July 21, 1942. F. E. BEST 2,290,728

DEAD LOCKING TUBULAR NIGHT LATCH

Filed Nov. 6, 1940 2 Sheets-Sheet 1

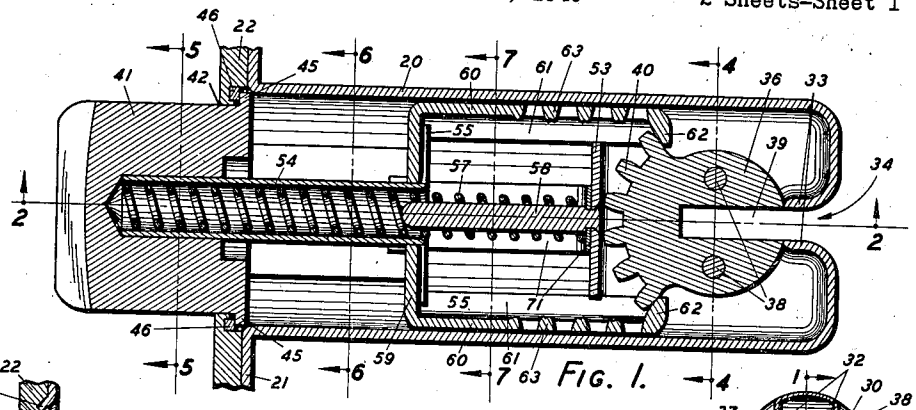


FIG. 1.

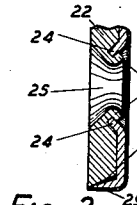


FIG. 3.

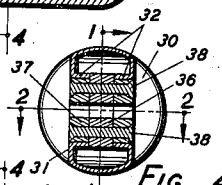


FIG. 4.

FIG. 2.

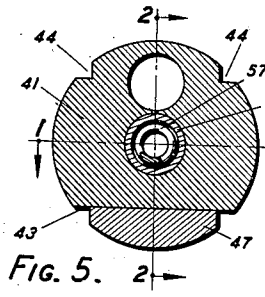


FIG. 5.

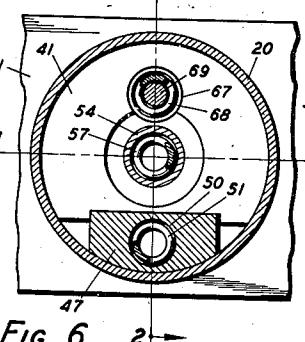


FIG. 6.

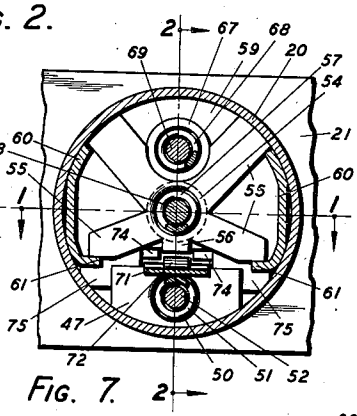


FIG. 7.

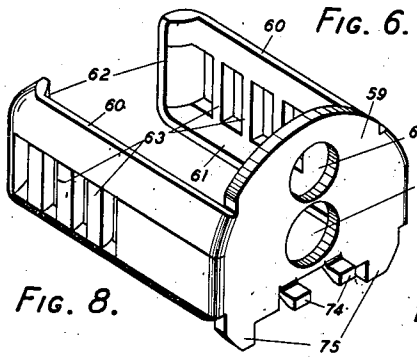


FIG. 8.

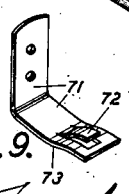


FIG. 9.

FIG. 10.

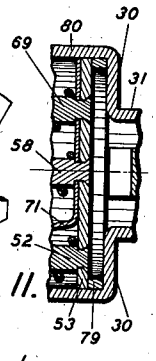


FIG. 11.

