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[58] Field of Search 292/288, 292, 264, 295, 289,
292/340, 145, 147, 341.15, 346, DIG. 57; 70/464

UNITED STATES PATENTS

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Primary Examiner—Robert L. Wolfe

[57]

Abstract
A combination bolt type and chain lock having an L-shaped frame with an edge part forming a strike plate and extending flatwise along and secured to a door jamb edge surface with a frame side part extending flatwise longitudinally along a door jamb side surface. A bolt opening is formed longitudinally through the juncture between the frame edge and side parts and the frame side part has longitudinally spaced overlying portions, with spaced protuberances acting as guide means for a sheetlike lock bolt, and is separated by intermediate underlying portions longitudinally slidably mounting the lock bolt movable through the frame bolt opening. The lock bolt is provided with spaced protuberances to act as abutment stops for the full open and locked positions thereof. Additional locking means is provided by the combination of a hasp secured to the overlying portions of said frame with a length of chain links sufficient in length to be looped around a doorknob of the door when in the closed position. With the swinging door in the closed position, the lock bolt may be extended overlapping the door side surface acting as a bolt lock, the strike plate of the lock frame edge part may be engaged by a main lock bolt extending from the door edge and the loop of secured chain positioned around the doorknob as an additional locking feature. Disengagement of the bolt lock allows partial opening of the door to the extent of the chain loop.

10 Claims, 6 Drawing Figures

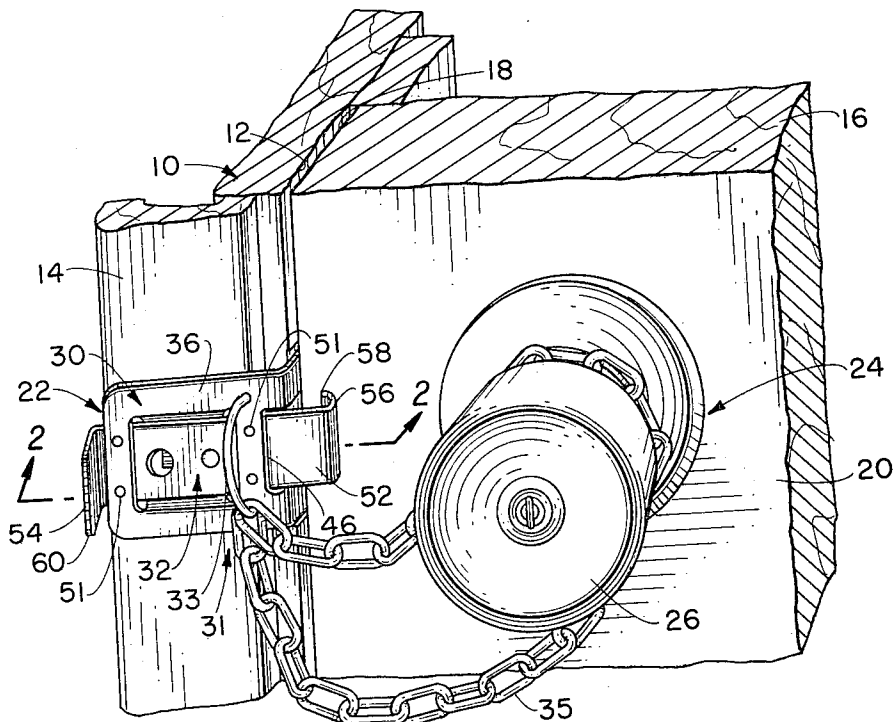


FIG. 1.

