 against the lower spacing pin 30, whereas the movement to retracted position is limited by engagement of the pin 31 with the innermost end of the slot 33, as shown in FIG. 4. It will also be observed that in the retracted position of the bolt, the outermost end face of the bolt will be flush with the outer face of the face plate 16 while the inner end faces of the bolt side plates 25 and 26 are substantially flush with the inner edges of the casing side plates 11 and 12. Advantage is thus taken of the maximum rectilinear movement of the bolt.

Referring further to FIGS. 2 and 3, a combined actuating and locking arm 34 is floatingly supported between the bolt side plates 25 and 26 for pivotal movement and generally endwise movement.

The arm 34 has an innermost end 35 which is secured to a laterally extending pivot pin 36 the outermost ends of which are respectively positioned in vertically extending slots 37—37 provided respectively in the bolt side plates 25 and 26. The end 35 of the arm 34 is more or less pointed so as to extend into one end of a compression spring 38, the other end of this spring being retained by a circumferentially extending rib 39 formed intermediate the ends of a pin 40, the opposite ends of which are respectively supported in the bolt side plates 25 and 26. This spring serves to bias the arm 34 to one side or the other of a dead center position upon swinging movement of the arm about its pivot pin 36.

As shown in FIGS. 2 and 3, the arm 34 has an outermost end 41 which projects above the upper edges of the bolt side plates 25 and 26 and is of rounded configuration along its end edge. The extent of movement on each side of dead center position of the arm 34 is limited by spaced stop pins 42 and 43 which are symmetrically spaced on opposite sides of the dead center position. However, the extent of movement of the outermost end 41 to the right side of the dead center position is less than the movement on the left side, in order that a better disposition of actuating forces may be obtained and in order that maximum rectilinear movement of the bolt may be utilized. The angular limit of movement between the dead center position of the arm 34 and its engagement with the stop pin 43 is decreased by providing an offset edge portion 44 on

the arm 34 for engagement with the pin 43. By applying an actuating force against the outermost end 41 of the arm 34, the arm may be swung into selective engagement with the stop pin 42 or the stop pin 43, and by the application of additional force the bolt 19 may be selectively actuated to its retracted position or its extended position. During this movement of the bolt, it will be observed that the arm 34 has unitary movement with the bolt.

The arm 34 is also utilized to control the locking of the bolt in both its extended and retracted positions. For this purpose, the slots 37—37 permit endwise movement of the arm 34 against the compression spring 38. Advantage is taken of this construction by providing elongate slots 45—45 respectively in the casing side plates 11 and 12, the ends of the pivot pin 36 being respectively positioned for movement in these slots during movement of the bolt between its retracted and extended positions. At the retracted and extended positions of the bolt, the slots 45 are provided with upwardly extending detent notches 46 and 47, the notch 46 corresponding with the retracted position of the bolt and the notch 47 corresponding with the extended position of the bolt. At these positions, the spring 38 will bias the pivot pin 36 upwardly into the detent notch and thus deadlock the bolt. However, by depressing the lever 34 by substantially endwise movement, the ends of the pin 36 will move downwardly until it enters the slot 45, whereupon the bolt is released for rectilinear movement to its other position, where the spring will bias the pin into the adjacent notch and deadlock the bolt in this position.

For selectively actuating the bolt 19, various types of manually operable mechanisms may be used. In the present instance the casing side plates 11 and 12 are respectively provided with a threaded opening 48 in each case which is positioned above the bolt structure for the mounting therein of a conventional key actuated lock cylinder 49 which carries a rotatable member 50 having a cam extension 51. It will be observed that the center of the opening 48, and the center of rotation of the member 50 are vertically aligned slightly to the rear of a vertical longitudinal center line of the casing side plates 11 and 12, and that the outermost end 41 of the arm 34 is positioned in the path of movement of the cam extension 51. The cam extension may thus be rotated in opposite directions into engagement with the outermost end of the arm 34 for motivating the bolt 19 to either its extended or retracted position. The coaction of the cam extension and the arm 34 also functions to control the locking and unlocking of the bolt in these positions.

