

[54] LOCK CONSTRUCTION

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[51] Int. Cl. **E05c 1/08**

[58] Field of Search..... 292/74, 75, 144, 292/254, 302, 335, 341.15, 341.16, DIG. 72

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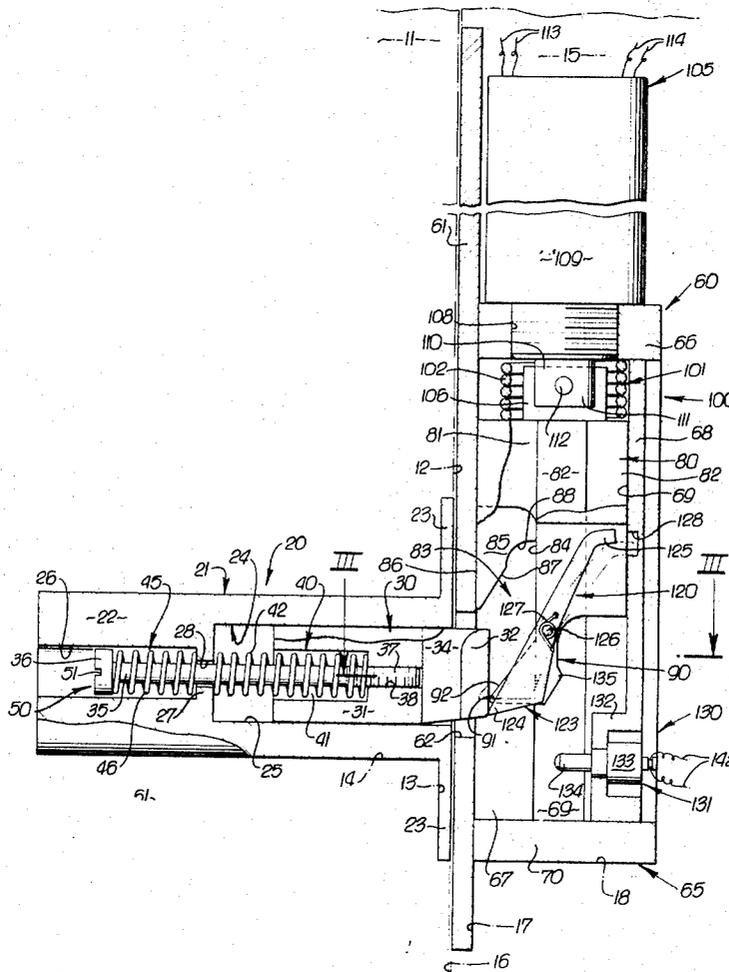
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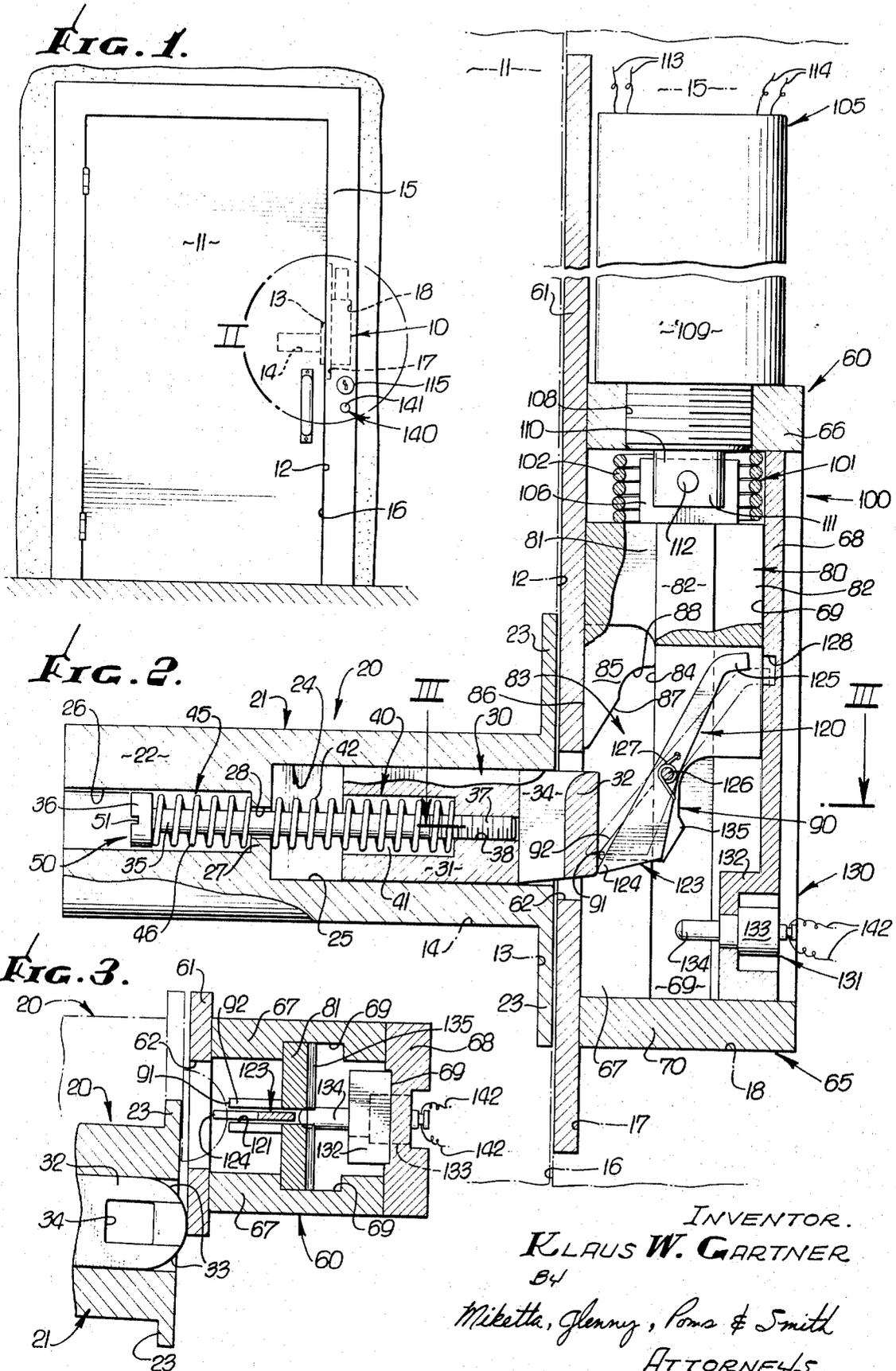
[57] **ABSTRACT**