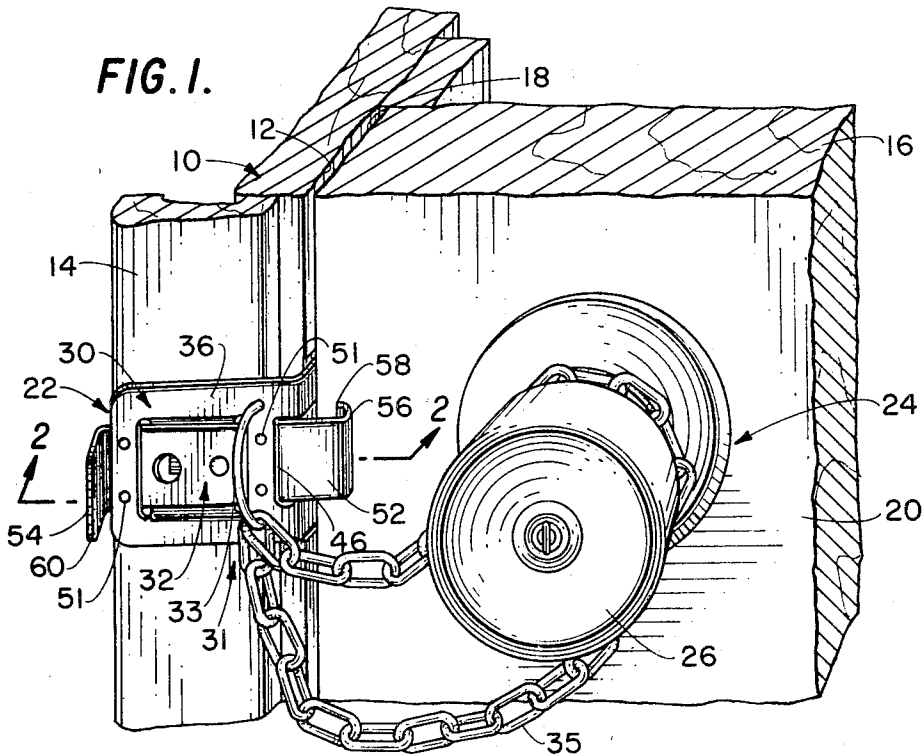
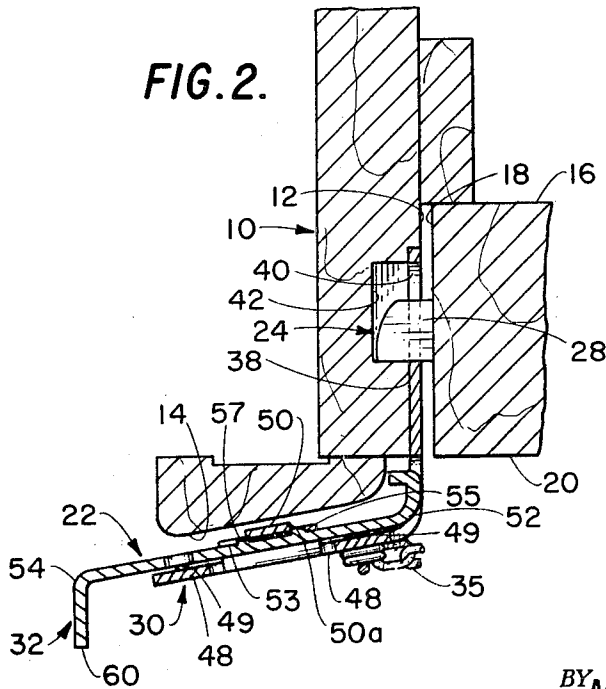


FIG. 2.



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FIG. 3.

