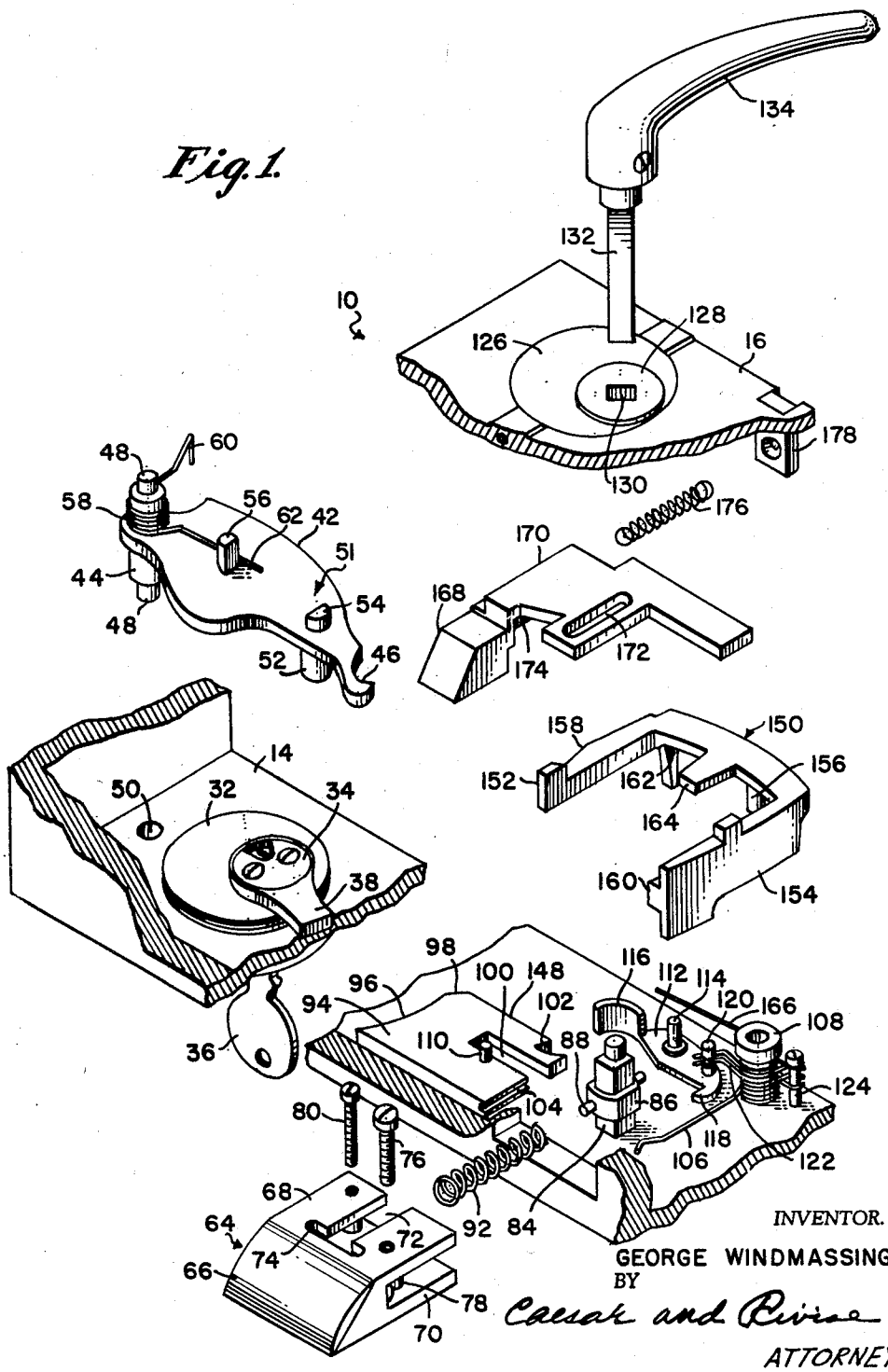
June 28, 1960 G. WINDMASSINGER 2,942,451

LATCH LOCK

Filed Sept. 11, 1957 4 Sheets-Sheet 1

Fig. 1.



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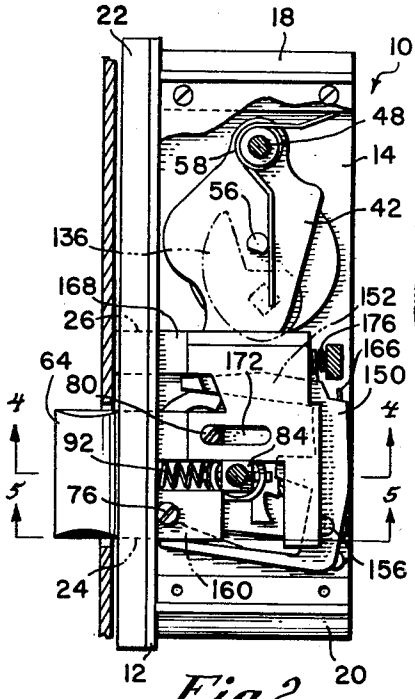


Fig. 2.