The lock, includes a door mounted striker assembly

comprising a housing; a striker, movably mounted in the housing for movement between a flush position, a normally extended position, and an extreme extended position; an indented nose on the striker; opposed springs in the housing and engaging the striker for biasing the striker to the normally extended position; and a threaded screw for adjusting the location of the normally extended position relative the housing, and includes a jamb mounted striker plate assembly comprising a striker plate; a hollow housing mounted on the back of the striker plate; a cross bolt, movably mounted in the housing for movement between retracted and protruding positions; a lug protruding from the cross bolt; oppositely acting spring and solenoid in the housing and engaging the cross bolt to move it between positions; a dog in the cross bolt for temporarily holding the cross bolt in the retracted position while the door is open; and a switch connected to a light and being operated by the cross bolt whereby the insertion of the nose of the striker into the striker plate, moves the dog to release the cross bolt which is moved by the spring to the extended position while the lug thereof enters the indentation to pull the striker to the extreme extended position for locking, with energizing of the solenoid returning the cross bolt to the retracted position to free the striker for being returned to the normally extended position so that opening of the door will move the striker to the flush position.

10 Claims, 8 Drawing Figures





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FIG. 6.

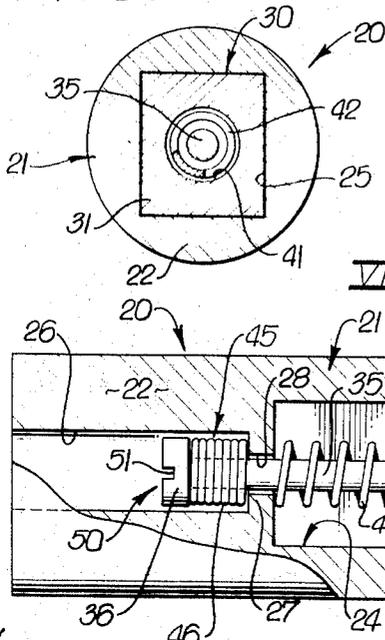


FIG. 4.

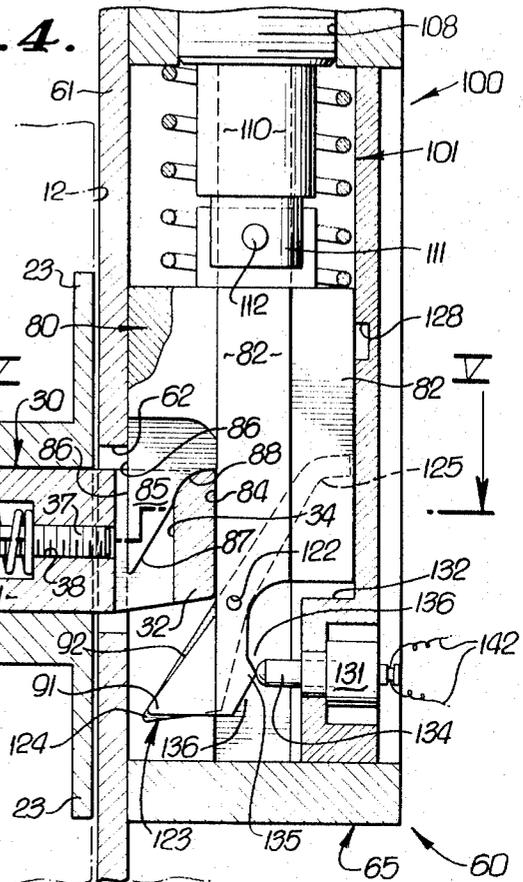


FIG. 7.

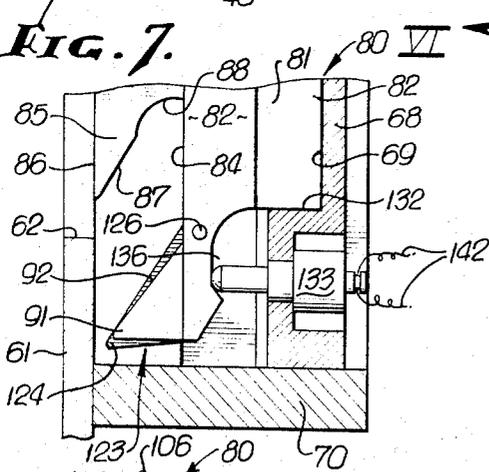


FIG. 5.