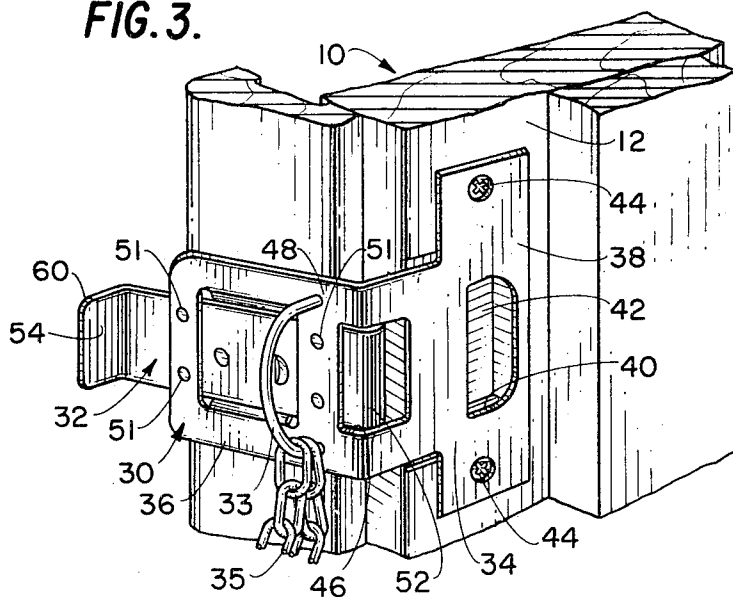


FIG. 4.

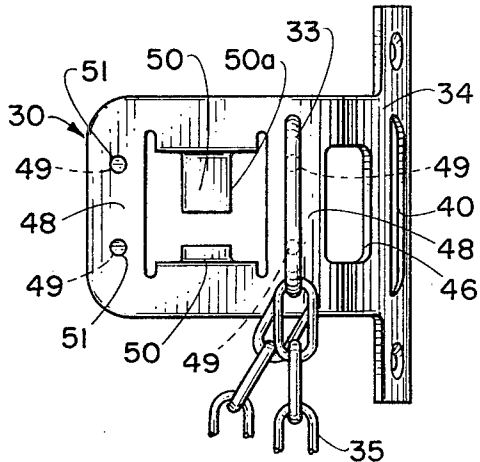


FIG. 5.

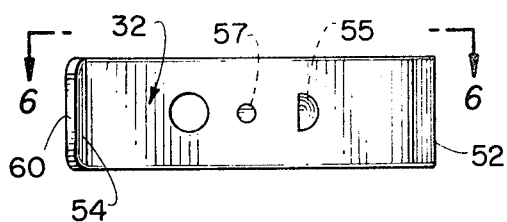
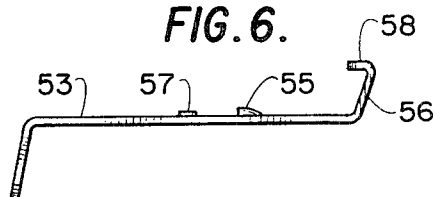


FIG. 6.



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AUXILIARY LOCK FOR SWINGING DOORS

BACKGROUND OF THE INVENTION

This invention relates to a swinging door construction and more particularly to a swinging door lock construction of the fully manually operable, dead bolt type and auxiliary chain normally installed operable between inner side surfaces of a door and door jamb and solely operable from said door inner side despite the installation of other integral latches or locks in such door. Furthermore, the swinging door lock construction of the present invention is most advantageously usable as an auxiliary lock in combination with a conventional key-operated lock actionable between edges of the same door and door jamb and at the same general location thereon. A novel mounting arrangement for the swinging door lock construction of the present invention gives far greater security than has heretofore been possible in similar types of locks and in the auxiliary lock environment further serves to make possible the combining into the lock construction of the present invention the strike plate for the main, key-operated door lock so as to decrease original installation time and costs and increase the security of the overall combined lock system. Additionally, the locks of this invention permit, where desired, partial opening of the door in secure fashion.

Many prior dead bolt types of auxiliary locks have been heretofore provided and probably the major failing thereof has been the required manner of installation. As hereinbefore pointed out, the dead bolt type of locks must be mounted at the inner side surfaces of the door or door jamb, or both, and this mounting has always been accomplished merely by the installation of the usual fasteners, such as wood screws and the like, directly into the door and door jamb inner side surfaces. This, thereby, positions the fastening screws extending substantially parallel to the direction of swinging door movement during the initial stages of opening thereof.