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DEAD LOCKING TUBULAR NIGHT LATCH

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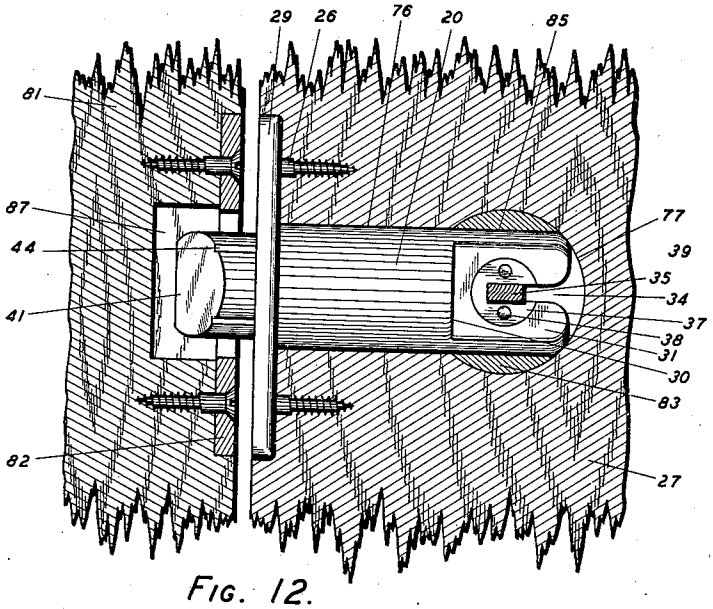


FIG. 12.

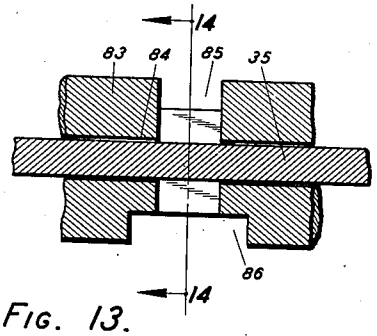


FIG. 13.

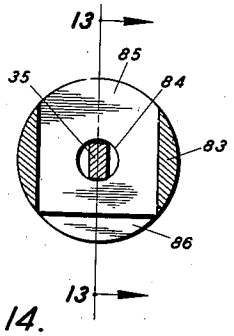


FIG. 14.

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UNITED STATES PATENT OFFICE

2,290,728

DEAD LOCKING TUBULAR NIGHT LATCH

Frank Ellison Best, Indianapolis, Ind.

Application November 6, 1940, Serial No. 364,496

10 Claims. (Cl. 292—172)

My invention relates to tubular locks and my present application is in the nature of a continuation in part of my prior patent application Serial Number 290,592, filed Aug. 17, 1939.

An object of this invention is to provide a tubular lock, of the type known as a reversable dead locking night latch, having a large bolt with a long throw mounted in a tube of minimum size and operable with a small amount of spindle action.

Another object is to provide a tubular lock of this type that is of short over-all length and in which the distance from the lock face to the spindle center, commonly known as the backset is short.

Another object of this invention is to provide simple and efficient means for assembling a lock in a door in such a manner as to make it necessary to open the door and remove the lock before certain of the knob shank and spindle parts can be removed, thus making it impossible for a person to disassemble the lock without first opening the door.

Other objects are to provide a lock mechanism that is smooth in operation, easily retractable and one wherein the bolt is pushed back easily without turning the knobs when a door carrying the lock mechanism is pushed closed.

Other objects are to provide a lock of this type that is simple, durable and not expensive in construction, neat and rugged in appearance and efficient and reliable in operation.

Another object is to provide bolt blocking means of novel and efficient construction which makes it impossible to insert a thin flat instrument between a door and a door jamb and push the bolt of the lock back to thereby gain admission through the door.

Another object is to provide a tubular lock of this nature in which the backset and the over-all length may be varied without altering any of the parts of the lock except the housing and a bolt retracting member.

Other objects will be apparent from the following description taken in connection with the accompaniying drawings:

In the drawings, Figure 1 is a vertical axial section of a tubular dead locking night latch constructed in accordance with this invention taken substantially on broken lines 1—1 of Figs. 2, 4, 5, 6 and 7.

Fig. 2 is a horizontal axial section of the same taken substantially on broken line 2—2 of Figs. 1, 4, 5, 6 and 7.