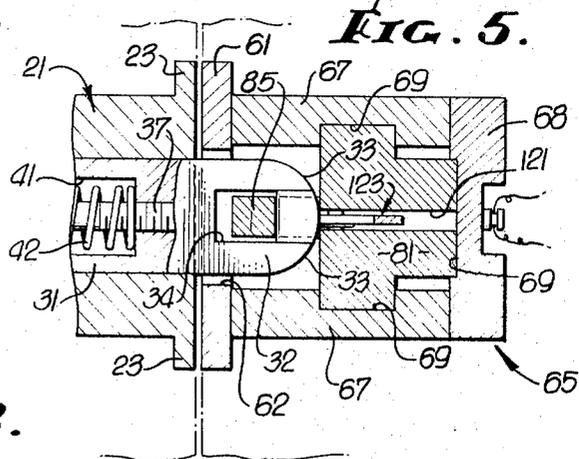
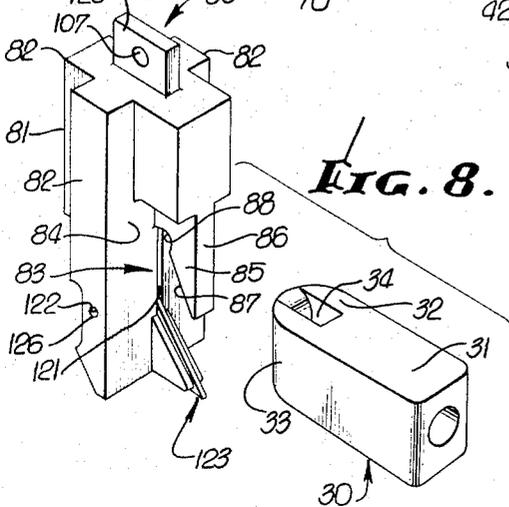


FIG. 8.



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LOCK CONSTRUCTION

BACKGROUND OF THE INVENTION

This invention relates to door locks and more particularly to a dead bolt type of spring latch lock for a door.

Heretofore, there have been two popular types of key locks for doors, the spring latch type and the dead bolt type. The spring latch type is the most popular for it enables the lock to be moved to the locked position after which the door may be closed. To accomplish such locking action, the striker is spring biased to an extended position and movable against this spring biasing to a flush position. As the door swings closed, the nose of the extended striker engages the striker plate in the door jamb, to be cammed inwardly against the spring biasing until the nose passes thereover and then the nose is moved by the spring biasing into the cavity in the striker plate to hold the door closed. The spring latch type of lock is unlocked by turning a key to move the striker against the spring biasing, out of the striker plate cavity, thus permitting the door to be opened.

The spring latch type of lock is convenient because the door can be closed with the lock already locked. However, this very feature makes the spring latch type of lock easily opened by an unauthorized person. To open a spring latch type of lock without a key, a thin flexible strip is inserted between the door edge and jamb, moved behind the nose of the striker and pulled forwardly to cam the striker against the spring biasing, out of the striker plate cavity, thus permitting the door to be opened.

To prevent such easy opening of the door, a dead bolt type of lock is used, either along or in conjunction with a spring latch type of lock. A dead bolt type of lock has a bolt which is flush with the door edge when the lock is unlocked and which fixedly protrudes from the door edge when the lock is locked. To lock a door having a dead bolt type of lock, the door must be closed before the key is turned to move the bolt into the cavity in the striker plate. The door is held closed by the bolt which cannot be slipped as before. To open the door the key is reinserted, and turned to move the bolt out of the striker plate cavity to the flush position, thus permitting the door to be opened. The disadvantage of the use of the dead bolt type of lock is that the door cannot be shut with the lock in the locked position, and therefore the key must be used to lock the door after the door is closed.

It would be desirable to provide a lock with the features of, the spring latch type of lock and the dead bolt type of lock. Such a lock would be a dead bolt type of spring latch lock.

BRIEF DESCRIPTION OF THE INVENTION

Therefore it is the primary object of this invention to provide, a novel dead bolt type of spring latch lock which has the advantages of both lock types.

Other and additional objects of this invention are to provide such a lock which is equally adaptable to both swinging, sliding or any other type of door; to provide such a lock which may be locked and then the door closed and which once the door is closed cannot be opened by slipping the spring biased striker; to provide such a lock which is of the spring latch type but which cannot be opened by unauthorized persons as easily as a conventional spring latch lock; to provide such a lock is easily opened with a proper key; to provide such a

lock with a striker assembly and a striker plate assembly which can be mounted on either member; to provide such a lock in which the normal position of the striker nose can be adjusted; to provide such a lock which indicates false latching of the lock, i.e., failure of the lock; to provide such a lock which operates electrically; and to provide such a lock which is economical to manufacture, easy to install and effective to lock a door against entry by unauthorized persons.

Generally stated, the subject lock includes a striker assembly and a striker plate assembly, with a spring biased nose of the striker assembly protruding into a cavity in the striker plate assembly when aligned therewith with the improvement therein according to this invention, including the provision of the interlocking means for selectively releasably locking the striker to the striker plate to prevent the lock from being opened. The interlocking means may include an indentation in the nose of the striker assembly and a mating lug on cross bolt of the striker plate assembly. The striker nose may be movable between a flush position, a normally extended position, and extreme extended position and may be biased to the normally extended position, with camming engagement of the nose with the striker plate assembly moving the nose to the other positions. The lock may include indicating means such as a switch and a light for indicating that the cross bolt is in the locked position to show false locking. The cross bolt may be moved between its positions by the combination of a spring and a solenoid operated by a key cylinder. The lock may be mounted on either sliding, swinging or other type of door. The cross bolt may move the nose upon movement of the cross bolt between positions.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary, side elevational view of a wall having a swinging door hinged thereto, for opening and closing, and showing in hidden lines, the outline of the dead bolt type of spring latch lock, according to this invention.