Thus, even if the dead bolt type of lock is installed in combination with a usual main, key-operated lock, once the key-operated lock has been manipulated and opened, it is usually possible with sufficient force to open the door by strong inward forces thereagainst. That is, with the obstruction of the key-operated lock removed, and in view of the direction of extension of the dead bolt type of lock wood screws or other fasteners, sharp impact forces against the door in its inward swinging direction will frequently tear the fasteners of the dead bolt lock from their mounting in the door and door jamb inner surfaces. As a result, the security of the lock system installed on conventional doors and door jambs is of questionable validity.

A further factor of consideration involved where a dead bolt type of lock is used as an additional lock in combination with a conventional, key-operated main lock or main door latch is the dual installation requirements. With prior constructions, even though it is originally known that both the main door lock or main door latch and the auxiliary dead bolt type of lock are desired, each part of the combined lock system is separately installed, one having no true relationship to the other. Obviously, where it is originally known that the combined lock system is required, it is clearly advantageous if certain elements thereof can be combined so as to reduce the installation requirements and the necessary time for accomplishing the same. Furthermore, the usual dead bolt type of lock does not provide controlled guidance of the bolt member, simple locking thereof or the capability of disengaging the bolt member to allow partial opening of the door in a secured or guarded manner by means of an auxiliary chain.

OBJECTS AND SUMMARY OF THE INVENTION

It is, therefore, an object of this invention to provide a swinging door lock construction of the dead bolt type as hereinbefore generally discussed wherein, due to the specific combined configuration thereof, more secure fastening of the lock elements relative to the door and door jamb is accom-

plished greatly increasing the locked security of the same. According to certain of the principles of the present invention, the frame of the lock is formed generally L-shaped in horizontal cross section with an edge part thereof extending along the jamb inner side surface. The lock bolt is slidably mounted on protuberances of the frame side part and is slidably movable to and through one of two positions generally parallel to the jamb inner side surface and extendable across the door inner side surface to overlap the door and obstruct the usual inward swinging movement of the door. A hasp and secured chain permits partial guarded opening of the door when the lock bolt is in the open position.

By providing the securement of the lock frame, through the frame edge part against the door jamb edge surface, the fasteners accomplishing such fastening extend perpendicularly to the door initial swinging movement, rather than generally parallel thereto as is true with the prior constructions. Furthermore, with the door in closed position in the door jamb, the door edge serves to protect the fasteners for the lock frame edge part against movement outward of the jamb edge which would be required for fastener removal. The overall result is that with the lock bolt in extended position overlapping the door inner side surface while the door is in closed position, virtually complete destruction of the door jamb or destruction of the lock construction is required before inward swinging movement of the door can be accomplished toward open position and, again, it is not merely necessary to apply a sufficient inward swinging force on the door to cause parallel fastener removal as is true with the prior construction and hereinbefore discussed.

It is a further object of this invention to provide a swinging door lock construction of the dead bolt type having the foregoing advantageous mounting securement which, when combined with an overall lock installation including a conventional key-operated main lock or main door latch, may have the described lock frame serve the dual function of not only mounting the auxiliary dead bolt type of lock in the improved manner described, but also with said lock frame edge part forming the strike plate for the additional key-operated main lock or main door latch. The lock of the dead bolt type may have the frame edge part thereof formed as a conventional strike plate mounted on the door jamb edge surface in somewhat conventional manner with the exception that portions of the frame edge part forming the strike plate extend inwardly along the door jamb edge surface and around the door jamb corner along the jamb inner side surface. Thus, a combined strike plate and auxiliary dead bolt type of lock installation is accomplished in one operation while still maintaining the secure mounting of the dead bolt type of lock and while properly positioning and securing the strike plate in proper functional position for use by the key-operated main lock or main door latch.

It is also an object of this invention to provide a swinging door lock construction of the dead bolt type wherein sliding friction of the lock bolt is minimized, the sliding bolt is controllably movable from the fully open or fully closed position and intermediate positions thereof and an auxiliary chain loop, adapted to engage the door knob of the swinging door, is provided to allow guarded, partial opening of the door when the lock bolt is not being used to fully lock the door.