Fig. 3 is a fragmentary sectional view showing the manner of securing a face plate to a face plate retainer.

Fig. 4 is a sectional view, on a smaller scale than Figs. 1 and 2, taken substantially on broken lines 4—4 of Figs. 1 and 2.

Figs. 5, 6 and 7 are sectional views taken substantially on broken lines 5—5, 6—6 and 7—7 of Figs. 1 and 2.

Fig. 8 is a detached isometric view of a bolt retracting member.

Fig. 9 is a detached isometric view of a dead locking spring.

Fig. 10 is a detached isometric view of a tubular spring guide and bolt retractor that is connected with the latch bolt.

Fig. 11 is a fragmentary sectional view showing the lock constructed to provide a greater distance between the face of the lock and the axis of the spindle, this distance being commonly referred to as the backset.

Fig. 12 is a sectional view with parts in elevation showing this lock installed, a fragment of a door and a door jamb being shown.

Fig. 13 is a detached sectional view on broken line 13—13 of Fig. 14, showing a fragment of a tubular member that extends crosswise of a door and interlocks with this lock when the same is installed.

Fig. 14 is a sectional view substantially on broken line 13—13 of Fig. 14.

Similar characters refer to the same or similar parts throughout the several views.

The housing of this lock comprises a tubular shell 20 preferably formed from a single piece of metal by suitable drawing and annealing operations. The forward end portion of the shell 20 has an integral face plate retainer 21 extending perpendicularly therefrom.

The face plate retainer 21 is flat and of rectangular shape and is secured to a rectangular face plate 22 by clinching annular projections 23 of the face plate 22 over indented annular portions 24 of the face plate retainer as shown in Fig. 3, the clinched portions being at the location of screw holes 25 through which screws 26 are inserted, see Fig. 12, to secure the lock to a door 27.

Preferably the marginal edges of the face plate 22 are beveled, as indicated by 28 in Figs. 2 and 3, and the edges 29 of the face plate retainer 21 are dished to fit over and receive the face plate and are internally beveled to substantially mate with the bevels 28 of the face plate. The dished edges 29 of the face plate retainer 21 are just deep enough to receive the face plate 22 and be flush with the outer surface thereof and the joint

between the face plate 22 and dished edges 29 is a corner joint that terminates at the outermost edge of the face plate 22 and is substantially invisible.

When the face plate 22 is mated with a retainer plate 21 so as to provide a corner joint, as above described, it is possible to provide one finish on the face plate and a different finish on the face plate retainer 29 and yet have the two parts look like a single piece having two different finishes thereon. Also this method of construction gives to the lock a strong and rugged appearance.

The rear end portion of the shell 20 is the full width of the shell in one plane, as shown in Figs. 1 and 4, and is flattened in a plane at right angles to the first mentioned plane, as shown in Figs. 2 and 4.

The flattening of the rear end portion of the shell 20 provides two oppositely positioned shoulders 30 as shown in Figs. 2 and 4, and two flat side walls 31.

The flattened side walls 31 are bent inwardly to provide cylindrical bearing flanges 32 and the walls 33 at the rear end of the flattened portion are bent inwardly and forwardly to leave a notch or opening 34 in said rear walls so that this portion of the lock may be fitted over a spindle 35, as shown in Figs. 12, 13 and 14 and hereinafter described, without inserting the spindle endwise therethrough.

A throw member made up of a gear segment 36 secured between two discs 37 by rivets 38 is supported for angular movement in the bearing flanges 32. The gear segment 36 and discs 37 are all notched from one edge inwardly to provide an opening 39 which may be passed over the spindle 35 shown in Figs. 12, 13 and 14. Thus the lock can be inserted into the door and fitted over the spindle while the spindle is in place or can be withdrawn from the door without removing the spindle. Gear teeth 40 are provided on the gear segment 36. As the lock housing 20 is of one piece construction the discs 37 are installed after the throw member has been positioned in the housing.

A beveled latch bolt 41 is reciprocably supported in the front end portion of the shell 20 and in a substantially cylindrical opening 42 in the face plate 22. This latch bolt 41 is of substantially cylindrical cross section except that it has a flattened portion 43 on one side and is provided with two notches 44 which cooperate with suitable parts of the face plate to prevent rotary movement of the bolt.