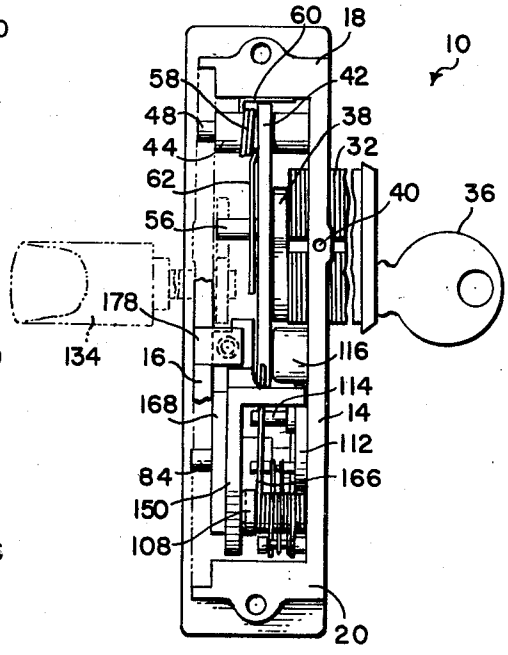


Fig. 3.

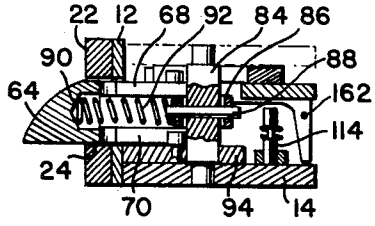


Fig. 4.

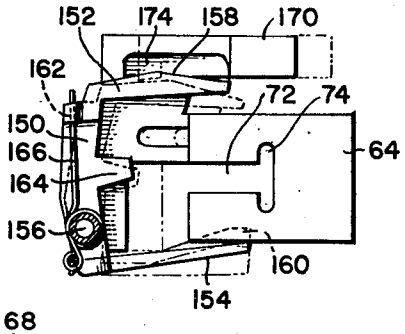


Fig. 7.

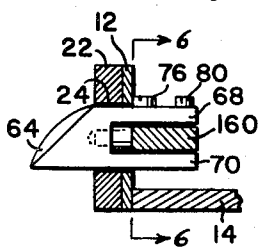


Fig. 5.

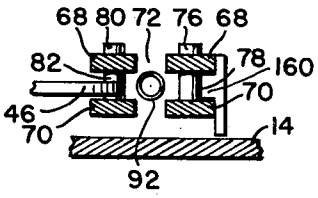


Fig. 6.

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LATCH LOCK

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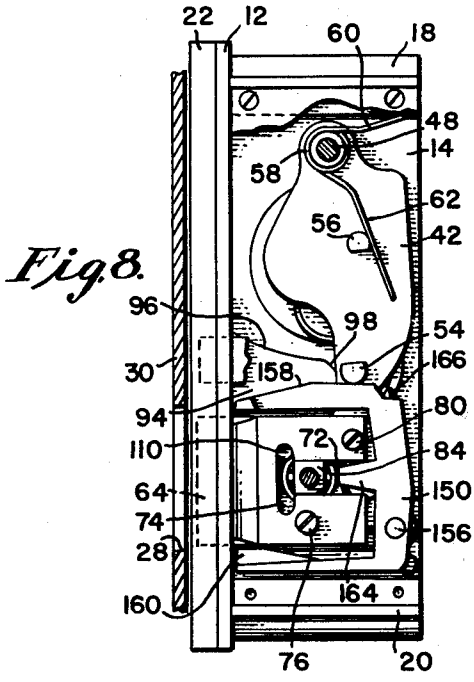


Fig. 8.

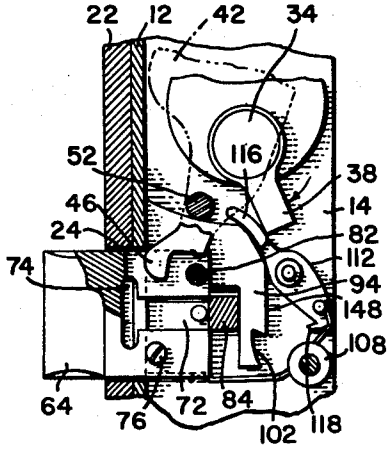


Fig. 11.