FIG. 2 is an enlarged, fragmentary, cross sectional view of the portion of FIG. 1 enclosed by circle II, showing the striker assembly aligned with the striker plate assembly, with the nose of the striker in the normally extended position for protruding into the cavity of the striker plate assembly of the lock to engage a dog to pivot the dog from a holding position, shown in phantom lines, to a release position, shown in solid lines, and showing the interlocking means in the raised or retracted position.

FIG. 3 is a fragmentary, cross sectional view taken along the plane III—III of FIG. 2 showing in solid lines the striker assembly moving towards alignment with the striker plate assembly, with the nose of the striker assembly cammed to a flush position by the striker plate assembly, and showing in phantom lines, the striker assembly aligned with the strikerplate assembly with the nose of the striker assembly returned to the normally extended position.

FIG. 4 is a view similar to FIG. 2 but showing the interlocking means in the protruding position after having moved the nose of the striker assembly to an extreme extended position by interlocking therewith.

FIG. 5 is a fragmentary cross sectional view taken along the plane V—V of FIG. 4.

FIG. 6 is a cross sectional view taken along the plane VI—VI of FIG. 4.

FIG. 7 is a fragmentary view of a portion of FIG. 4 but showing the interlocking means moved past the protruding position to a false latching position due to a lack of proper engagement with the nose of the striker assembly.

FIG. 8 is an enlarged perspective view of the nose and the cross bolt of the dead bolt type of spring latch lock, according to this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings and particularly to FIG. 1, the dead bolt type of spring latch lock, according to this invention, is generally denoted by the number 10. The lock 10 is for holding a closure member 11 with an edge 12 having an indentation 13 and a cavity 14 to a jamb member 15 having an adjacent edge 16 also with an indentation 17 and a cavity 18. Typically, the jamb member 15 will be mounted to a wall and the closure member 11 will be a door mounted to the jamb member 15 for movement between open and closed positions, as is well known. The door could be a conventional swinging door, as is shown, for opening outwardly, inwardly or both; a conventional sliding door; or any other type of a door. Additionally the closure member 11 need not be a door at all but could be any type of a member which moves relative to another member.

Generally the lock 10, according to this invention, includes a striker assembly 20 shown mounted to and in the door 11 and which comprises a hollow housing 21; a striker or spring bolt 30 mounted in the housing 21 for movement between a flush position, a normally extended position and an extreme extended position; main biasing means 40 and auxiliary biasing means 45, together for biasing the striker 30 to the normally extended position; and an adjusting means 50 for adjusting the location of the normally extended position relative the housing 21; and includes a striker plate assembly 60 shown mounted to and in the jamb 15 and which comprises a striker plate 61; a hollow housing 65 mounted on the back of the striker plate 61; interlocking means 80 mounted in the housing 65 for movement between a retracted position and a protruding position for interlocking with the striker 30; operating means 100 for moving the interlocking means 80 between positions in response to positions of a key cylinder 115; temporarily holding means 120 for holding the interlocking means 80 in the retracted position while the door 11 is open, and indicating means 130 for indicating the position of the interlocking means 80.

Referring now primarily to FIGS. 2 and 3, the striker assembly 20 is for mounting to and in the closure member 11. The striker assembly 20 includes a housing 21 with generally cylindrically shaped body 22 and a pair of opposed ears 23 on the outer end of the body 22. The ears 23 are located in the indentation 13 with the body 22 extending to fill the cavity 14 in the door 11 to provide a straight vertical edge 12 to the door 11. Typically the ears 23 are suitably drilled and counter sunk to receive therethrough screws for securing the housing 21 to the door 11.

The housing 21 has a central cavity 24 which includes a front portion 25 of generally square cross section, as is shown in FIG. 6. Returning to FIG. 2, the cavity 24 also has a portion 26 of generally round cross section. The rear portion 26 is separated from the front

portion 25 by a wall 27 with a bore 28 therethrough for joining the front portion 25 to the rear portion 26. The front portion 25 of the housing 21 is for slidably receiving the striker 30.

The striker or spring bolt 30 of the striker assembly 20 is for being slidably mounted in the housing 21 to protrude therefrom. As best seen in FIGS. 2, 3 and 6, the striker 30 of the preferred embodiment of this invention, is generally elongated with a square cross section body 31 which matingly slides into the front portion 25 of the housing 21. The body 31 is of such a length that when it abuts the wall 27 of the housing 21, it does not protrude from the housing 21. On the front end of the body 31 is a nose 32 which is curved to provide camming surfaces 33 and which has a central vertical indentation 34. A rod 35 has an enlarged head 36 on one end thereof and threads 37 on the other end thereof. The rod 35 has the head 36 located in the rear portion 26 of the cavity 24 with the rod 35 extending through the bore 28 in the wall 27 to have the threaded end 37 turned into a threaded hole 38 in the body 31 of the striker 30 for retaining the striker 30 in the housing 21. The striker 30, so mounted in the housing 21, is slidable in the cavity 24 from a flush position, as is shown in FIG. 3, wherein the nose 32 is flush with the housing 21, through a normally extended position, as is shown in FIG. 2, wherein the nose 32 protrudes from the housing 21 to an extreme extended position, as shown in FIGS. 4 and 5, wherein the nose 32 protrudes from the housing 21 further than in the normally extended position, with the biasing means 40 and 45 biasing the striker 30 to the normally extended position.