An outwardly directed flange 45 on the inner end portion of the bolt 41 is adapted to engage with a ring 46 of cushioning material, such as cork, when the bolt is fully extended. The ring 46 serves as a cushioning and sound deadening means.

A dead locking slide 47 is positioned against the flat side 43 of the latch bolt 41. A shoulder 48 is provided on the dead locking slide 47 for engagement with the cushion ring 46. Another shoulder 49 is provided on the dead locking slide 47 for engagement with the inner end portion of the latch bolt 41.

The inner end portion of the dead locking slide 47 extends a substantial distance into the housing 20 and a longitudinal hole 50 is provided therein for the reception of a compression spring 51 that is guided on a pin 52. The pin 52 is staked or otherwise secured to a plate 53 that rests against the shoulders 30.

A guide tube 54 has one end portion thereof fixedly secured in the latch bolt 41, as by press fitting. This guide tube 54 is positioned coaxially of the lock and extends inwardly from the latch bolt 41 into the housing 20.

The inner end of this guide tube 54 is split and flared outwardly as shown in Figs. 7 and 10 to provide four substantially radial arms 55 and an outwardly protruding lug 56. The radial arms 55 are guided in the housing 20 and on guide means hereinafter described and the guide tube 54 gives stability to the bolt 41 and serves as a guide for a compression spring 57. A guide pin 58, staked to the plate 53 cooperates in guiding the spring 57.

A bolt retracting member, shown in isometric in Fig. 8, is provided within the housing 20. This bolt retracting member comprises an end plate 59 having two integral rack bars 60 positioned on opposite sides thereof and extending perpendicularly therefrom. The position of this lock retracting member in Fig. 8 is reversed end for end as respects the showing of the same in Figs. 1 and 2.

The rack bars 60 are positioned and shaped so that they engage with the walls of the housing 20 and are guided thereby, see Figs. 1 and 7, and the lower edge portions of said rack bars extend inwardly to form shelf members or guide portions 61 for the arms 55.

A longer rack tooth 62 is provided at the inner end of each rack bar 60 and a plurality of shorter rack teeth 63 are provided forwardly of longer teeth 62.

The end plate 59 is provided with a centrally positioned hole 64 for slidably receiving the guide tube 54. Also the end plate 59 is provided with another hole 65 positioned adjacent the hole 64. A tubular spring guide member 66 is positioned within the hole 65 and is provided with an external flange 67, which engages with one side of the plate 59.

A compression spring 68 has one end portion thereof positioned within the spring guide member 66 and the other end thereof positioned to abut against the plate 53. A guide pin 69 staked to plate 53 is provided within spring 68 and extends through tubular spring guide 66. Recesses 70 are provided in latch bolt 41 to afford clearance for spring guide 66 and guide pin 69 and for cams 74 on plate member 59, this clearance being necessary when the bolt is pushed back without retracting the member 59—60.

The bolt is thus pushed back, without moving the retractor means 59—60 and without turning the throw or spindle or knob means, every time the door is pushed closed.

An L shaped bolt blocking spring 71 is secured to the plate 53 by trapping the same between the plate 53 and suitable shoulders on the pins 58 and 69.

One leg of spring 71 extends outwardly from plate 53 just above helical spring 51 and has its end portion positioned on the dead locking slide 47. A bolt blocking lug 72 is formed by stamping the same out of said spring 71 near the free end thereof and said spring 71 also has a curved or cam shaped portion 73 bowed toward the path of movement of the bolt blocking slide 47 and arranged to be engaged by said slide when said slide is moved inwardly.

The bolt blocking lug 72 is positioned so that it may be moved into alignment with the lug 56 on the main spring guide 54 but stands clear of said lug 56 unless the free end of the spring 71

is raised up by the dead locking slide 47, as hereinafter explained.

Two cam members 74 are provided on the lower portion of the end plate 59 for the purpose of engaging with and depressing the free end portion of the spring 71. The cam members 74 are spaced apart laterally so as to clear the lug 72.