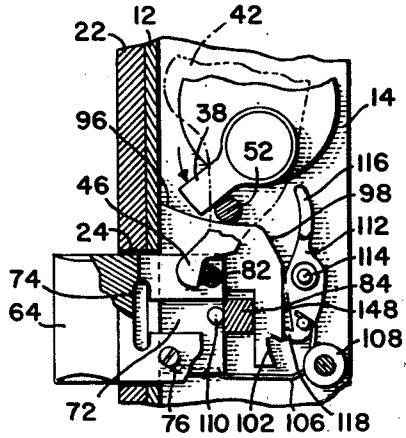


Fig. 9.

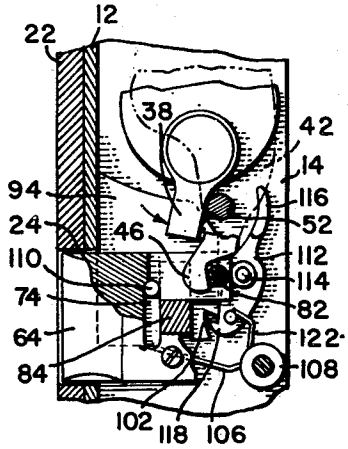


Fig. 10.

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LATCH LOCK

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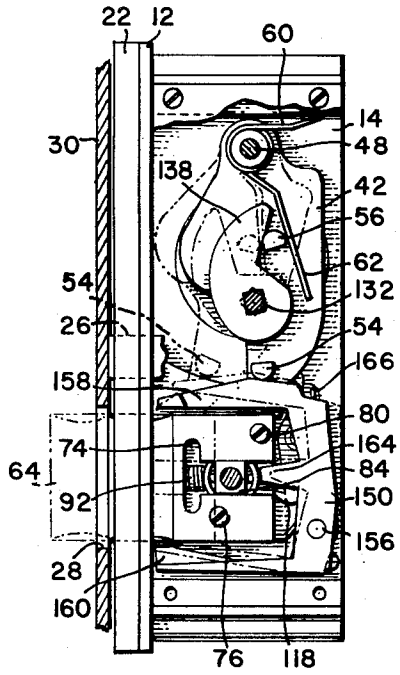


Fig. 12.

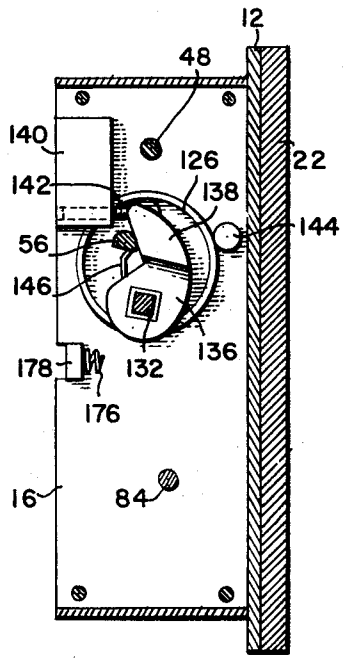


Fig. 13.

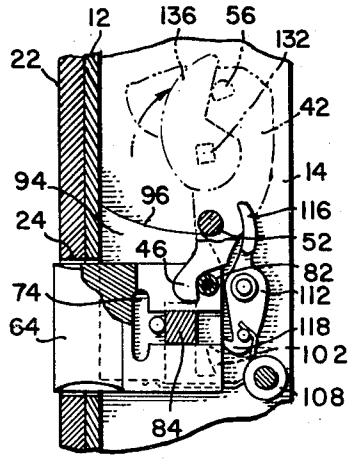


Fig. 14.

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United States Patent Office 2,942,451 Patented June 28, 1960

2,942,451

LATCH LOCK

George Windmassinger, Feasterville, Pa., assignor to George B. Henne & Co., Inc., Philadelphia, Pa., a corporation of Pennsylvania

Filed Sept. 11, 1957, Ser. No. 683,332

6 Claims. (Cl. 70—150)

This invention relates to a latch lock mechanism having general utility but especially well adapted for use in office buildings.

In office buildings it is desirable that the doors be capable of opening freely from the inside or outside during working hours, but after working hours it is desirable that the doors be restricted by a lock mechanism wherein those remaining in the building can easily open the doors to leave, while those wishing to return after working hours can do so only with a key.

The primary object of the invention is to provide a lock mechanism capable of performing the aforementioned functions. The mechanism is a latch lock operable by a lever handle from one side and a key from the other. The construction and arrangement of parts are such that when the latch bolt is retracted by key operation, a means is automatically actuated holding the bolt in a fixed fully retracted position. In this position the lever handle is incapable of affecting the lock mechanism so that the door is freely movable from inside and outside the door. This is the position of the lock during office hours. On the other hand, when the key is operated to release the latch bolt to the door locking position the lever handle is capable of releasably retracting the latch bolt bit it cannnot retract the bolt to a position where it remains fixedly open, as is possible with key operation. Thus the lever handle can open the door from the inside and automatically lock it when the handle is released. From the outside only key operation can open the door. This is the after-office hours position of the lock.

