May 17, 1960 N. A. WELCH ET AL 2,936,606

DEADBOLT LOCK

Filed May 17, 1957 2 Sheets-Sheet 1

Fig. 1.

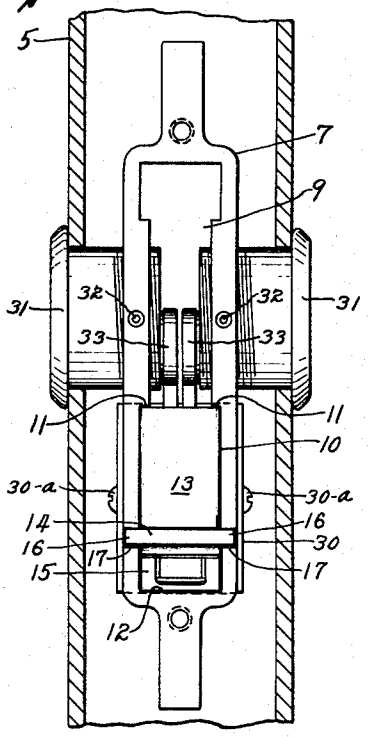



Fig. 2.

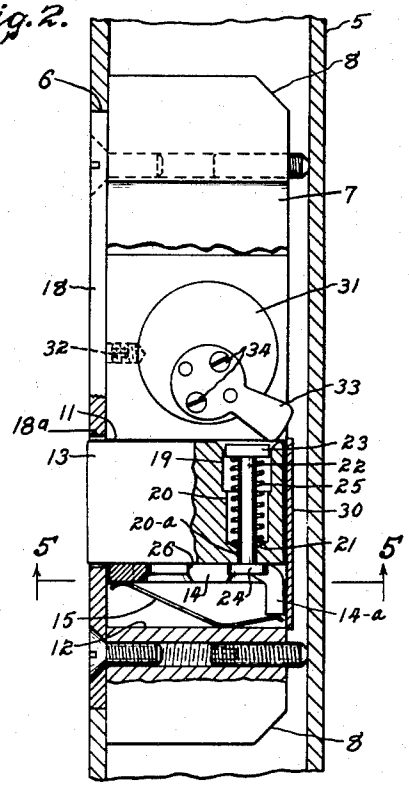



Fig. 3.

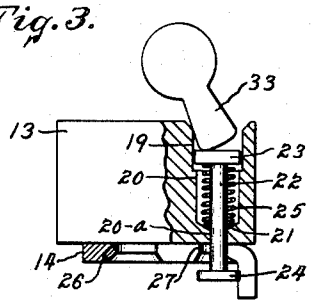



Fig. 4.

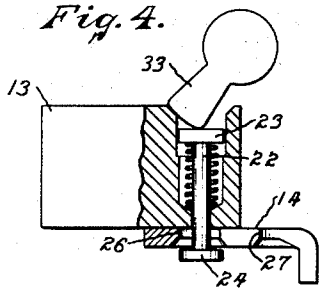



Fig. 5.

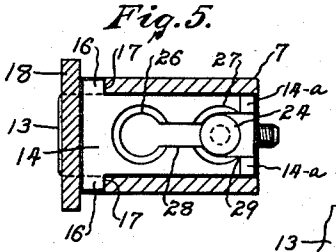



Fig. 8.

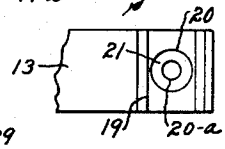



Fig. 6.

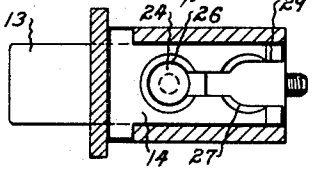
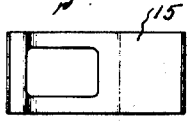



Fig. 7.




INVENTOR.
NICHOLAS A. WELCH
BY CHARLES WOLF
Louis V. Lucia
ATTORNEY.

May 17, 1960 N. A. WELCH ET AL 2,936,606

DEADBOLT LOCK

Filed May 17, 1957 2 Sheets-Sheet 2

Fig. 9.

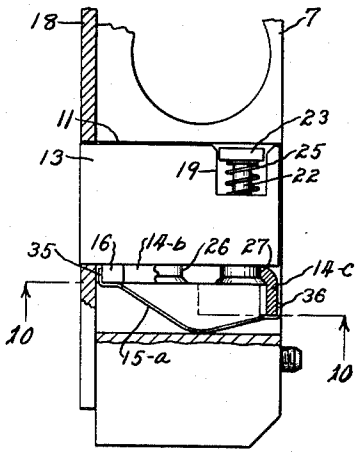



Fig. 11.

