Jan. 5, 1943. L. GUTMAN 2,307,038

TUBULAR NIGHT LATCH

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Fig. 1.

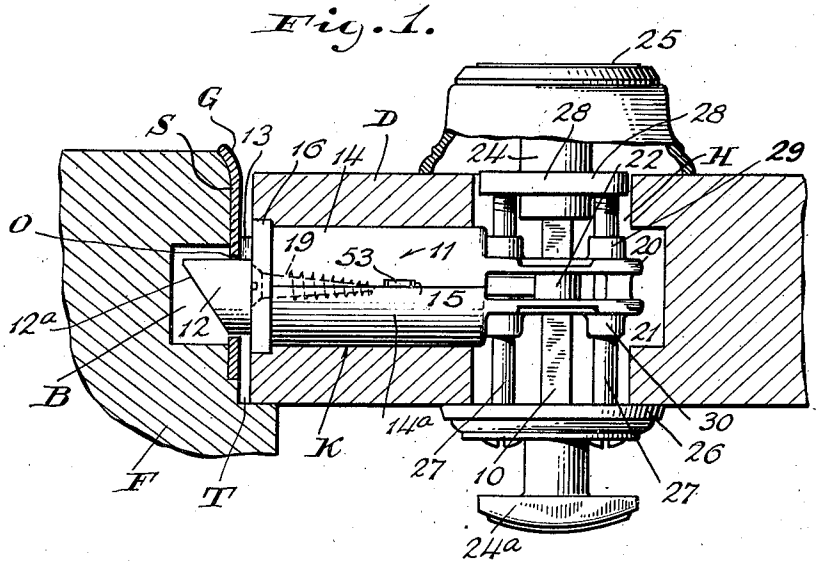


Fig. 2.

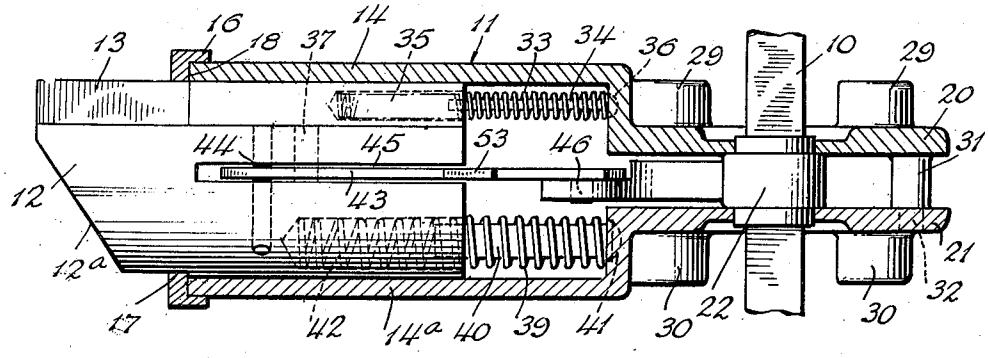


Fig. 3.

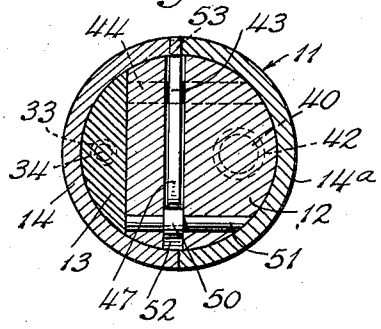
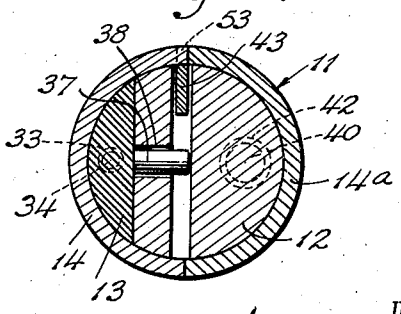


Fig. 4.



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Fig. 5.