Another object of the invention is to provide a lock mechanism of the character described which is of such construction and arrangement of parts as to permit it readily to be installed in relatively narrow metallic door frame extrusions.

A further object of the invention is to provide a lock mechanism of the character described in association with an auxiliary lock which prevents the main latch bolt from being retracted by prying implements applied to the bolt.

And yet another object of the invention is to provide a lock mechanism which can be manufactured of standard parts, which is relatively simple to assemble, relatively easy to install and relatively easy to repair.

These and other objects of the invention will become more apparent as the following description proceeds in conjunction with the accompanying drawings, wherein:

Figure 1 is a group perspective view, some parts being broken away, of the lock mechanism;

Figure 2 is an elevational view looking towards the front of the lock with the rear wall broken away and handle omitted;

Figure 3 is an end elevational view looking to the left on Figure 2;

Figure 4 is a section taken on the line 4—4 of Figure 2;

Figure 5 is a section taken on the line 5—5 of Figure 2;

Figure 6 is a section taken on the line 6—6 of Figure 5;

Figure 7 is a reverse elevational view of the main latch bolt, auxiliary bolt and yoke;

Figure 8 is a view similar to Figure 2 showing the latch bolt in a position as retracted by the key, the auxiliary latch being broken away for clarity;

Figure 9 is a fragmentary view similar to Figure 8 with latch bolt in extended or door locking position and about to be retracted by key operation;

Figure 10 is a fragmentary view similar to Figure 9 showing the position of the latch bolt as completely retracted by key operation;

Figure 11 is a fragmentary view similar to Figure 9 showing initial release of latch bolt from its locked position of Figure 10;

Figure 12 is a view similar to Figure 8 showing position of latch bolt as retracted by lever handle;

Figure 13 is an elevational view looking to the rear on the cover plate carrying the lever handle cam; and

Figure 14 is a fragmentary view similar to Figure 12 with parts broken away to better illustrate the relative position of the operating elements.

Specific reference is now made to the drawings wherein similar reference characters are used for corresponding elements throughout.

The present lock mechanism is generally indicated at 10 and is contained in a housing comprising a side wall 12, a front wall 14, a rear wall 16 and top and bottom walls 18 and 20. Secured by appropriate screws to the side wall 12 is a face plate 22, there being aligned openings 24 and 26 in the side wall and face plate through which the main and auxiliary latch bolts are made to extend. The housing containing the lock mechanism is adapted for ready installation into the frame of a door and accordingly, the main latch bolt is movable into and out of engagement with a keeper which is normally another opening 28 that is provided in the door jamb 30, there being no opening or keeper for the auxiliary latch bolt.

Threaded into a suitable opening in the front wall 14 is a conventional pin tumbler lock which contains a barrel 32 in which is rotatably mounted a plug 34 operable by a key 36. Mounted on the end of the plug which is disposed within the housing is an arm 38. The proper adjusted position of the barrel 32 on the front wall 14 is maintained by an appropriate set screw 40 which enters an axial groove on the side of the barrel, as shown clearly in Figure 3.

A latch bolt actuating plate 42 is provided which at its upper end carries a pin 44 and at its lower end is provided with a curved portion 46. The pin 44 extends perpendicularly through the plane of the plate 42 and includes reduced terminal portions 48 which are journaled for rotation in suitable apertures 50 that are provided in the front and rear walls 14 and 16. Thus the plate 42 is mounted in such a way that its lower curved portion 46 is movable towards and away from the side plate 12 about the pivot pin 44. Adjacent its lower curved end 46, the plate 42 also carries a pin 51 which extends perpendicularly therethrough, said pin having a portion 52 facing the front wall and a portion 54 facing the rear wall. Between the pivot pin 44 and the pin 51 the plate 42 also carries a perpendicularly extending pin 56 which faces the rear wall 16. A spring 58 is wound about the pivot pin 44 and has a terminal portion 60 which bears against the upper wall 18 and another terminal portion 62 which bears against the pin 56, the spring acting to bias the lower curved portion 46 of the plate towards the side wall 12. The plate 42 is so mounted in the housing that roation of the plug 34 by the key 36 in a clockwise direction will move the plug arm 38 into position to bear against the portion 52 of the pin 51 and continued movement of the key will pull

the lower end of the plate 42 away from the side wall 12.