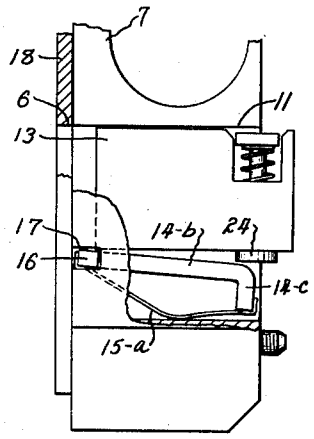
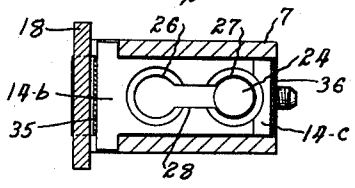



Fig. 10.




INVENTOR.
NICHOLAS A. WELCH
BY CHARLES WOLF
Louis V. Lucia
ATTORNEY.

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# DEADBOLT LOCK

Nicholas A. Welch, West Hartford, and Charles Wolf, New Britain, Conn., assignors to The American Hardware Corporation, New Britain, Conn., a corporation of Connecticut

Application May 17, 1957, Serial No. 659,820

11 Claims. (Cl. 70—134)

This invention relates to a deadbolt lock and more particularly to a lock for doors and the like.

The primary object of this invention is to provide a deadbolt lock which is especially adapted for use in the narrow aluminum frame of a glass door such as used extensively today on modernistic store fronts and the like.

A further object of this invention is to provide a lock having an improved mechanism which is economical to manufacture, highly efficient in its operation, and is adapted for operation by key controlled cylinder locks prodced by different manufacturers and varying slightly in size.

Further objects and advantages of the present invention will be more clearly understood from the following description and the accompanying drawing in which:

Fig. 1 is a front view showing our improved lock, with the face place removed, installed in a tubular frame such as used for a glass door.

Fig. 2 is a side view thereof partly in vertical section.

Fig. 3 is a side view, partly in vertical section, illustrating the operation of the lock mechanism and showing the bolt in retracted position.

Fig. 4 is a similar view showing the bolt in projected position.

Fig. 5 is a sectional bottom view taken substantially on line 5—5 of Fig. 2, showing the bolt in retracted position.

Fig. 6 is a similar view, but showing the bolt in projected position.

Fig. 7 is a bottom view of the spring member included in the lock mechanism.

Fig. 8 is a plan view of the rear portion of the bolt.

Fig. 9 is a side view, partly in vertical section, showing a modified form of the lock mechanism embodying our invention.

Fig. 10 is a sectional bottom view on line 10—10 of Fig. 9.

Fig. 11 is a side view showing the manner in which the bolt is assembled into the lock casing.

As shown in the drawings, the numeral 5 denotes a portion of a tubular door frame such as commonly used for glass doors and the like. Said frame is provided with an opening 6 in the outer edge thereof through which the lock may be inserted into the tubular frame portion as fully described in the copending application of Nicholas A. Welch, Serial No. 644,590, filed March 7, 1957, and now Patent No. 2,919,571, issued January 5, 1960.

The lock includes a case 7 which may be constructed of extruded metal and is simply cut off to the desired depth. The inner corners of the said case are bevelled, as at 8—8, to facilitate the insertion of said case through the opening 6 as it is installed in the door frame. The said case is preferably provided with a central opening 9 extending longitudinally therethrough and having an enlarged lower portion 10, forming guide shoulders 11—11 at the opposite sides of the opening, and a bottom surface 12.



Our present invention provides an improved deadbolt mechanism for such locks which includes a bolt 13 that is slidable within the enlarged portion 10 of said central opening between the said shoulders 11—11 and a pressure plate 14 that is disposed in said enlarged portion and is yieldingly pressed into engagement with the bottom edge of the bolt 13 by means of a spring member 15 located between the said pressure plate and the bottom 12 of the opening. Said spring also yieldingly urges the bolt into sliding engagement with the said shoulders 11—11. The pressure plate 14 is preferably provided with downwardly extending portions 14–*a*—14–*a* at its rear end which are engaged by one end of the spring 15 and space the spring from the horizontal portion of the pressure plate. Said portions also provide stops limiting downward movement of the plate and the bolt 13, as will be hereinafter explained.

The pressure plate is anchored in the case by means of ears 16—16 which extend laterally from the opposite edges of the plate at its front end and fit loosely into notches 17—17 in the side walls of the case. Said notches open to the front edge of the case, but are closed by a face plate 18 that is secured to said front edge and fits into the opening 6 in the frame, said faceplate having an opening 18–*a* therein through which the bolt 13 moves. The said ears 16—16 secure the pressure plate against endwise movement, but permit pivotal movement thereof toward the bottom 12 of the opening 6.