The end plate 59 of the bolt retracting member, Fig. 8, has two outwardly extending lugs 75 that are positioned on opposite sides of the dead locking slide 47 and cooperate in guiding both the dead locking slide and the bolt retracting member.

If it is desired to provide a lock with a longer backset, or greater distance from the face of the lock to the axis of the shank, then I provide a longer lock housing 80, Fig. 11, and provide longer rack bars and provide a ring member 79 between the plate 53 and the shouldered end portions of the housing and use all of the remaining parts of the lock without alterations. Thus I am able to vary the backset of the lock by varying the lengths of the housing and rack bars only. Obviously the ring member 79 may be of any desired thickness to provide any desired backset and the housing and rack members may be proportioned accordingly.

In installing this lock in a door one hole 76 is bored inwardly from the edge of the door for the reception of the lock and another intersecting hole 77 is bored transversely of the door. The axes of the two holes 76 and 77 intersect at right angles to each other and the transverse hole 77 is set back from the edge of the door 27 the proper distance so that its axis will coincide with the axis of a spindle 35 to be later installed therein.

A tubular member 83 having relatively thick walls and having an axial passageway 84 for receiving and guiding the spindle 35 is installed in the transverse hole 77. The ends of the tubular member 83 are broken away in Fig. 13 but may be of any suitable shape to cooperate with knob means or lock means by which the spindle 35 may be operated. The tube 83 forms both an armor means and a support for the lock and for the spindle 35.

The medial portion of the tubular member 83 has a transverse slot 85 for the reception of the narrower inner end portions of the lock housing 20 and said tubular member 83 further has a transverse cut away portion 86 on one side thereof to provide clearance for the shoulders 30 of the lock housing.

Obviously when the tubular member 83 and the lock are installed in the relation shown in Fig. 12 it will be impossible to remove the lock as long as the door 27 is in closed position and it will be impossible to remove the tubular member 83 and thus gain access to the inner end portion of the lock while said lock is in its proper position in the door. This provides a safeguard against unauthorized persons disassembling the lock to thus gain admission through the door that is safeguarded by the lock.

In the assembly of the tubular lock mechanism within the housing 20, preferably the several parts of the lock mechanism are first put together outside of the housing with the gear segment 36 in engagement with the longer rack teeth 62 and the disc members 37 detached. These assembled parts are then slipped into the open end of the lock housing 20 and properly positioned and the face plate 22 and discs 37 are applied and fastened leaving the lock permanently assembled in such a manner that it can not be taken apart without unclinching the face plate fastening members 23—24 and removing the rivets 38.

This dead locking tubular night latch is quickly and easily installed in a door 27 by boring the two intersecting holes 76 and 77 thus saving much time over any installation that requires mortising.

The holes 76 and 77 are of a size capable of being bored with bits ordinarily carried by carpenters and do not require expansive bits for boring.

This night latch may be operated by various forms of turn knobs and primary locks connected with gear member 36 or directly by knobs.

When a door carrying this night latch is open the several parts of the latch will occupy the positions shown in Figs. 1 and 2. When the door is moved to a closed position the bolt 41 will be moved inwardly by engagement with a keeper or striker plate 82 of a door frame 81 and will carry the dead locking slide 47 inwardly along with it.

When bolt 41 and dead locking slide 47 thus move inwardly together by pressure from the outside the stop lug 56 of spring guide 54 will move past the bolt blocking lug 72 before the dead locking slide 47 engages with the curved portion 73 of spring 71 and begins to lift said spring and there will be no blocking of this inward movement.

Also when inward movement of the bolt 41 and dead locking slide 47 is produced by pressure on the bolt 41, as by the closing of the door, the two springs 57 and 51 will be compressed but the spring 63 will not be compressed because the lock retracting member 59—60 is not moved inwardly. This provides for an easy closing of the door against a soft spring pressure, a thing which is desirable in operation.