The main biasing means 40 of the striker assembly 20 is for biasing the striker 30 from the flush position of FIG. 3 to the normally extended position of FIG. 2. In the preferred embodiment, the main biasing means 40 includes the provision of a rearwardly opening central bore 41 in the body 31 of the striker 30. A spring 42 is located therein around the rod 35 with one end of the spring 42 being seated against the end of the bore 41 and the other end extending from the body 31 of the striker 30 to seat against the wall 27 of the housing 21. The spring 42 biases the striker 30 outwardly and would bias the striker past the extreme extended position were it not for the auxiliary biasing means 45.

The auxiliary biasing means 45 of the striker assembly 20 is for biasing the striker from the extreme extended position of FIGS. 4 and 5 to the normally extended position of FIG. 2. In the preferred embodiment, the auxiliary biasing means 45 includes the provision of a spring 46 located in the rear portion 26 of the housing 21 around the rod with one end seated on the head 36 of the rod 35 and the other end against wall 27 of the housing 21. The spring 46 works against the spring 42, and biases the striker from the extreme extended position to the normally extended position. The stable position of the springs 42 and 46 which is the normally extended position is determined by the adjusting means 50.

The adjusting means 50 of the striker assembly 20 is for adjusting the location of the normally extended position of the nose 32 of the striker 30. In the preferred embodiment, the adjusting means 50 includes the provision of a screwdriver slot 51 or other suitable indentation therein, to facilitate the turning of the rod 35 relative the body 31 which is held rotationally stationary in the housing 21 by its square cross section. The adjust-

ing means 50 also includes the provision of different spring rates for the springs 42 and 46 whereby the shortening or lengthening of the distance from the inner end of the bore 28 of the striker 20 to the head 36 of the rod 35 will move the neutral position of the springs 42 and 46 to move the normally extended position as desired. The major reason for moving the normally extended position would be to facilitate better mating of the striker 30 with the striker plate assembly 60.

The striker plate assembly 60 is for mounting on the jamb member 15 for receiving the nose 32 of the striker 30 of the striker assembly 20 therein. The striker plate assembly 60 includes an elongated generally rectangular striker plate 61, with a nose receiving cavity 62 therein. The plate 61 is centrally located in the indentation 17 over the cavity 18 to be flush with the edge 16 of the jamb member 15. The plate 61 is suitably drilled and counter sunk to receive therethrough screws for securing the plate 61 to the jamb member 15 so that the cavity 62 therein will be aligned with the nose 32 of the striker assembly 30 to receive the nose 32.

The striker plate assembly 60 also includes a housing 65 mounted to the back side of the striker plate 61 and extending into the cavity 18. The housing 65 has a top wall 66 from which side walls 67 and a rear wall 68 depend. The side walls 67 and rear wall 68 each have a vertical groove 69 formed therein which opens into the space enclosed by the walls. The housing is completed by the provision of a bottom wall 70 and is now ready to receive the interlocking means 80.

The interlocking means 80 of the striker plate assembly 60 is for selectively releasably locking the striker 30 to the striker plate 61 when the nose 32 is located in the cavity 62. In the preferred embodiment, the interlocking means 80 includes the provision of a cross bolt 81 sized to be slidably received within the housing 65 for movement between a raised retracted position as shown in FIG. 2 and a lowered or protruding position as shown in FIG. 4. As best seen in FIGS. 5 and 8, the cross bolt 81 is provided with vertical ridges 82 which mate with the vertical grooves 69 of the walls 68 and 67 of the housing 65 to guide the movement of the cross bolt 81 therein between its positions. The cross bolt 81 also has a front striker receiving cavity 83 formed therein and limited by a vertical surface 84 which will locate the extreme extended position of the striker 30, as will appear later.

The cross bolt 81 has formed therein a lug 85 which protrudes downwardly into the cavity 83. The lug 85 is generally triangular in cross section and has an outwardly facing vertical surface 86, a rearwardly facing vertical ramp surface 87 extending from the lower end of the surface 86 to a curved surface 88 which joins the upper end of the vertical surface 84. As best seen in FIGS. 2, 3, 4, 5 and 7, the lug 85 is suitably sized to mate with the indentation 34 of the nose 32 of the striker 30 to be lockingly received therein. As best seen in FIG. 4, when the lug 85 mates with the indentation 34 of the nose 32, the curved surface 88 engages with the forward surface bounding the indentation 34 while the vertical surface 86 engages the rear surface of the indentation 34 to interlock the nose 32 onto the lug 85 and thereby onto the cross bolt 81. As the cross bolt 81 is raised, the lug 85 moves from a protruding position of FIG. 4 upwardly therewith and out of the indentation 34 to a retracted position of FIG. 2 while camming means

90 assists in returning the nose 32 to the normally extended position.

The camming means 90 of the interlocking means 80 is for camming the nose 32 of the striker 30 from the extreme extended position to the normally extended position upon retracting movement of the interlocking means 80. In the preferred embodiment, the camming means 90 includes the provision of a protruding shoulder 91 adjacent the lower end of the cross bolt 81. The shoulder 91 protrudes into the cavity 83 and has an upwardly facing sloping surface 92 which as is seen by comparing FIGS. 4 and 2 cammingly engages the nose 32 as the cross bolt 81 is raised to move the nose 32 to the left. The cross bolt 81 is moved between its positions to move the lug 85 and shoulder 91 by an operating means 100.