It is also an object of this invention to provide a swinging door lock construction of the dead bolt type satisfying the foregoing objects in an efficient manner yet which may be relatively simply manufactured at a minimum of expensive despite the clear advantages thereof. The lock frame may be formed unitary and of unique configuration for receiving the lock bolt slidably thereon and provided with a hasp and secured chain loop. The lock bolt is also of unitary construction and both the frame and the bolt are preferably formed of sheet material. In this manner, only a two-piece assembly as to frame and bolt is required through relatively simple manufacturing operations so as to reduce the material and labor costs to a minimum while still providing improved strength and durability in use.

Other objects and advantages of the invention will be apparent from the following specification and the accompanying drawings, which are for the purpose of illustration only.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing the dead bolt, chain-loop-type lock construction of the present invention mounted as an additional lock in combination with a conventional key-operated main lock for retaining a swinging door in closed position in a door jamb, the dead bolt type of lock being shown with the bolt thereof in extended locking position; and the chain being looped around the doorknob as an auxiliary locking feature.

FIG. 2 is an enlarged, horizontal sectional view looking in the direction of the arrows 2—2 in FIG. 1, but with the bolt of the dead bolt type of lock in retracted position, thereby allowing for partial opening of the door in a secured fashion because of the still engaged chain loop;

FIG. 3 is a perspective view showing the dead bolt type of lock of the present invention and the mounting thereof on the door jamb, the lock bolt in retracted position and the loop chain being disengaged from the doorknob;

FIG. 4 is an enlarged, side elevational view of the lock frame removed from the dead bolt type of lock of FIG. 3, the lock bolt being removed;

FIG. 5 is an enlarged, side elevational view of the lock bolt taken from the dead bolt type of lock of FIG. 3 removed from the lock frame and showing the locking and control features thereof; and

FIG. 6 is a view taken along the lines 6—6 of FIG. 5.

DESCRIPTION OF THE BEST EMBODIMENT CONTEMPLATED

Referring to the drawings, an embodiment of the dead bolt type of lock of the present invention is shown as an additional lock mounted in combination with a conventional, key-operated main lock, both locks being mounted in usual environment for selectively retaining a swinging door in closed position aligned with a door jamb. As shown, a door jamb is generally indicated at 10 and has the usual vertically extending edge surface 12 and inner side surface 14 extending somewhat right angularly to the edge surface. A usual hinged, inwardly swinging door is generally indicated at 16 and includes a corresponding vertically extending edge surface 18 and inner side surface 20, the door edge surface facing the door jamb edge surface and the door side surface generally longitudinally aligned with the door jamb side surface when the door is in its closed position.

The embodiment of the dead bolt type lock of the present invention is generally indicated at 22 secured to the door jamb 10 as will be hereinafter described in detail and as here mounted, the dead bolt type lock is arranged as an additional lock in combination with a conventional key-operated, main door lock generally indicated at 24. The main door lock 24, which could equally as well be merely a main door latch, is mounted in usual manner in the door 16 operable by usual door knobs 26 for projecting and retracting a main lock bolt 28 generally longitudinally outwardly of and reversely within the door edge surface 18. Although the dead bolt type of lock 22 of the present invention is shown herein in combination with the main door lock 24 as described, it should be understood at the outset that certain of the advantages of the present invention can still be obtained with use of the unique dead bolt type of lock even though the main door lock 24 or a corresponding door latch is completely eliminated and it is not intended to limit the broader principles of the present invention to the exact combination shown.