The main latch bolt is indicated at 64 and is a substantially rectangular block having the conventional forward arcuate portion 66. To the rear of the arcuate portion the bolt consists of a pair of spaced plates 68 and 70 each including a slot containing a longitudinal portion 72 and a lateral portion 74. Threaded into a pair of appropriate aligned apertures in the plates 68 and 70 of the latch bolt is a screw 76, the head of which is adapted to strike the side wall 12 and serve as a stop to limit the outward or extended movement of the latch bolt 64, there being a bushing 78 which is interposed between the plates 68 and 70 for receiving the stop screw 76. At another predetermined location, another pair of aligned apertures is provided in the plates 68 and 70 of the latch bolt for receiving a further screw 80, there being a bushing 82 about said screw which is interposed between the plates 68 and 70 of the latch bolt.

Secured to the front wall 14 adjacent its lower end is a square post 84 with a collar 86 thereabout and a pin 88 extending diametrically through the collar and the post. The latch bolt 64 is provided with a recess 90 for receiving one end of a coil spring 92 which extends longitudinally of the latch bolt, the other end of the spring receiving the pin 88 and pressing against the collar 86 on the post 84. The spring 92 is biased to urge the latch bolt in an extended position through the opening 24 in the face plate and therefore towards the locked position. In the sliding movement of the latch bolt it will be observed that the plates 68 and 70 of the latch bolt receive the collar 86 between them and the square post 84 slides in the longitudinal portion 72 of the latch bolt slots.

Mounted for vertical movement on the front wall 14 is a substantially rectangular plate or slide 94. The upper surface of said slide is curved as at 96 and the upper corner of the slide remote from the side wall 12 is cut off or downwardly inclined as at 98. The slide also contains a slot 100 opening through its lower edge and of width sufficient to clear the square post 84, the thickness of the slide being such that it under-rides the collar 86 on the square post 84. The lower corner of the slide remote from the side wall 12 includes an angulated, open-ended slot 102. The lower edge of the slide 94 includes a groove 104 into which fits one portion of a spring 106 which is wound about a hollow post 108 that is mounted on the front wall 14, the spring 106 normally urging the slide upwardly so that its upper curved surface 96 engages the portion 52 of the pin 51 carried by the plate 42. At a predetermined location on the side of the slot 100 towards the side wall 12, the slide carries an upstanding pin 110.

A locking lever bar 112 is provided which is pivoted intermediate its ends by a pin 114 to the front wall 14 adjacent the hollow post 108. The upper portion of the locking lever 112 is curved as at 116 and the lower end of the locking lever is shaped to form a hook 118. A pin 120 is provided on the locking lever adjacent its hook 118, there being a spring 122 which bears against the pin 120, the spring being wound about the post 108 and bearing against another pin 124 which is carried by the front wall 14 near the post 108. The spring 122 urges the hook end of the locking lever towards the slide 94.

The rear wall 16 includes a disk 126 in which is rotatably mounted a bearing 128 with a square opening 130 for receiving the square shaft 132 of a lever handle 134. Mounted on the bearing for rotation therewith is a cam member 136 having a portion 138 that is adapted to bear against the pin 56 of the plate 42. Upon rotation of the handle 134 in a clockwise direction, the portion 138 of the cam 136 will bear against the pin 56 and pivot the lower end 46 of the plate 42 away from the side wall 12. The rear wall 16 is further provided with a block 140 in which is threaded a set screw 142, the same being so set that the cam 136 strikes the set screw 142 before the latch bolt is completely retracted. The reverse or counter-clockwise rotation of the lever handle 134 is limited by the fact that the portion 138 of the cam 136 strikes another stop 144 which is carried by the rear wall 16 opposite the set screw 142. A spring 146 is provided which normally urges the portion 138 of the cam 136 away from the set screw 142.

At this point the operation of the lock will be described first in connection with key actuation and then in connection with handle actuation. Regarding key actuation, it will be seen from Figure 9 that when the latch bolt 64 is extended into the door latching position, the portion 52 of the pin 51 of the plate 42 bears against the upper curved surface 96 of the slide 94 urging the latter downwardly against action of the spring 106. In this lowered position the slide pin 110 is positioned in front of the block 84 and therefore is in alignment with the longitudinal portion 72 of the latch bolt slot. Also in this lowered position of the slide, the longitudinal edge portion 148 which faces away from the side wall 12 bears against the hook 118 of the locking lever 112 so that the hook 118 is not engaged in the slide slot 102, as shown clearly in Figure 9. Rotation of the key in a clockwise direction as indicated by the arrow in Figure 9 will cause the arm 38 to bear against the portion 52 of the pin 51 of the plate 42. Continued rotation of the key in the clockwise direction will urge the plate 42 away from the side wall 12 and in so doing the curved portion 46 at the lower end of the plate 42 will pull on the bearing 82 of the latch bolt screw 80 thereby retracting the latch bolt 64 against action of the spring 92. As the latch bolt is retracted the portion 52 of the pin 51 rides on the upper curved surface 96 of the slide 94 and keeps the slide in the downward position as previously described hereinabove and as shown in Figure 9. When the latch bolt is completely retracted within the aperture 24 so that its outer edge clears the surface of the face plate 22, as shown in Figures 8 and 10, the portion 52 of the pin 51 of the plate 42 has assumed a position at the cut-off corner portion 98 of the slide 94, as shown in Figure 10. When this occurs the slide 94 is moved upwardly by its spring 106 so that the slide pin 110 engages in the lateral portion 74 of the latch bolt slot. At the same time the slide 94 moves upwardly to a position where the hook 118 of the locking lever 112 engages in the slot 102 at the lower corner of the slide 94, as shown in Figure 10. Thus when the latch bolt 64 is completely retracted by the key the latch bolt is fixedly retained in the completely retracted position.