When the bolt 41 snaps outwardly into an opening 87 in the striker plate 82, as the door is closed, the dead locking slide 47 will not drop into the opening 87 but will abut against the striker plate 82 and will be held in retracted position thereby. This will elevate the movable end portion of the spring 71 as the curved portion 73 of said spring rides forwardly over the dead locking slide 47 and will position the bolt blocking lug 72 in blocking position as respects the lug 56.

If an attempt is made to push the bolt 41 back into the lock when the bowed portion 73 of the spring 71 thus rests on the dead locking slide 47 the stop lug 56 will strike against the bolt blocking lug 72 and the bolt 41 will be thereby blocked against retractile movement.

This prevents unauthorized retraction of the bolt 41 by inserting a flat instrument between a door and a door jamb and pressing said flat instrument against the inclined face of the bolt 41.

Some lost motion is provided between the stop lug 56 and the bolt blocking lug 72 when the bolt is projected outwardly. This lost motion is not enough to allow the bolt 41 to be pushed back clear of the striker plate by force applied from the outside. However it provides enough lost motion so that when bolt 41 is drawn inwardly by retractile movement of bolt retracting member 59—60 the cams 74 will contact the raised end portion of spring 71 and depress the bolt blocking lug 72 before the stop lug 56 strikes said lug 72.

When gear segment 36 is angularly moved in

either direction by turning spindle 35, either with a knob or by the insertion of a key in a lock or by a turn knob or otherwise, it will begin to retractively move the bolt retracting member 59—60 and bolt 41. As cam members 74 move to the right, Fig. 2, they will engage with and depress the end portion of the spring 71 and will move the blocking lug 72 out of the path of lug 56 before lug 56 encounters said lug 72.

When the curved portion 73 of the spring 71 rests on the dead locking slide 47 the end portion of the spring 71 will be elevated above said slide 47 and can be readily depressed by cams 74.

It is to be noted that the end portion of the tubular spring guide 54 extends well into the bolt 41. This spring guide is preferably formed of hardened steel which serves as an armor means embedded within the bolt and makes it very difficult to saw through the bolt.

The foregoing description and accompanying drawings clearly disclose a preferred embodiment of my invention but it is to be understood that this disclosure is merely illustrative and that changes may be made within the scope and spirit of the following claims.

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

1. In lock means for a door having two openings therein intersecting each other at right angles, a tubular shank member positioned in one of said openings, a longitudinal spindle in said shank, a transverse passageway in said shank, a lock housing adapted to be inserted in the other opening, a throw member rotatively mounted in the inner end portion of said lock housing, said throw member and said housing having slots adapted to register with each other whereby the rear end portion of said lock housing may be inserted into the transverse passageway in said shank and the slots in said housing and said throw member passed over said spindle.

2. In lock means of the class described, an integral tubular housing, a relatively narrow end portion on the rear end of said housing, said narrow end portion having aligned substantially circular openings in the sides thereof, a throw member adapted to be positioned in said narrow end portion, and separable discs insertable in said circular openings from the exterior of said housing and rotatively movable in said circular openings, and means adapted to secure said discs to said throw member after said throw member is positioned in said housing, said discs serving to correctly align said throw member and support the same for oscillation.

3. In a lock, a tubular housing, a bolt reciprocable in said housing, a reciprocable bolt retracting plate positioned diametrically of said housing and having a guide hole therein, a tube secured to said bolt and extending slidably through said guide hole, radial arms on said tube on the opposite side of said plate from said bolt providing guide means for said tube and adapted to engage with said plate and retract said bolt when said plate is retracted, springs urging said bolt outwardly, and plate retracting means connected with said plate for retracting the same.

4. In a lock, a tubular housing, a reciprocable bolt in said housing, a reciprocable dead locking slide positioned alongside of said bolt movable by said bolt into a retracted position and adapted to be retained by engagement with a striker plate in said retracted position when said bolt moves outwardly into locked engagement with said striker plate, a bolt retracting plate positioned diametrically of said housing and having an opening therein, a tube secured to said bolt and extending slidably through said plate, a stop lug on the end portion of said tube on the opposite side of the plate from the bolt, a bolt blocking spring, movable into and out of a blocking position as respects said lug, means on said spring positioned for engagement by said dead locking slide to move the same into bolt blocking position when the slide is held inwardly, and means on the plate to depress the spring.