Considering the operation more specifically, in FIG. 3 the bolt is shown in its extended position. In this position, the arm 34 is in engagement with the stop pin 43. The key control cylinder is actuated in an unlocking direction by rotating the member 50 in a direction to carry the cam extension against the outer end 41 of the arm 34. As the cam extension continues to move, the arm 34 is moved past its dead center position into engagement with the stop pin 42. In this position of the arm 34, the cam extension 51 then acts to apply a force against the outer end 41 of the arm in a direction which will move the arm 34 downwardly in an endwise direction against the action of the spring 38. The ends of the pivot pin 36 move downwardly in their associated slots 37 until the pin is in the slot 45, the bolt now being unlocked. Further movement of the cam extension 51 in a clockwise direction operates to move the arm 34 and bolt 19 as a unit to the retracted position of the bolt, whereupon the spring 38 forces the ends of the pivot pin 36 upwardly into the detent notch 46 so as to lock the bolt in its retracted position, as shown in FIG. 4.

In order to unlock the bolt and move it to extended position from its retracted position, it is only necessary to actuate the key control lock mechanism in proper direction to rotate the cam extension 51 in a counterclockwise direction until it engages the outer end 41 of the arm 34

as shown in FIG. 4. Continued movement swings the arm 34 through its dead center position into engagement with the stop pin 43. Further movement of the cam extension now acts to move the arm 34 in an endwise direction downwardly, this movement acting to disengage the pivot pin 36 with respect to the detent notch 46. The cam extension may by further movement now actuate the arm 34 and bolt 19 with unitary movement to its extended position, as shown in FIG. 3. In the extended position, the pivot pin 36 may now move under the action of spring 38 into the detent notch 47 and thus lock the bolt in extended position.

From the foregoing description, it is believed that it will be readily apparent that the lock structure of the present invention will accomplish the objects as hereinbefore noted.

Various modifications may suggest themselves to those skilled in the art without departing from the spirit of my invention, and, hence, I do not wish to be restricted to the specific form shown or uses mentioned, except to the extent indicated in the appended claims.

I claim:

1. In a locking mechanism for a door having a relatively narrow stile, the combination, comprising: a casing structure positionable within the stile, said structure having an opening adapted to lie adjacent an edge face of said stile; bolt means supported in said casing structure for movment to a retracted position within said casing and to an extended position projecting through said opening; a movably mounted bolt actuating arm carried by said bolt, said arm having an end portion projecting beyond the uppermost edge confines of said bolt; means supporting said arm on said bolt for limited longitudinal movement in opposite directions; manually movable means vertically spaced above said bolt engageable with said portion for imparting longitudinal movement to said arm and actuating said bolt to its retracted and extended positions; and means controlled by said longitudinal movement of said arm for releasably locking said bolt in its retracted and extended positions, respectively.

2. In a locking mechanism for a door having a relatively narrow stile, the combination, comprising: a casing structure positionable within the stile, said structure having an opening adapted to lie adjacent an edge face of said stile; bolt means supported in said casing structure for movement to a retracted position within said casing and to an extended position projecting through said opening; an actuating arm carried by and movable with said bolt, said arm having a projecting end extending vertically beyond said bolt; means mounting said arm on said bolt for limited endwise movements in opposite directions; biasing means carried by said bolt normally acting to move said arm to one limit of its endwise movement; manually movable means vertically positioned from said bolt engageable with said projecting end for moving said arm to its other limit of endwise movement against said biasing means, and thereafter selectively move said bolt to its retracted and extended positions; and releasable locking means controlled by said arm movements operative at said extended and retracted positions of said bolt.