The operating means 100 of the striker plate assembly 60 is for moving the cross bolt between its positions. In the preferred embodiment, the operating means 100 includes a cross bolt biasing means 101 for biasing the cross bolt 81 to the protruding position and a motor means 105 for moving the cross bolt 81 against the biasing means 101 to the retracted position in response to operation of a key cylinder. It should be understood that the biasing means 101 and motor means 105 could be interchanged and still provide a suitable movement for the cross bolt 81.

The biasing means 101 of the operating means 100 is best seen in FIGS. 2 and 4, and includes the provision of a spring 102 with one end seated on the upper surface on the cross bolt 81 and the other end seated on the top wall 66. The spring 102 biases the cross bolt 81 downwardly into the protruding position, as shown in FIG. 4. The cross bolt 81 is moved from the protruding position against the action of the biasing means 101 by the motor means 105.

The motor means 105 of the preferred embodiment includes the provision of a vertical tab 106 extending upwardly from the upper surface of the cross bolt 81 centrally of the spring 102. The tab 106 containing a transverse hole 107 therethrough. A threaded hole 108 is provided in the top wall 66 into which a solenoid 109 is mounted. The plunger 110 of the solenoid 109 extends through the hole 108 and down through the center of spring 102. The plunger 110 has on the lower end thereof a yoke 111. The yoke 111 mates with the tab 106 and a pin 112 secures the two together. The solenoid 109 is connected by wires 113 to a source of electrical energy and by wires 114 to a key cylinder 115 mounted to the wall adjacent the jamb member 15. Upon energizing of the solenoid 109 by the key cylinder 115, the plunger 110 is pulled upwardly against the action of the spring 102 to raise the cross bolt from the protruding position of FIG. 4 to the retracted position of FIG. 2 where it is maintained as long as the key cylinder 115 energizes the solenoid 109.

It now becomes apparent why modes of movement and orientation of the solenoid 109 and spring 102 were selected for the preferred embodiment. In the event of a power failure, the cross bolt 81 is biased to the protruding position, and in the event of a broken spring 102, gravity pulls the cross bolt 81 to the protruding position, which, of course, is the locked position to provide a fail safe feature to the preferred embodiment.

Also it should be noted that the electrical solenoid 109 could be replaced with a suitable mechanical

motor means operated by the key cylinder. However, the use of such a mechanical motor means would probably restrict the location of the cylinder 115 to closely adjacent the striker plate assembly 60. Such a restriction may prove undesirable and is not required of the cylinder 115 for operating the solenoid 109.

The temporary holding means 120 is for temporarily holding the cross bolt 81 in the retracted position, once the solenoid 109 has raised the cross bolt 81 and the door 11 is opened and is for releasing the cross bolt 81 once the door 11 is closed again. This action permits the key cylinder 115 to be returned to a non-energizing position before the door 11 is closed. In the preferred embodiment, as best seen in FIGS. 2, 3, 4, 5 and 7, the temporary holding means 120 includes the provision of a vertical slot 121 in the cross bolt 81. The vertical slot 121 extends from the lower end thereof, upwardly to approximately midway thereof. A transverse hole 122 is provided in the cross bolt 81 which opens to the slot 121. A dog 123 is provided with a prow end 124 and hook end 125. The dog 123 is located in the slot 121 with a hole therein aligned with the hole 122. A pin 126 extends through the hole 122 to pivotally mount the dog 123 in the slot 121 for pivotal movement between a holding position shown in phantom lines in FIG. 2 and a release position shown in solid lines in FIGS. 2 and 4. A torsion spring 127 around pin 126 biases the dog 123 to the holding position. The rear wall 68 has a recess 128 for receiving the hook end 125 to enable the dog 123 to hold the cross bolt 81 in the retracted position.

The dog 123 in the holding position has the prow end 124 thereof located in the space into which the nose 32 of the striker 30 extends when the door 11 is closed. Once the door 11 is closed, the nose 32 extends into this space and moves the prow end 124 to pivot the dog 123 from the holding position to the release position to move the hook end 125 out of the recess 128 and free the cross bolt 81 for movement by the spring 102 to the protruding position. Should the cross bolt 81 move to the protruding position without catching the nose 32 of the striker 30, for example because the dog 123 didn't catch in the recess 128, the lock unit 10 will appear to be locked, when in fact it is not, and a false latching will occur. Such false latching condition is indicated by indicating means 130.

The indicating means 130 is for indicating that a false latching has occurred, i.e., that the cross bolt 81 is in the protruding position without the lug 85 thereof extending into the indentation 34 of the striker 30. In the preferred embodiment, the indicating means 130 includes a switch means 131 for generating a signal when the cross bolt 81 is not properly mated with the striker 30, i.e., when false latching has occurred, and an indicator 140 for receiving the signal and producing an observable indication.

The switch means 131 of the indicating means 130 includes the provision of an enlargement 132 in the rear wall 68 adjacent the lower end thereof for receiving a switch housing 133. The switch housing 133 has a push button 134 extending into the interior of the housing 65 for engagement by the cross bolt 81 in the protruding position and only when the lug 85 of the cross bolt is mated with the indentation 34 of the striker 30. The cross bolt 81 has a rearwardly protruding ridge 135 with cavities 136 on both sides thereof. The ridge 135 being suitably located, as is shown in FIG. 4, such that the ridge 135 engages the push button

134 to operate the switch means 131 when the lug 85 mates with the indentation 34. Should the lug 85 miss the indentation 34, the cross bolt 81 will either be held in the retracted position or, as seen in FIG. 7, will be bottom against the enlargement 132. In either situation, the push button 134 will be located in one of the cavities 136 to cause the switch means 131 to operate the indicator 140.