The latch bolt is released by key operation in the following manner, as shown in Figure 11. When the key is rotated in a counter-clockwise direction as shown by the arrow in Figure 11, the rotatable plug arm 38 strikes the curved portion 116 of the locking lever 112 thereby rocking the lever about its pivot 114 and urging the hook 118 out of engagement with the slide slot 102.

When this occurs the inner surface of the curved portion 116 of the locking lever presses against the portion 52 of the pin 51 of the plate 42 so that it clears the cut-off corner 98 of the slide, whereupon the spring 92 urges the latch bolt 64 into the latching position and the spring 58 acting on the plate 42 urges the curved portion 46 of said plate towards the side wall 12.

Regarding the operation of the lock by the lever handle 134, when the latch bolt is in the extended or latching position and the lever handle is rotated in a clockwise direction when looking on the rear wall 16, the portion 138 of the cam 136 bears against the pin 56 of the plate 42 thereby pivoting the latter so that its lower curved portion 46 acts upon the latch bolt screw 80 to retract the latch bolt 64. This retraction takes place to the point where the portion 138 of the lever handle cam 136 strikes the stop 142, as shown in

Figure 13. This position is such that the portion 52 of the pin 51 of the plate 42 still rides upon the upper curved surface 96 of the slide 94 and has not reached the cut-off corner 98. As a result, after complete rotation of the lever handle until its cam strikes the set screw stop 142, the slide 94 still remains in the position shown in Figures 9 and 14 so that the latch bolt is not retained in a fixed retracted position by operation of the lever handle as it is by operation of the key.

To improve the security of the lock so that it will resist opening of the main latch bolt by a prying implement applied thereto, an auxiliary lock mechanism is combined with the aforementioned elements. Said auxiliary lock mechanism comprises a substantially U-shaped yoke 150 having upper and lower legs 152 and 154, a depending pivot pin 156 adjacent its lower corner, an inclined cam surface 158 on the leg 152, a shoulder 160 on the inner surface of the lower leg 152 and an aperture 162 in a portion of the yoke adjacent its upper corner. Said yoke 150 is positioned in the casing so that its pivot pin 156 is journaled in the hollow post 108 whereby the upper and lower legs 152 and 154 frame the latch bolt 64, there being a central lug 164 which is carried by the web of the yoke that is adapted to enter the longitudinal portion 72 of the latch bolt 64, as shown more clearly in Figures 7, 8 and 12. One arm 166 of the slide spring 106 extends through the aperture 162 of the yoke and thereby biases the yoke upwardly about its pivot pin 156 so that the shoulder 160 is urged into the space between the upper and lower plates 68 and 70 of the latch bolt adjacent the latch bolt stop screw 76, as shown more clearly in dotted lines in Figures 2 and 7.

The auxiliary lock mechanism also includes an auxiliary latch bolt 168 which is adapted to move in and out of the aligned openings 26 in the side wall 12 and face plate 22. The auxiliary bolt 168 includes a plate 170 having an elongated slot 172 for receiving the head of the main latch bolt screw 80 and an inner curved shoulder 174 forming a groove which receives the portion 54 of the pin 51 of the plate 42. The end of the plate 170 of the auxiliary latch bolt 168 which faces away from the side wall 12 contains a groove which seats a coil spring 176 whose other end is seated in the groove of an abutment 178 that is carried by the rear wall 16 of the housing.

The spring 176 normally urges the auxiliary latch bolt 168 outwardly through the opening 26, and when this occurs a portion of the shoulder 174 of the auxiliary latch bears against the portion 54 of the pin 51 of the plate 42. This portion 54 of the pin in turn presses against the leg 152 of the yoke at a point beyond the inclined surface 158, thereby rocking the yoke 150 downwardly about its pivot pin 156 so that the shoulder 160 of the lower leg 154 of the yoke is moved out of the space between the plates 68 and 70 of the main latch bolt 64, as shown more clearly in Figure 12. However, when the auxiliary latch bolt 168 is itself retracted while the main latch bolt 64 is in the extended or latching position (and this occurs because there is no keeper opening in the door jamb for the auxiliary latch bolt), then the portion 54 of the pin 51 of the plate 42 is caused to be positioned above the inclined surface 158 of the upper leg 152 of the yoke 150, whereupon the yoke rocks upwardly and the shoulder 160 on the lower leg 154 of the yoke enters the space between the upper and lower plates 68 and 70 of the main latch bolt 64.