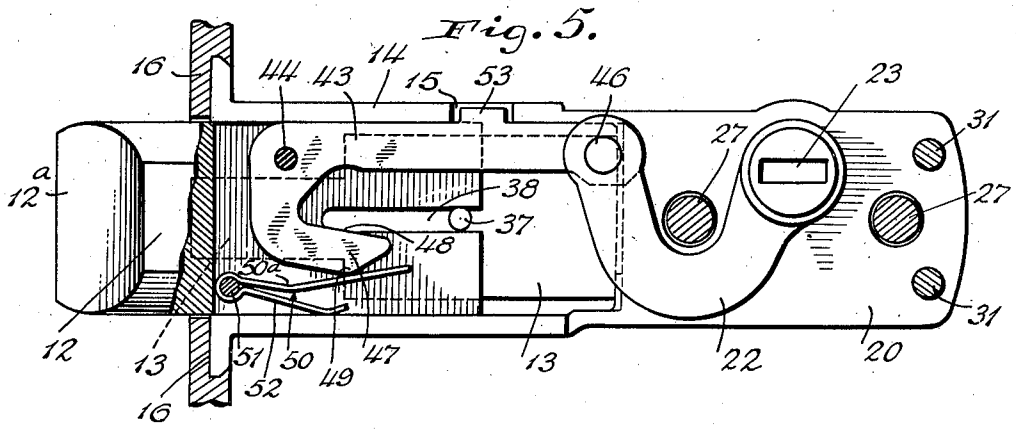


Fig. 6.

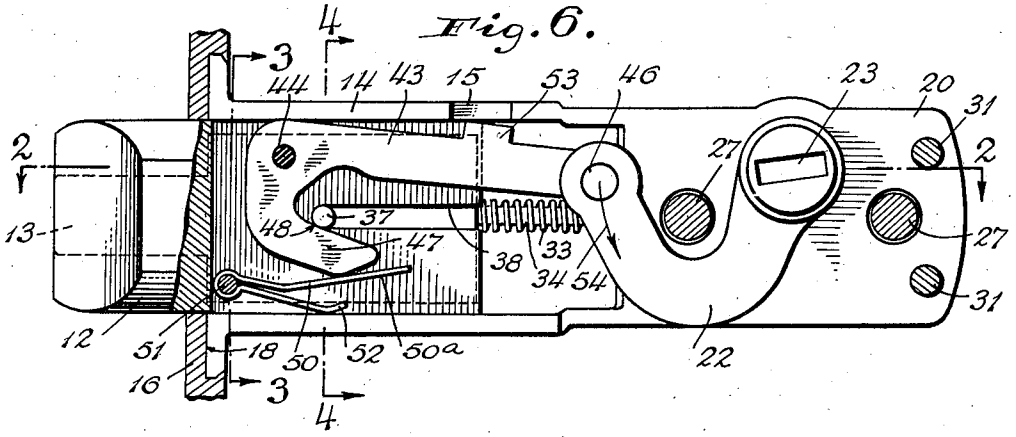
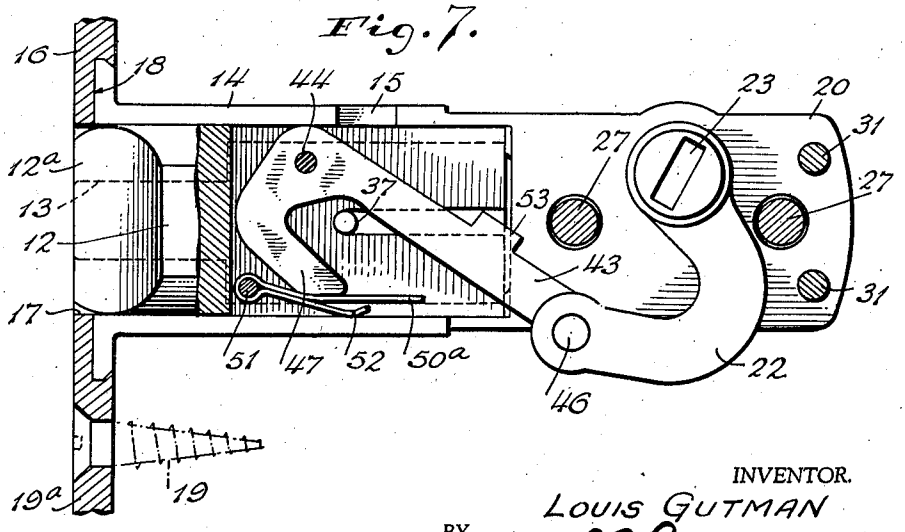


Fig. 7.



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2,307,038

TUBULAR NIGHT LATCH

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Application February 23, 1939, Serial No. 257,884

14 Claims. (Cl. 292—167)

This invention relates in general to dead latch locks; that is, to locks in which, in addition to the main latch bolt, an auxiliary latch bolt is provided, the function of which is, under particular conditions, to lock the main bolt against movement.