The upper edge of the bolt 13 contains a transverse slot 19, and a bore 20 extends downwardly through the bolt from the bottom of said slot. The lower portion 20–*a* of said bore is of a reduced diameter, thus forming an upwardly facing annular seat 21 therein. A plunger 22 is mounted to slide in the lower portion 20–*a* of the bore and said plunger has a rectangular head plate 23 secured to the upper end thereof which is slidable in the slot 19. At its lower end, said plunger has a disc-shaped dog 24 which is disposed exteriorly of the bolt and is normally retained against the bottom edge of the bolt by a compression spring 25 that surrounds the plunger 22 and is disposed between the head plate 23 and the seat 21 as clearly shown in Fig. 2 of the drawing.

The pressure plate 14 contains, in effect, a pair of spaced openings 26 and 27 which are of a size to receive the dog 24 on the plunger 22 and are connected by a slot 28 of a width to accommodate said plunger. The lower edge of each of said openings 26 and 27 is preferably beveled to form a guide surface therearound which will guide the dog 24 into the opening. In the form illustrated in Figs. 1 to 6, a slot 29 extends from the opening 27 to the end of the plate 14 and the dog 24 is adapted to pass through the slot as the bolt is assembled into position through the rear of the case.

A retaining cover 30 is secured to the case 7 by screws 30–*a* and overlies the bolt 13 and the spring 15 to retain them therein.

Our above described mechanism is operated by conventional key operated cylinder locks 31—31 which are threaded into coaxial openings in the side walls of the case and are secured against rotation by suitable set screws 32—32 which are threaded into the walls of the case and engage the said cylinders.

Each of said cylinder locks includes an operating lever 33 which is secured to the key plug of the lock by means of screws 34 and is rotatable into engagement with the head plate 23 of the plunger 22 upon rotation of its respective key plug with a suitable key to cause operation of the lock mechanism in the following manner and as clearly illustrated in Figs. 2 to 6.

When the lever 33 is rotated toward the left from its normal position illustrated in Fig. 2, the end of said lever

will first engage the plate 23 and force the plunger 22 downwardly to move the dog 24 out of the opening 27. Upon continued rotation of the lever, it will engage the side of the slot 19 in the bolt and urge said bolt outwardly toward its locking, or projected, position shown in Fig. 4. As the bolt is moved toward projected position, the plunger will be retained in its downward position and will be carried with the bolt through the slot 28 in the pressure plate. When the lever passes "dead-center" position and starts on its upward swing, the spring 25, which causes the plunger to follow the lever, will urge the plunger upwardly so that as the bolt reaches fully projected position the dog 24 will move into the opening 26 in the pressure plate and thereby dog the bolt in its projected position. Further rotation of the key plug will carry the lever out of the slot 19 and back to its normal position to permit withdrawal of the key. When the bolt is returned to its retracted position, the operation of the mechanism is merely the reverse of that above described.

The construction of our improved mechanism permits the use of cylinder locks produced by different manufacturers and having levers 33 which are longer or shorter than that shown. If the lever used is of such length that it will hit the upper rear edge of the slot 19 in the bolt as the lever is rotated from normal position, it will be understood from the above description that the rear end portions of the bolt 13 and the pressure plate 14 can move downwardly against the spring 15 to allow the lever to pass into the slot 19 and to operate the bolt in the normal manner, sufficient clearance being provided between the bolt 13 and the opening 18-*a* to permit such movement. When either longer or shorter levers are used, the dog 24 on the plunger 22 will not be exactly aligned with the openings 26 and 27 when the bolt reaches its fully projected or retracted positions. Said dog will, however, engage the bevelled surfaces surrounding said openings and will be guided into said openings by said surfaces to thereby properly locate and dog said bolt in either of its extreme position.

In the modified form of the invention illustrated in Figs. 9 to 11, the construction of the pressure plate 14 and the spring 15 is changed slightly to eliminate the necessity of providing the retaining cover 30 illustrated in Figs. 1 and 2. In this modified form, the pressure plate 14-*b* is substantially the same as the pressure plate 14 except that the rear portion 14-*c* is not slotted from the opening 27 and is made slightly shorter to permit said plate to move downwardly a greater distance. The spring 15-*a* is provided with upturned portions 35 and 36 at its opposite ends which extend over the adjacent ends of the pressure plate and prevent movement of the spring relatively thereto.