Thus when the main latch bolt is extended but the auxiliary latch bolt is retracted, a prying implement applied to the main latch bolt cannot retract the same since it is obstructed by the shoulder 160 of the yoke. However, the main latch bolt can be retracted either by the lever handle 134 or the key 36. This is so because the operation of the lever handle or the key causes the plate 42 to rock about its pivot 48 so that the lower curved portion 46 bears against the main latch bolt screw 80. At the same time, while the portion 52 of the pin 51 of the plate 42 rides upon the upper curved surface 96 of the slide 94, the other portion 54 of the pin 51 is caused to bear against the leg 152 of the yoke and rock it, whereupon the shoulder 160 of the yoke moves out of the space between the plates 68 and 70 of the main latch bolt so that the main latch bolt is free to be retracted.

While a preferred embodiment of the invention has been shown and described hereinabove, minor variations may be made by skilled artisans in the construction and arrangement of parts without departing from the spirit of the invention and the scope of the appended claims.

I claim:

1. A latch lock mechanism comprising a substantially rectangular housing having a side wall and front and rear walls, a latch bolt slidable through an opening provided in said side wall, said latch bolt including a slot having a longitudinal and a lateral portion, spring means normally urging said bolt through the opening towards the locked position, a plate pivoted to said front wall for movement towards and away from said side wall, a first pin carried by said latch bolt, a curved member at one end of said plate bearing on said pin, a substantially rectangular slide beneath said latch bolt and movable vertically, said slide including an upper curved surface, a cut-off corner and an upstanding pin, the lower corner of said slide adjacent said cut-off corner including an open-ended slot, a second pin carried by said plate adjacent its curved member, spring means urging said slide upwardly so that its upper curved surface bears against said second pin, a locking lever pivoted intermediate its ends on said front wall, said locking lever including an upper curved portion and a lower hook, spring means urging said hook towards said slide, said hook bearing against a portion of the slide above its slot when the latch bolt is through the opening in the side wall and in the locked position and said slide pin being in position to enter the longitudinal portion of said latch bolt slot, a barrel mounted in the front wall of said housing, a key-operated plug rotatable in said barrel, said plug including an arm thereon extending beyond the barrel and into the housing whereby when the key-operated plug is rotated clockwise, said arm bears on said second pin to pull said plate away from said side wall, the curved member of said plate pulling on said first latch bolt pin to retract the latter, said second pin riding against the upper curved surface of said slide until said latch bolt is fully retracted whereupon said second pin reaches the cut-off corner of said slide allowing the slide spring means to push the slide upwardly until the slide slot is engaged by the locking lever hook and the slide pin is engaged in the lateral portion of the latch bolt slot to retain the latch bolt in a fixed retracted position, and whereby upon counterclockwise rotation of the plug, the plug arm bears against the upper curved portion of the locking lever urging said curved portion against said second plate pin and also rocking said locking lever until its hook is released from the slide slot, whereupon the latch bolt moves into the locked position through the opening in the side wall.

2. The combination of claim 1 and a cam rotatably mounted on said rear wall, a lever handle operatively connected to said cam and a stop carried by said rear wall at a predetermined position from the cam, said plate including a third pin, whereby operation of the lever handle clockwise will cause the cam to engage said third plate pin, move the latter and retract the latch bolt, but said cam will strike said stop before the locking lever hook can engage the slide slot so that the latch bolt cannot be retracted to a fixed position by operation of the lever handle nor can the lever handle affect the latch bolt after the latter has been fully retracted to a fixed position by the key-operated plug.

3. The combination of claim 2 and an auxiliary lock mechanism which prevents prying retraction of said latch bolt.

4. The combination of claim 3 wherein said auxiliary lock mechanism comprises a substantially U-shaped yoke pivoted at one of its corners to the front wall, one leg of which has a shoulder and the other leg of which has an inclined surface, spring means biasing said yoke so that the shoulder of said one leg obstructs movement of said latch bolt while said inclined surface engages said second plate pin, and an auxiliary bolt adapted to pass through an additional opening in said side wall, said auxiliary bolt having an extension with an arcuate recess receiving said second plate pin whereby when said auxiliary bolt is in the extended position through its opening in said side wall, the walls of said arcuate recess force said second plate pin against said other leg of said yoke so that the latter pivots and moves the shoulder of said one yoke leg out of obstruction with said latch bolt and the latter is fully retractable whereas when said auxiliary bolt is itself retracted, said second plate pin engages said inclined surface of said other yoke leg and said shoulder on said one yoke leg obstructs said latch bolt.