The indicator 140 of the preferred embodiment is shown in FIG. 1 as being a light 141 connected by wires 142 to the switch means 131. It is contemplated that the switch means 131 will be normally closed, so that the light will be on except when the cross bolt 81 is properly latched to the striker 30. Thus, if the light remains on after the door is closed; the lock 10 is falsely latched. The description of the major portions of the lock unit 10 is now complete and the operation of the unit 10 will be explained next.

The operation of the lock unit 10 is best explained by starting with the door 11 in the closed position, as is shown in FIG. 1. In this position, as is shown in FIGS. 4 and 5, the nose 34 of the striker 30 is drawn to the extreme extended position by the mating of the lug 85 into the indentation 34 by the cross bolt which is located in the protruding position by the spring 102.

To open the door 11, a key is inserted into the key cylinder 115 and turned to energize the solenoid 109. The energizing of the solenoid 109 raises the cross bolt 81 against the action of spring 102 from the protruding position of FIGS. 4 and 5, to the retracted position of FIG. 2 and thereby energizes the light 141. This movement withdraws the lug 85 from the indentation 34 while the shoulder 91 assists the spring 46 in moving the striker 30 to the normal extended position of FIG. 2. The door 11 is now free to be opened.

Opening the door 11 moves the striker 30 across the striker plate 61 while the engagement of the plate 61 with the appropriate camming surface 33 moves the striker 30 to the flush position, as is shown in FIG. 3 until the nose 32 is past the plate 61, whereupon spring 42 returns the striker 30 to the normally extended position. At the same time, the spring 127 pivots the dog 123 from the release position to the holding position to insert the hook end 125 thereof into the recess 128 to temporarily hold the cross bolt 81 in the retracted position. The cylinder may now be returned to the locked position and the key removed.

Upon closing the door 11, the striker 30 is moved against the striker plate 61, whereupon, engagement of the plate 61 with the appropriate camming surface 33 moves the striker 30 to the retracted position, as is shown in FIG. 3, until the striker 30 is aligned with cavity 62. Upon alignment with the cavity 62, the nose 32 of the striker 30 is returned by the spring 42 to the normally extended position in which the nose 32 protrudes into the cavity 62 and moves the dog 123 to the release position as is shown in FIG. 2. Upon movement of the dog 123 to the release position, the cross bolt 81 is moved by the spring 102 from the retracted position of FIG. 2 to the protruding position of FIG. 4 to insert the lug 85 into the indentation 34 to pull the striker 30 from the normally extended position to the extreme extended position. In this position, the ridge 135 depresses push button 134 to extinguish light 141 and thereby indicate that the door 11 is again locked.

Should the lug 85 miss the indentation 34 for any reason, the ridge 135 as is shown in FIG. 7 will not be

properly located to depress push button 134 and the light 141 will remain on, indicating false latching. To cure the false latching the key is reinserted in the key cylinder 115 and turned to energize the solenoid 109 and raise the cross bolt 81 for another attempt at inserting the lug 85 into the indentation 34, and thereby completing the locking of door 11.

Thus the lock unit, according to this invention, combines the advantage of locking upon closing of the spring latch type of lock with security of a dead bolt type of lock.

I claim:

1. In a lock for locking a movable closure member to a jamb member, said lock including a striker assembly mounted to one member and including a striker having a protruding nose formed with an indentation therein, which nose protrudes from one member toward the other member, and wherein said striker is movably mounted to one member for movement between a first extended position and a second extended position in which said nose protrudes from said member a greater distance than in the first extended position, and

biasing means for biasing said striker in said first extended position; and

a striker plate assembly mounted to the other member, said striker plate assembly having a striker plate formed with a cavity therein aligned with the protruding nose of said striker to receive said protruding nose therein when said closure member is closely adjacent and aligned with said jamb member, the improvement comprising;

interlocking means associated with said assemblies for selectively releasably locking said striker in said striker plate when the nose of said striker is located in said cavity, said interlocking means including a cross bolt formed with a mating lug and being movably mounted in said striker plate assembly for movement between a retracted position in which said lug is spaced from said cavity and a protruding position in which said lug is located in said cavity to mate with the indentation formed in said striker nose when said striker nose is located in said cavity; said cross bolt lug having a ramp surface which upon insertion of said striker nose into said cavity causes said lug to enter said striker nose indentation to slide said striker nose along said ramp surface of said lug to move said striker from the first extended position against said biasing means to the second extended position and which upon withdrawal of said lug from said indentation permits said biasing means to return said striker from said second extended position to said first extended position.

2. The invention as in claim 1 wherein the cross bolt includes camming means thereon and protruding therefrom towards the nose of the striker when the nose is located in the cavity of the striker plate, said camming means engaging the nose when the striker is in the second extended position and the cross bolt is moved from the extended position to the retracted position to cam the striker from the second extended position to the first extended position.

3. The invention as in claim 2 wherein the camming means includes a shoulder on the cross bolt, said shoulder having a sloping surface for engaging the nose of the striker.

4. The invention as in claim 1 wherein adjusting means is provided for adjusting the location of the normally extended position of the striker.

5. The invention as in claim 4 wherein the biasing means includes oppositely acting springs engaging the striker to bias the striker to the normally extended position, and wherein the adjusting means includes the provision of different spring rates for the springs and means for changing the combined length of the springs.