3. In a locking mechanism for a door having a relatively narrow stile, the combination, comprising: a casing structure positionable within the stile, said structure having an opening adapted to lie adjacent an edge face of said stile; bolt means supported in said casing structure for movement to a retracted position within said casing and to an extended position projecting through said opening; an actuating arm carried by and movable with said bolt, said arm having a projecting end extending vertically beyond said bolt; means mounting said arm on said bolt for limited endwise movement between a locked position and an unlocked position; biasing means carried by said bolt normally motivating said arm towards its locked position; manually operable means vertically po-

sitioned from said bolt engageable with said projecting end for initially moving said arm endwise to its unlocked position and thereafter selectively move said bolt to its retracted and extended positions; and means cooperating with said arm in its locked position for locking the bolt in the retracted and extended positions thereof.

4. In a locking mechanism for a door having a relatively narrow stile, the combination, comprising: a casing structure positionable within the stile, said structure having an opening adapted to lie adjacent an edge face of said stile; bolt means supported in said casing structure for movement to a retracted position within said casing and to an extended position projecting through said opening; an actuating arm having an inner end positioned within the confines of the bolt, and an outer end projecting therefrom; a pivot pin carried by said arm adjacent its inner end and having its opposite ends respectively positioned in one of a pair of spaced aligned parallel slots in said bolt; a spring coacting with the inner end of said arm to bias said pivot pin towards one set of corresponding ends of said slots, and upon swinging movement of the arm through a dead center position, bias said arm towards one of a pair of angularly spaced limit positions; means engaged by at least one of the ends of said pivot pin in the retracted and extended positions of said bolt for locking it in such positions, but being unlocked by movement of said pivot pin in its slots against the action of said spring; and manually operable means engageable with the outer end of said arm for successively swinging said arm from one side of dead center to the other, moving said pivot pin along the associated slots against said spring to unlock the bolt, and thereafter move the bolt to one of said positions of retraction or extension.

5. In a locking mechanism for a door having a relatively narrow stile, the combination, comprising: a casing structure positionable within the stile, said structure having an opening adapted to lie adjacent an edge face of said stile; bolt means supported in said casing structure for movement to a retracted position within said casing and to an extended position projecting through said opening; an actuating arm having an inner end positioned within the confines of the bolt and an outer end projecting therefrom; a pivot pin carried by said arm adjacent its inner end and having its opposite ends respectively positioned in one of a pair of spaced aligned parallel slots in said bolt; a spring coacting with the inner end of said arm to bias said pivot pin towards one set of corresponding ends of said slots, and upon swinging movement of the arm,

through a dead center position; stops on opposite sides of said arm positioned to unequally limit the extent of its angular swinging movement from the dead center position; means engaged by at least one of the ends of said pivot pin in the retracted and extended positions of said bolt for locking it in such positions, but being unlocked by movement of said pivot pin in its slots against the action of said spring; and manually operable means engageable with the outer end of said arm for successively swinging said arm from one side of dead center to the other, moving said pivot pin along the associated slots against said spring to unlock the bolt, and thereafter move the bolt to one of said positions of retraction or extension.

6. In a locking mechanism for a door having a relatively narrow stile, the combination, comprising: a casing structure positionable within the stile, said structure having a first opening adapted to be positioned adjacent a side of said stile, and a second opening adapted to be positioned adjacent an edge face of said stile; a bolt supported in said casing below said first opening for rectilinear movement to a retracted position within said casing and to an extended position projecting through said second opening, said bolt having spaced apart side plates; an elongate bolt actuating arm positioned with an inner end thereof between said side plates and an outer end projecting above the bolt; means supporting said arm for limited swinging movement about its inner end portion, and for a generally endwise movement between a locked position and an unlocked position; means normally biasing the endwise movement in a direction towards the locked position; manually operable means mounted in said first opening engageable with said arm outer end for initially moving said arm endwise to its unlocked position and thereafter selectively move said bolt to its retracted and extended positions; and means cooperating with said arm in its locked position for locking the bolt in the retracted and extended positions thereof.

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