The dead bolt type lock 22 is preferably formed of three basic components, a lock frame generally indicated at 30, an associated hasp and chain loop generally indicated at 31, and a lock bolt generally indicated at 32. Each of the lock frame and lock bolt preferably are unitary components and formed of sheet metal of the like. The lock frame 30 includes an edge

part 34 extending preferably recessed within and along the door jamb edge surface 12, and a side part 36 integral with the edge part extending generally longitudinally adjacent the door jamb side surface 14 inwardly thereof. Where the dead bolt type of lock 22 is mounted in the combination shown with the main door lock 24, the lock frame edge part 34 is formed partially as a conventional strike plate 38 with a conventional strike plate opening 40 backed by usual bolt-receiving recess 42 within the door jamb edge surface 12. Hasp 33 is of conventional staplelike configuration suitably secured to lock frame 30 as by welding, rivet like securement or other means well known in the art. A loop of chain 35, is secured to hasp 33 and is of sufficient length so as to be able to be looped around door knob 26 as shown.

Equally important and directed to one of the basic functions of the lock frame edge part 34 is the fact that the lock frame edge part is secured to the door jamb edge surface 12 by usual fasteners 44, such as wood screws and the like. As a result, the fasteners 44 in their securement functions relative to the lock frame edge part 34 project into the door jamb edge surface 12 at right angles to the initial inward swinging movement of the door 16 when said door is opened. This thereby gives maximum strength of securement for the entire lock frame 30 and its lock bolt 32 mounted thereon as will be described while still performing the function of securing the strike plate 38 in proper position relative to the main door lock 24 and its lock bolt 28.

At the juncture between the lock frame edge part 34 and side part 36 thereof, the lock frame 30 is formed with a bolt opening 46 generally longitudinally therethrough and the lock frame side part 36 projects longitudinally therefrom outwardly adjacent the door jamb side surface 14 as previously described. The lock frame side part 36 is formed with longitudinally spaced, bolt overlying portions 48 having spaced protuberances 49 on the interior surface thereof (seen as dimples or recesses 51 on the exterior surface) and providing bearing surfaces upon which the lock bolt 32 rides. It will be noted that protuberances 49 keep the major surfaces of each of the portions 48 and lock bolt 32 out of engagement thereby decreasing frictional forces therebetween. Lock frame 30 has overlying portions 48 separated by intermediate bolt underlying portions 50. The lock bolt 32 is longitudinally slidably received on protuberances 49 and longitudinally aligned with the lock frame bolt opening 46 inwardly of the spaced bolt overlying portions 48 and outwardly of the intermediate bolt underlying portions 50.

In this manner, the lock bolt 32 is slidably secured to ride in a friction-reducing manner on the protuberances 49 of portions 48 of the lock frame 30 with a projecting end portion 52 thereof longitudinally projectable through and retractable within the lock frame bolt opening 46, while an opposite bolt operating end portion 54 remains at all times longitudinally beyond the free longitudinal end of the frame side part 36 as can be seen in FIGS. 1, 2 and 3. The bolt overlying portions 48 (and more directly protuberances 49 thereof) of the frame side part 36 thereby project vertically along and securely retain the lock bolt 32 inwardly therebeneath or inwardly toward the door jamb side surface 14 despite the longitudinal slidable position of the lock bolt, and the bolt underlying portions 50 of the frame side part through vertical extension inwardly beneath or inwardly between the lock bolt and the door jamb side surface cooperate to retain the lock bolt longitudinally aligned and slidable on protuberances 49 through the lock frame bolt opening 46. It will be noted (FIGS. 5 and 6) that the interior surface 53 of lock bolt 32 is provided with abutment stop 55 which is adapted to engage (FIG. 2) the edge 50a of underlying portion 50 to define the outer limit of retraction for lock bolt 32 when moved longitudinally to the left as viewed in the figures. Adjacent abutment stop 55 is direction control bead 57 which engages the under surface of the major underlying portions 50 for a majority of the distance of travel of the lock bolt 32 except when positioned in the fully closed portion (FIG. 1) in which event disengagement occurs

and a sharplike action results. This then requires a positive minimum force to overcome the locked position and to thereby again position the control bead 57 into engagement with underlying portion 50. The stop 55 and bead 57 may be integrally formed as by punch press thereby forming corresponding recesses in the opposite surface as best seen in FIG. 5. Thus, any forces against the lock bolt 32 inwardly away from the door jamb side surface 14 are directly resisted by the locking action of bead 57 against edge 50a of portion 50, lock frame side part 36 and transmitted therethrough into the lock frame edge part 34 ultimately through the fasteners 44 into the door jamb edge surface 12 at right angles to the direction of initial swinging movement of the door 16 in its inward swinging movement from the door jamb 10.