More particularly, it relates to dead latch locks of the non-mortise type. It is characteristic of non-mortise type locks that they do not require for their installation, the cutting of mortises in the door to which they are applied, but instead require only the boring of one or more holes within which the parts of the lock, which may be tubular or at least fit within one or more cylindrical spaces, may be accommodated.

It is among the general objects of my invention to provide, in a non-mortise dead latch lock, a simple, sturdy, compact, effective and economical construction and one that is easy and inexpensive to assemble and to install.

It is still further an object of my invention to provide a latching type lock which automatically acts as a dead bolt and may be opened only by a key or interior knob, and is nonetheless sturdy in its construction, when made from simple and inexpensive elements.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, I make reference to the accompanying drawings, forming a part hereof, in which—

Figure 1 is a horizontal, fragmentary sectional view through a door and its frame, showing my improved lock installed therein, and with the parts in their locked position;

Figure 2 is a horizontal sectional view through the lock, with the main and the auxiliary latches in their projected position and taken substantially on the line 2—2 of Figure 6, looking in the direction of the arrows;

Figure 3 is a sectional view on the line 3—3 of Figure 6, looking in the direction of the arrows;

Figure 4 is a sectional view on the line 4—4 of Figure 6, looking in the direction of the arrows;

Figure 5 is a vertical sectional view through my improved lock showing the auxiliary latch in its dead lock position;

Figure 6 is a view similar to Figure 5, but showing the main latch and the auxiliary latch in their projected position;

Figure 7 is a view similar to Figure 5, showing both latches in their retracted position.

Dead latch locks of the type herein disclosed comprise, in general, a main latch bolt movable into a retracted position by the action of a key or a knob on a latch spindle and urged outwardly into its projected position by means such as a spring. Associated with this main latch bolt is a member which may be in the form of a second or auxiliary latch bolt, that will function automatically, when the door is shut, to lock the main bolt in its projected position and prevent its retraction by pressure on the projected end of the bolt.

In describing my invention, it will be convenient first to describe the mounting of the lock and its general construction, and thereafter to describe the details of the construction.

Referring now to the drawings in detail, I have shown at D a door and at F a door frame. The former has a round bore H extending transversely through it, and adapted to accommodate the latch spindle 10 and associated parts, constituting the latch bolt operating unit, that will be hereinafter more fully described, and a horizontal bore K extending at right angles to the bore H and adapted to accommodate the cylindrical housing 11, within which the latch bolts 12 and 13 are slidably mounted.

The frame F has a recess B into which the main latch bolt 12 may extend, and this recess is partly covered by the strike plate S, leaving an opening O therein through which the latch bolt 12 may enter the recess B. The auxiliary latch bolt 13 is maintained by the plate S in its retracted or depressed position, since the opening O is not large enough to permit the bolt 13 to enter the recess B. The strike plate S is further shown as provided with a guide or camming portion G, which will exert a camming action on the inclined face 12a of the main latch bolt 12, and will cause it to move inward. As will appear hereinafter, such inward or retracting movement of the main latch bolt 12 will cause the auxiliary bolt 13 to move with it, and the bolts 12 and 13 during the action described will act as a single bolt.

A shoulder T of conventional type is provided on the frame to limit the inward movement of the door.

The latch bolt housing 11 is shown desirably as comprising two complementary sections 14 and 14a, one of which has a notch 15 formed in it, to provide an opening in the casing for a purpose that will presently appear.

A guide plate 16, provided with an opening 17 through which the latch bolts 12 and 13 may protrude and serving to guide them, and further provided with a recess 18 adapted to receive the ends of the housing sections 14 and 14a, serves to unite them and to retain the latch bolt housing 11 in the bore K. For this last-named purpose,

it is fastened to the door in any suitable or preferred manner, as by the screws 19, through orifices 19a.

Journalled in extensions 20 and 21 of the housing sections 14 and 14a is shown a retractor link 22, provided with a slot 23, centrally positioned in relation to the journals of the retractor link, through which slot 23 there is adapted to pass the aforementioned spindle 10. When the spindle 10 is turned counter clockwise, as viewed in Figures 5, 6 and 7, it will correspondingly turn the retractor link 22 and operate the latch bolts, as will appear as the description proceeds.