6. In a lock for locking a movable closure member to a jamb member, said lock including a striker assembly mounted to one member and including a striker having a protruding nose formed with an indentation, which nose protrudes from one member toward the other member; and

a striker plate assembly mounted to the other member, said striker plate assembly including a striker plate formed with a cavity therein aligned with said striker assembly to receive said protruding nose therein when said closure member is closely adjacent and aligned with said jamb member, the improvement comprising;

interlocking means associated with said assemblies for selectively releasably locking said striker in said striker plate when said striker nose is located in said cavity, said interlocking means including a cross bolt having a mating lug and being movably mounted in said striker plate assembly for movement between a retracted position in which said lug is spaced from said cavity and a protruding position in which said lug is located in said cavity to mate with said indentation in said striker nose upon said striker nose being located in said cavity; and

operating means for moving said cross bolt between its retracted and extended positions including a solenoid having a plunger mounted to said cross bolt and cross bolt biasing means both mounted in said striker plate assembly, said cross bolt biasing means urging said cross bolt to its extended position and said solenoid and plunger being selectively operable to move said cross bolt against the action of said biasing means from said extended position to said retracted position;

a key cylinder mounted to said member associated with said striker plate assembly and operably connected to said solenoid for selective operation thereof; and

temporary holding means in said striker plate assembly for holding said cross bolt in said retracted position against the action of said cross bolt biasing means once said cross bolt is moved to said retracted position and said striker nose is removed from said cavity, and for releasing said cross bolt upon re-entry of said striker nose into said cavity to permit said cross bolt biasing means to move said cross bolt to its extended position.

7. In a lock for locking a movable door member to a door jamb member, said lock including a striker assembly mounted to one member and including a striker having a protruding nose formed with an indentation, which nose protrudes from one member toward the other member; and

a striker plate assembly mounted to the other member, said striker plate assembly having a striker plate with a cavity therein aligned with said striker assembly for receiving said protruding nose in said cavity when said door member is closely adjacent

and aligned with said door jamb member, the improvement comprising;
interlocking means associated with said assemblies for selectively releasably locking said striker in said striker plate when said striker nose is located in said cavity, said interlocking means including a cross bolt having a mating lug and being movably mounted in said striker plate assembly for movement between a retracted position in which said lug is spaced from said cavity and a protruding position in which said lug is located in said cavity to mate with said striker nose indentation when said striker nose is located in said cavity;
said striker being movably mounted in said striker assembly for movement between a position in which said striker nose is generally flush with the adjacent edge of said one member and an extended position in which said striker nose protrudes from said adjacent edge of said one member; and
main striker biasing means provided in said striker assembly for biasing said striker to its extended position such that the pivoting of said door member from an open position to a closed position relative to said door jamb member causes the nose of said striker while in its extended position to engage said striker plate and to be forced thereby against the action of said main striker biasing means to said flush position until said striker nose is aligned with the cavity of said striker plate whereupon said main biasing means returns said striker to its extended position moving the striker nose into said striker plate cavity for receiving said cross bolt lug in said nose indentation.

8. The invention as in claim 7

wherein the striker is also movably mounted for movement between a first extended position and a second extended position in which the nose of the striker protrudes from the edge of the one member a greater distance than in the first extended position, said nose in the first extended position having sloping surfaces for engaging the striker plate upon attempted pivoting of the door from the closed position to the open position whereby the striker plate cams the striker to the flush position to permit the door to be opened, and
additionally comprising striker auxiliary biasing means in the striker assembly for biasing the striker to the first extended position, and
wherein the lug of the cross bolt has a ramp surface, said lug, upon insertion of the nose into the cavity, entering the indentation to slide the nose along the ramp surface thereof and thereby move the striker against the action of the auxiliary biasing means from the first extended position, to the second extended position, withdrawal of the lug from the indentation permitting the auxiliary biasing means to

return the striker from the second extended position to the first extended position for opening the door.

9. The invention as in claim 8 wherein the cross bolt includes camming means thereon and protruding therefrom, said camming means engaging the nose, when the striker is in the second extended position and the cross bolt is moved from the protruding position to the retracted position to cam the striker from the second extended position to the first extended position.

10. A striker assembly for use with a striker plate assembly having a cavity therein, said striker assembly comprising;

- a hollow housing mounted for movement between a position aligned with said striker plate assembly and a position spaced from said striker plate assembly, said hollow housing having a cavity therein opening toward the cavity in said striker plate assembly when aligned therewith, an aperatured wall in said housing cavity dividing said cavity into two portions;

- a striker slideably mounted in said housing cavity for movement between a flush position flush with the end of said housing, a normally extended position, and an extreme extended position in which an end of said striker protrudes further from said housing than when in said normally extended position, said striker including a body positioned in a front portion of said two portions of said cavity, said body having a headed rod with the head thereof in a rear portion of said two portions of said cavity, said rod extending through said aperatured wall for connection to said body;

- biasing means in said housing for biasing said striker from both the flush position and the extreme extended position to said normally extended position, said biasing means including a main biasing spring between said striker head and said aperatured wall and an auxiliary biasing spring of different spring rate disposed between said aperatured wall and said striker body for biasing said striker in opposite directions from said flush position and extreme extended position to said normally extended position, said normally extended position of said striker being a balanced position of said springs; and
- adjusting means for adjusting the location of said striker relative to said housing when in said balanced position, said adjusting means including the provision of a notch in said striker head affording rotation of said rod relative to said striker body for changing the combined length of said springs to effect an adjustment in the balanced position therebetween and thereby an adjustment in the normally extended position of said striker.

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