As best seen in FIGS. 1 and 2, the projecting end portion 52 of the lock bolt 32 terminates longitudinally in an inward curl or inward extension 56 toward the door side surface 20 and then in a short reverse longitudinal extension 58 substantially parallel to said door side surface when the lock bolt is in its extension position overlapping the door. In this position the flat surface of abutment stop 55 engages edge 50a of underlying portion 50. With such configuration, the reverse longitudinal extension 58 of the bolt projecting end portion 52 will not only longitudinally overlap the door side surface 20 when the lock bolt 32 is extended, but will move during such extension closely adjacent if not abutting the door side surface 20 providing maximum locking security. The bolt operating end portion 54 of the lock bolt 32 terminates longitudinally beyond the lock frame side part 36 in a finger grip extension outwardly away from the door jamb side surface 14 and away from the exposed face of the lock frame side part 36 so as to serve as a finger grip portion for slidably moving the lock bolt 32 within the lock frame 30 and also to serve in conjunction with the coaction of control bead 57 as a longitudinal limit for the longitudinal slidable movement of the lock bolt relative to the lock frame.

In use of the swinging door lock construction of the present invention, therefore, the lock bolt 32 may be positioned in its retracted position as shown in FIGS. 2 and 3 with the bolt projecting end portion 52 withdrawn into the lock frame bolt opening 46 so as to permit free inward swinging movement of the door 16 from the door jamb 10 by proper manipulation of the main door lock 24 and the disengagement of the main lock bolt 28 from the strike plate 38. If it is desired to have the door only partially open in a secured or guarded manner, the auxiliary locking feature, i.e., chain loop 35 is looped around the door knob 26 in the manner shown. Removal of chain loop 35 permits complete unguarded opening of the door to its fullest open position. When it is desired to use the dead bolt type of lock of the present invention, the door 16 is moved to closed position and the lock bolt 32 may be slid longitudinally relative to the lock frame 30 until the projecting end portion 52 of the bolt overlaps the door side surface 20 as shown in FIG. 1, and the snap-acting coaction of bead 57 and edge 50a are obtained, thereby securely retaining the door against inward swinging movement relative to the door jamb 10. Again, it is pointed out that in this projected or extended position of the lock bolt 32 overlapping the door side surface 20, the forces created by any attempted inward swinging movement of the door 16 will be transmitted from the lock bolt into the lock frame side part 36 and ultimately into the lock frame edge part 34 where such forces will be resisted by the fasteners 44 extending substantially at right angles to the initial inward swinging movement of the door and transmitted thereby into the door jamb edge surface 12 so as to give the maximum resisting forces. As an additional safety feature, the chain loop 35 may be looped around knob 26 of door 16.

According to the principles of the present invention, therefore, a swinging door lock construction in the form of a chain loop and dead bolt type lock is provided which may be mounted as an individual lock on the door jamb of a swinging door construction and through the unique fastening of the lock frame edge part 34 to the door jamb edge surface 12 will

give maximum resistance to surreptitious inward swinging movement of the door, far greater than that of similar types of locks heretofore provided. Also, merely by the proper formation of the configuration of the lock frame 30 and particularly its edge part 34, the dead bolt type lock of the present invention may be directly combined with a usual main door lock 24 to provide the strike plate 38 for the main door lock and minimize the combined lock mounting procedure, the lock frame side part 36 of the dead bolt type lock serving the dual purpose of providing the increased strength of fastening of the lock frame 30 for the dead bolt type of lock and the mounting and structure for the main door lock strike plate 38 combined therewith. Still further, the parts of the dead bolt type lock of the present invention, namely the lock frame 30 and the lock bolt 32 will be designed to coact and cooperate to provide the inner and outer limits of bolt movement and to minimize the amount of sliding friction between their respective surfaces and provided with an auxiliary locking feature by way of hasp and chain loop to allow partial opening of the door with which the invention is used in a guarded or secured manner.