On the outside end of the spindle 10 is shown a lock cylinder 24 of any suitable or preferred type, which cylinder may be of the conventional type, provided with the customary key slot, plug and tumblers and is adapted to receive a key. The inside end of the spindle is shown carrying a knob 24a, also serving for manipulation of the spindle. An escutcheon plate 25 is shown associated with the cylinder 24, on the outer side of the door. A second escutcheon plate 26 is provided on the inside of the door. The plates 25 and 26 and the cylinder 24 are held in place by screws 27 passing through the plate 26 and threaded into lugs 28, carried by the cylinder 24. The screws 27 are shown passing through bushed portions 29 and 30, provided on the extensions 20 and 21 of the housing 11, and serve to align the sections 20 and 21 while, on the other hand, the bushed portions 29 and 30 serve to support and guide the screws. It will be understood, however, that the arrangements of the sections 20 and 21 and the bushed portions 29 and 30 are optional and are merely stock saving means and other means may be used to form lateral guides for the link 22.

Locating pins 31, projecting from one of the extensions 30 and 21 and having end portions 32 of reduced diameter, providing a spacer shoulder, are further shown for properly locating the extensions 20 and 21 and for spacing them. If desired, the end portions 32 of the pins 31 may be riveted over, thereby permanently uniting the housing sections 14 and 14a and their extensions 20 and 21. The connection of these housing sections at this end is also optional, and it will be understood that those skilled in the art will readily appreciate that other means for connection of the housing sections may be devised.

As clearly appears from Figures 3 and 4, the latch bolts 12 and 13 together have a cylindrical contour which substantially fills the bore of the housing 11.

The auxiliary latch bolt 13 is shown urged outwardly into its projected position by a coil spring 33, positioned over a guide pin 34, adapted to enter a bore 35 in the auxiliary latch bolt, which the spring however is unable to enter. The head 36 of the pin is shown supported in a recess in the bushing section and its other end is supported in the bolt 13, as already explained. It will be observed that the bolt 13 can be independently moved inwardly against the resistance of the spring 33. Outward movement of the bolt 13 is limited by a pin 37 which moves in a slot 38 in the main bolt 12, which is of limited length and serves to limit the movement of the pin, and consequently of the bolt 13.

The main latch bolt 12 is urged outwardly into its projected position by a spring 39 carried on a guide pin 40, having its head 41 supported in a recess in the housing 11 and having its other end supported in the latch bolt 12, for sliding movement into the bore 42. The spring 39 is prevented from entering the bore by any suitable or preferred means. It will therefore appear that the latch bolt 12 may slide inwardly against the resistance of the spring 39.

Positioned within a longitudinal slot 45 in the bolt 12 is a link 43, pivotally mounted on the bolt at 44 and pivotally connected to the retractor link 22 at 46, and this link has a hook-shaped branched portion 47, provided with an inner camming surface 48, adapted to be engaged by the pin 37 as it moves inwardly in the slot 38, and further provided with an outer surface 49 adapted to be engaged by one arm 50a of a spring 50, pivotally mounted at 51 in the bolt 12 and having its other arm 52 bearing against the housing 11, whereby it exerts a pressure against the portion 47 of the link 43, tending to move it upward about the pivot 44 and thereby tending to move the whole link 43 upward and, when the latch bolt 12 is in its protruded position, to move the locking lug 53 on the upper portion of the link into the aforementioned opening 15 in the housing 11.

It will be observed that the links 22 and 43 constitute a toggle with a breaking point at 46, and that the point 46 is urged above its dead center position by the action of spring 50 unless, as is the case when the auxiliary latch 13 is released, its action is overcome by the force of the spring 33 acting through the pin 37, in which case it is urged below its dead center position.

The operation of the lock will now be described. Assuming that the parts are in the positions of Figures 2 and 6, in which both bolts 12 and 13 are substantially fully projected or protruded by their respective springs 39 and 33, it will be observed that the pin 37 on the auxiliary latch bolt 13 has engaged the cam face 48 of the end portion 47 of the link 43 and has depressed it against the resistance of the weaker spring 50, with the result that the main branch of the link 43 is depressed and the locking lug 53 no longer engages the opening 15 in the housing 11. The link 43 is therefore free to move in a longitudinal direction. At the same time, the pivot 46 is depressed below its dead center position (as in Figure 6), and therefore the latch bolt 12 is free to move inwardly when pressure is exerted against it, as when its inclined face 12a engages the strike plate S. As it moves inward it causes rotation of the retractor link and the spindle 10.

It will further be observed that as the bolt 12 moves inward, it carries the auxiliary bolt 13 inwardly with it, because of the engagement of the pin 37 on the bolt 13 with the end of the slot 38 in the bolt 12.