5. In a lock, a reciprocable bolt, a reciprocable dead locking slide, retractively movable with said bolt, bolt retracting means operable to retract said bolt and adapted to remain immovable if said bolt is pushed inwardly, a bolt blocking spring resting on said dead locking slide, and having a forward end portion movable into and out of a blocking position relative to said bolt, a curved portion on said spring extending into the path of the dead locking slide, whereby said spring will be moved into a bolt blocking position when said slide is retracted and said bolt is outwardly projected, and cam means on said bolt retracting means positioned to engage with said spring and depress the bolt blocking end portion thereof if said bolt retracting means is retracted when said slide is in a retracted position.

6. In a lock, a tubular housing, a reciprocable bolt in said housing, a reciprocable dead locking slide positioned alongside of said bolt movable by said bolt into a retracted position when the bolt is retracted and adapted to be retained by engagement with a striker plate in a retracted position when the bolt moves outwardly into locked engagement with the striker plate, a bolt retracting plate reciprocable in said housing, means for retracting said plate, bolt retracting means connecting said bolt and said plate providing for movement of said bolt toward said plate when said bolt is pushed inwardly and providing for retractile movement of said bolt with said plate when said plate is retracted, a bolt blocking spring of flat metal resting on said dead locking slide, a bolt blocking lug on the forward end portion of said spring, a curved portion on said spring extending into the path of the slide whereby said spring will be moved into a bolt blocking position when said slide is retracted without retracting said bolt, and cam means on said plate positioned to engage with said spring and depress the bolt blocking end portion thereof if said plate is retracted when said slide is in a retracted position.

7. In a lock, a tubular housing, a reciprocable bolt in said housing, a reciprocable bolt retracting plate in said housing having a guide hole therein, two oppositely positioned bars on said plate slidably guided in said housing, retracting means operatively connected with said bars, an inwardly directed guide portion forming a shelf member extending longitudinally of each of said bars, a tube secured to said bolt and extending slidably through said guide hole in said plate, and outwardly extending arms on said tube on the opposite side of said plate from said bolt, two of said arms resting on said shelf members formed by said guide portions and being guided thereby for longitudinal movement.

8. In a lock, a tubular housing, a reciprocable bolt in said housing, a reciprocable bolt retracting plate in said housing having a guide hole therein, two oppositely positioned bars on said

plate slidably guided in said housing and extending longitudinally therein, guide means carried by said bars, retracting means operatively connected with said bars, a bolt retracting tube secured to said bolt and extending through the guide hole in said retracting plate, outwardly extending guide arms carried by the inner end portion of said bolt retracting tube engaging the walls of said housing, and other outwardly extending guide arms carried by the inner end portion of said bolt retracting tube and guided on said guide means.

9. In a tubular lock, a tubular shank member having a transverse passageway therein, a tubular lock housing positioned at right angles to said tubular shank member and extending into said transverse passageway to thereby prevent rotative and longitudinal movement of said tubular shank member relative to said tubular lock housing, a spindle extending longitudinally within said shank member, a throw member rotatively mounted in the inner end portion of said tubular lock housing, said throw member and the inner end portion of said tubular lock housing having notches therein positioned to register with each other and positioned to receive therein said spindle when said tubular lock housing is inserted into said tubular shank member.

10. In tubular lock means for use with a door that is provided with two bores intersecting each other at right angles, a tubular shank member adapted to be positioned in one of said bores and having a transverse passageway therein, a tubular lock housing adapted to be positioned in the other bore and at right angles to said tubular shank member, said tubular lock housing having an end portion of less width than the diameter of the lock housing positioned in said transverse opening of said shank member when the lock is assembled and preventing rotative and longitudinal movement of said tubular shank member relative to said tubular lock housing, a spindle positioned axially of said tubular shank member, a throw member rotatively mounted in the narrower inner end portion of said tubular lock housing, said throw member and the narrower inner end portion of said tubular lock housing having notches therein positioned to register with each other and positioned to receive therein said spindle when said tubular lock housing is inserted into said tubular shank member.

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