I claim:

1. In a door lock construction for use in locking a swinging door in closed position with vertical edge surfaces of said door and a door jamb facing and vertical side surfaces at a swinging side of said door and a side of said door jamb generally longitudinally aligned, the combination of: a lock frame generally L-shaped in horizontal cross section having an edge part secured to said vertical edge surface of said door jamb facing said door edge surface and a side part extending generally longitudinally along said door jamb side; a lock bolt; mounting means mounting said lock bolt in a friction reducing manner on said lock frame side part, said lock bolt having an abutment stop and a spaced protuberance on the surface thereof opposed to and coacting with said lock frame to thereby be controllably movable between an extended position generally longitudinally overlapping and adjacent said door-swinging side when said door is in said closed position blocking swinging movement of said door from said closed position and a retracted position, defined by said abutment stop longitudinally displaced from said door-swinging side permitting said door-swinging movement; and a hasp and secured chain loop mounted on said lock frame to provide an auxiliary door lock when said lock bolt is in a retracted position and the door is partially open.

2. In a door lock construction for use as an additional door lock in locking a swinging door in closed position with vertical edge surfaces of said door and a door jamb facing and vertical side surface at a swinging side of said door and a side of said door jamb generally longitudinally aligned, the combination of: a lock frame generally L-shaped in horizontal cross section having an edge part secured to said vertical edge surface of said door jamb facing said door edge surface and a side part extending generally longitudinally along said door jamb side; a lock bolt; said lock frame edge part of said additional door lock includes a strike plate secured to said vertical edge surface of said door jamb facing said door edge surface having means thereon engageable by a main door bolt extendable from said door edge surface; mounting means mounting said lock bolt in a friction reducing manner on said lock frame side part and comprising a plurality of spaced projections on said lock frame in the area of the mounting of said lock bolt, said lock bolt having an abutment stop and a spaced protuberance coacting with said lock frame to thereby be controllably movable between an extended position generally longitudinally overlapping and adjacent said door swinging side when said door is in said closed position blocking swinging movement of said door from said closed position and a retracted position, defined by said abutment stop longitudinally displaced from said door-swinging side permitting said door-swinging movement; and a hasp and secured chain loop mounted on said lock frame to provide an auxiliary door lock when said lock bolt is in a retracted position and the door is partially open.

3. A door lock construction in accordance with claim 2 wherein said plurality of spaced projections are integrally formed with said lock frame and provide point, as opposed to surface contact, between said lock frame and said lock bolt.

4. A door lock construction in accordance with claim 3 wherein said lock frame comprises portions overlying said lock bolt and spaced discontinuous underlying portions and said plurality of spaced projections are spaced on the interior surface of said overlying portions adjacent said lock bolt.

5. A door lock construction in accordance with claim 4 wherein said protuberance on said lock bolt engages one of said underlying portion for a majority of the travel of said lock bolt from the extracted to the retracted position.

6. A door lock construction in accordance with claim 5 wherein said protuberance disengages said one of said underlying portion when said lock bolt is in the fully extended position.

tion.

7. A door lock construction in accordance with claim 6 wherein said abutment stop has an abutment shoulder to engage an edge wall of said one of said underlying portions.

8. A door lock construction in accordance with claim 7 wherein said hasp is secured on said lock frame adjacent said edge part.

9. A door lock construction in accordance with claim 8 wherein said chain loop is of sufficient size to loop around the doorknob of said door and to allow partial opening of said door with said chain loop engaged thereon.

10. A door lock construction in accordance with claim 9 wherein said hasp is secured to said overlying portions of said lock frame.

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