Retraction of the bolts 12 and 13 in the manner described may be effected by means of a key inserted into the cylinder 24, or by means of the knob 24a.

It is further to be observed that whereas the bolt 12 cannot move inwardly without taking with it the bolt 13, the latter is free to move inwardly or outwardly entirely independently of the bolt 12, as long as the latter is in its protruded or projected position. The bolt 12 may, however, move outwardly without carrying with it the bolt 13.

When the door is open, the normal position of the parts is that of Figure 6; they may be moved into the position of Figure 7 as the toggle link assembly is in the pre-dead center position

but as soon as released (with the door open), will return to the position of Figure 6.

During the process of shutting the door, the inclined face 12a of the bolt 12 first hits the guide portion G of the strike plate and is caused to move inwardly, thereby carrying with it the bolt 13.

When the door is completely shut, the position of the parts is as shown in Figures 1 and 5. The main bolt 12 has moved outwardly into its projected position through the opening O of the strike plate S but the auxiliary bolt 13 remains in its retracted or depressed position, being held there by its engagement with the strike plate. In this position of parts, the pin 37 is out of engagement with the cam face 48 of the link 43 so that the latter is free, under the action of spring 50, to move into a position past the dead center position of pivot 46, with the locking lug 53 in locking engagement with the opening 15 of the housing 11. When it is attempted to push the bolt 12 inwardly, as by applying a tool against its inclined face or any other portion thereof, the link 43 effectively resists such movement because any pressure on the bolt 12 is transmitted to the link 43 through the pin 44, and pressure on the pin 44 and the spring 50 tends to cause the pivot 46 to rise. Such rising movement is prevented by the housing 11 and the locking lug 53 is maintained in the slot 15 and is held against longitudinal movement by the shoulders provided by the walls of the opening 15.

Unlocking of the door may be effected by a key inserted into the cylinder 26 or by the door knob 24a. These are manipulated to move the retractor link and with it the bolts 12 and 13 from the position of Figure 5 into that of Figure 7, which is effected by a counter-clockwise movement of the retractor link, as indicated by the arrow 54 in Figure 6.

Attention may here be called to the extreme simplicity and compactness of construction, and further to the fact that that portion of the link 43 which is effective in resisting retraction of the latch bolt 12 is the portion between the pin 44 and the locking lug 53. This portion is at all times located in the narrow slot 45, the walls of which serve to brace said link portion against lateral deformation. For that reason the link 43 may be made of relatively thin sheet material that can be stamped. By using the stamping process in forming the link 43, great economies in manufacture may be effected.

The retractor link is subjected only to the force needed to retract the latch bolts, which are relatively slight. For this reason, this piece may also be a stamping.

It will be observed that only through manual operation of the retractor link 22 can the main bolt 12 be retracted when the parts are in position as shown in Figures 1 and 5 and that when the parts are in position as shown in Figure 6, manual operation of the link 22 as well as external pressure on the bolt 12 may serve to retract the main bolt. It will also be understood that the retractor link 22 is shown bent to permit clearance of the screws 27 when such construction or assembly of the cylinder is encountered; but otherwise the member may be straight.

It will also be observed that I have provided a simple assembly of parts for retraction and simultaneous unlatching of the main bolt from the position shown in Figures 1 and 5 by the toggle link assembly.

The extreme compactness, simplicity, ease of assembly and ease of installation of my improved lock need no further discussion, since they have already appeared sufficiently from the foregoing description.

While desirable results are obtained by the utilization of the complete assembly, it will be understood that isolated features are considered as having novelty, as outlined within the scope of the appended claims, and that the scope of my invention is not to be narrowly interpreted but I consider my invention to be reasonably interpreted within the scope of the appended claims.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. In a dead latch lock, a frame, a latch bolt slideable in said frame, a toggle link assembly for retracting said bolt, one of the elements of said assembly being a retractor pivotally mounted in said frame and another element being a locking link adapted to interlock with said frame connected to said bolt and said retractor link, said retractor link being adapted by pivotal movement thereof to bring said locking link into a non-locking position.

2. In a dead latch lock, a frame, a main bolt and an auxiliary bolt, each adapted to assume a projected or a retracted position, a toggle assembly adapted, when the main bolt is projected and the auxiliary bolt retracted, to break into a position on one side of its dead center in which it will interlock with the frame and will lock the main bolt so that it cannot be retracted by pressure on its projected portion.