5. A latch lock mechanism comprising a housing having a side, front and rear wall, a latch bolt slidable through an opening provided in the side wall, spring means normally urging the latch bolt through the opening towards an extended position, latch bolt retracting means, a key-operated plug rotatably mounted on the front wall, said plug including an arm operative upon said latch bolt retracting means, means releasably retaining said latch bolt in a fixed position when the latter is fully retracted, said latch bolt retracting means including a plate pivoted at one of its ends between the front and rear walls, the other end of the plate bearing upon a portion of the latch bolt, the plate including a pin adjacent the other end engageable by the key-operated plug arm, said means retaining said latch bolt in a fixed position comprising a slide mounted vertically on the front wall beneath said latch bolt, spring means normally urging said slide upwardly, a slot in said latch bolt including a longitudinal and a lateral portion, a pin carried by said slide and riding in the longitudinal portion of said latch bolt during extension and retraction thereof, means permitting said slide pin to enter said lateral portion of said latch bolt slot when said latch bolt is fully retracted and means releasably locking said slide with said slide pin in the lateral portion of said latch bolt slot, said slide including an upper curved surface against which said plate pin bears to push said slide down with said slide pin in the longitudinal portion of said latch bolt slot, said means permitting said slide pin to enter said lateral portion of the latch bolt slot including a cut-off portion in the slide downwardly inclined from one end of said upper curved surface, whereby when said plate pin reaches said cut-off portion at full retraction of said latch bolt, the slide is free to be urged upwardly by its spring means whereupon said slide pin enters said lateral portion of said latch bolt slot, said means releasably locking said slide pin in the lateral portion of said latch bolt slot including a lever pivoted intermediate its ends to said front wall, a hook at the lower end of said lever and a curved portion at its upper end and spring means urging said hook towards said slide, said slide having a slot towards its lower end, said hook bearing against an edge of said slide above said slide slot when the slide is down and said slide pin is in the longitudinal portion of said latch bolt slot, said hook engaging said slide slot when the slide moves upwardly upon complete retraction of said latch bolt, said hook being disengaged from said slide slot upon reverse rotation of plug whereby said plug arm bears against the upper curved portion of said lever to trip the latter.

6. A latch lock mechanism comprising a housing having a side, front and rear wall, a latch bolt slidable through an opening provided in the side wall, spring means normally urging the latch bolt through the opening towards an extended position, latch bolt retracting means, a key-operated plug rotatably mounted on the front wall, said plug including an arm operative upon said latch bolt retracting means, means releasably retaining said latch bolt in a fixed position when the latter is fully retracted, a lever handle rotatably mounted on the rear wall, a cam carried by the handle and operative on the latch bolt retracting means, and a stop carried by the rear wall at a predetermined location engageable by the cam at a position where the means releasably retaining the latch bolt in a fixed position is inoperative, said latch bolt retracting means including a plate pivoted at one of its ends between the front and rear walls, the other end of said plate bearing upon a portion of said latch bolt, said plate including a pin adjacent said other end engageable by said key-operated plug arm, said means retaining said latch bolt in a fixed position comprising a slide mounted vertically on the front wall beneath said latch bolt, spring means normally urging said slide upwardly, a slot in said latch bolt including a longitudinal and a lateral portion, a pin carried by said slide and riding in the longitudinal portion of said latch bolt during extension and retraction thereof, means permitting said slide pin to enter said lateral portion of said latch bolt slot when said latch bolt is fully retracted and means releasably locking said slide with said slide pin in the lateral portion of said latch bolt slot, said slide including an upper curved surface against which said plate pin bears to push said slide down with said slide pin in the longitudinal portion of said latch bolt slot, said means permitting said slide pin to enter said lateral portion of the latch bolt slot including a cut-off portion in the slide downwardly inclined from one end of said upper curved surface, whereby when said plate pin reaches said cut-off portion at full retraction of said latch bolt, the slide is free to be urged upwardly by its spring means whereupon said slide pin enters said lateral portion of said latch bolt slot, said means releasably locking said slide pin in the lateral portion of said latch bolt slot including a lever pivoted intermediate its ends to said front wall, a hook at the lower end of said lever and a curved portion at its upper end and spring means urging said hook towards said slide, said slide having a slot towards its lower end, said hook bearing against an edge of said slide above said slide slot when the slide is down and said slide pin is in the longitudinal portion of said latch bolt slot, said hook engaging said slide slot when the slide moves upwardly upon complete retraction of said latch bolt, said hook being disengaged from said slide slot upon reverse rotation of plug whereby said plug arm bears against the upper curved portion of said lever to trip the latter.

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