3. In a dead latch lock, a main latch bolt, an auxiliary latch bolt, a toggle system comprising a retractor member adapted for actuation by the lock spindle and a locking link pivotally carried by said main bolt and connected to said retractor member, said toggle system on one side of its dead center position permitting inward movement of the main latch bolt into its retracted position, and on the other side of said dead center position preventing retraction of said latch bolt, a housing surrounding said main bolt and said auxiliary bolt and in which said bolts may move longitudinally, and said locking link and said housing having portions adapted to interlock when said toggle system is in its latch bolt retraction preventing position.

4. In a dead latch lock, a frame, a latch bolt slidable in said frame, a slot in said latch bolt, a latch bolt retracting link having a portion thereof adapted to prevent retraction of the bolt carried by said bolt, said portion being located substantially within said slot whereby it is protected against lateral deformations, and said portion being provided with a locking lug adapted to interlock with means on the frame of the lock so as to prevent retraction of the bolt.

5. In a dead latch lock, a latch bolt, a slot in said latch bolt, a latch bolt retracting link carried by said bolt having a portion thereof formed to prevent retraction of the bolt, said link being located substantially within said slot and interfitting within said slot whereby it is protected against lateral deformations, a substantially cylindrical housing within which said latch bolt is slidable, a slot in said housing, and means carried by the retraction preventing portion of said link adapted to enter said slot and to lock said link against longitudinal movement.

6. In a dead latch lock, a frame including a latch bolt, a link pivotally connected to said latch

bolt, said link in one of its positions being adapted to lock said bolt against movement by interengagement with said frame, a hooklike extension on said link providing a camming surface on its inner edge portion, a member adapted to engage said camming surface so as to cause movement of said link about its pivot in a direction in which it moves away from its bolt-locking position.

7. A dead latch lock comprising a latch bolt, a longitudinal slot in said bolt, a link having a hooked end portion positioned within said slot and another portion extending out of said slot, said link being pivotally mounted in said slot substantially at the bight of its hook portion, and a locking lug on said link positioned adjacent the entrance of said slot and adapted to interlock with fixed portions of the lock.

8. A dead latch lock comprising a latch bolt, a longitudinal slot in said latch bolt, a flat link having a portion thereof positioned within said slot, said link portion being pivoted at its inner end within the slot and carrying a locking lug adjacent its outer end, said lug being adapted to interlock with stationary parts of said lock and to hold said link against longitudinal movement and said slot being relatively narrow so that it serves to brace said link against lateral deformation.

9. A dead latch lock comprising a latch bolt, a longitudinal slot in said latch bolt, a flat link having a portion thereof positioned within said slot, said link portion being pivoted at its inner end within the slot and carrying a locking lug adjacent its outer end, said lug being adapted to interlock with stationary parts of said lock and to hold said link against longitudinal movement, said link also having a second portion extending from the pivoting point of said link in the same direction as said first portion and spaced therefrom, and said slot being relatively narrow so that it serves to brace said link against lateral deformation.

10. In a dead latch lock, a main bolt and an auxiliary bolt, a slot in said main bolt, a link in said slot pivotally connected to said main bolt for retracting said main bolt and also for locking it, a second slot in said main bolt, and means carried by said auxiliary bolt and extending through said second slot, said means being adapted to engage said link and to move it out of its bolt locking position.

11. In a dead latch lock, a main bolt and an auxiliary bolt, means for retracting the main bolt comprising a hook-shaped link having a relatively long branch and a relatively short branch pivoted to the main bolt adjacent the bight portion of its hook, and means on the auxiliary bolt adapted to engage the inner edge of the short branch for the purpose of tilting the said link about its pivot.

12. In a lock, a frame, a bolt slidable in said frame, retractor mechanism, and a link interconnecting said retractor mechanism and said bolt and adapted in certain positions thereof to interlock with said frame and thereby to lock the bolt.

13. In a dead-latch lock, a main bolt, a slot in said bolt, a link mounted for pivotal movement in said slot, said link having a portion thereof adapted to protrude above the bolt when said link is in its uppermost position, said protruding portion being adapted to engage a portion of the frame of the lock and thereby to lock the main bolt, and means adapted to extend into said slot and to engage said link for the purpose of depressing it from said uppermost position.

14. In a dead latch lock, a frame including a latch bolt, a slot in said latch bolt, a latch bolt retracting link carried by said bolt having a portion thereof adapted to prevent retraction of the bolt by interengagement thereof with said frame, said link being located substantially within said slot and interfitting within said slot whereby it is protected against lateral deformations.

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