In assembling this modified form of lock mechanism, the pressure plate 14-*b*, with the spring 15-*a* attached thereto, is first mounted in the case from the front side thereof. The face plate 18 is then secured to the case to close the slots 17—17 in the side walls thereof and prevent endwise movement of the pressure plate. The bolt 13 is then inserted into the case from its rear side, as illustrated in Fig. 11, by forcing the rear end of the pressure plate downwardly to allow passage of the dog 24 on the plunger 22 thereover. When the bolt reaches its normal retracted position, the spring 15-*a* will return the pressure plate to its normal position wherein the dog 24 will enter the opening 27 therein and will thereafter prevent movement of the bolt rearwardly from its normal position. It will be understood that the retaining cover 30 is not necessary since the pressure plate will hold both the bolt and the spring 15 in the lock case.

We claim:

1. A lock including a case, a bolt slidable in said case between retracted and projected positions, a pressure plate movably secured to the case and against endwise movement relatively thereto, said pressure plate having a pair of spaced openings therein connected by a slot, spring means yieldingly urging said plate into engagement with the bolt, a plunger extending through said bolt and having a dogging portion insertable into each of said openings and a shank portion adapted to pass through said slot, spring means normally acting upon said plunger to retain said dogging portion in either of said openings in the pressure plate, and a key operated member adapted to move said plunger to cause disengagement of the dogging portion from the respective opening in the pressure plate and movement of the bolt from one of said positions to the other.

2. A lock as set forth in claim 1 wherein the bolt is yieldingly movable in a direction away from the key operated member, thereby adapting the lock mechanism to accommodate operating members of slightly different dimensions.

3. A lock including a case having an opening extending therethrough and guide surfaces on opposite walls of said opening, a bolt slidable in said opening against the said guide surfaces, a pressure plate movably secured to the case and disposed adjacent to the bolt, spring means yieldingly urging the pressure plate against the bolt and thereby yieldingly retaining the bolt in engagement with said guide surfaces, the said pressure plate having a pair of openings therein connected by a slot and the said bolt having a bore extending therethrough, a dogging plunger having a shank portion slidable in said bore and a dogging portion adapted to fit into either of said openings to dog the bolt in either of said positions, spring means surrounding said shank and normally retaining said dogging portion within the respective one of said openings, a key operated lever adapted to actuate the said plunger to move the dogging portion thereof out of the respective opening and to move the bolt from one of said positions to the other whereupon the shank of the plunger will pass from one of the openings to the other through the said slot and then enter said other opening upon being released by the key operated lever; the said bolt and pressure plate being movable in a direction away from the operating lever upon engagement of the bolt by said lever to permit movement of the operating lever into engagement with the dogging plunger, whereby the said lock is operable by levers of varying lengths.

4. A lock including a case having an opening therein with guide surfaces on opposite walls of said opening, a bolt slidable in said opening against said guide surfaces, a pressure plate movably secured to the case adjacent to the side of the bolt opposite said guide surfaces, a spring member contained in the case and yieldingly urging the said plate into contact with the bolt and the bolt into contact with the guide surfaces, the said plate having spaced openings therein connected by a slot, a dogging plunger carried by the bolt and having a dogging portion insertable into said openings and a shank adapted to pass through said slot, spring means surrounding the shank and normally urging said dogging portion into dogging position within either of the said openings in the plate, a key operated lever engageable with the plunger for moving the dogging portion thereof from the respective opening in the pressure plate and for moving the bolt from one position to the other whereupon the shank of said plunger will pass through the said slot, the said pressure plate having a notch in the rear end thereof extending from the adjacent opening for receiving the dogging portion of the plunger as the bolt is inserted into the case, the said bolt being retained against forward movement beyond its locking position by engagement of said dogging portion with the pressure plate, and a retaining cover secured to the case to prevent rearward movement of the bolt beyond its retracted position.

5. A lock including a case having an opening therein with guide surfaces in opposite walls of said opening, a bolt slidable in said opening, a pressure plate movably secured to the case adjacent to the side of the bolt oppo-

site said guide surfaces, a spring member anchored in the case and urging said plate toward the bolt, the said plate having forward and rear spaced openings therein connected by a slot extending in the direction of movement of the bolt, a dogging plunger carried by the bolt and having a dogging portion insertable into said openings and a shank adapted to pass through said slot, key operated means engageable with the plunger to move the dogging portion thereof out of the respective opening in the pressure plate and to cause movement of the bolt from one position to the other whereupon the shank of said plunger will pass through the said slot, the said pressure plate being movable in a direction away from the bolt to permit passage of the bolt and the dogging portion over the pressure plate as the bolt is inserted into the opening in the case from the rear of the case, the said dogging portion when disposed in the forward opening, preventing forward movement of the bolt beyond its projected position and, when disposed in the rear opening, preventing rearward movement of the bolt beyond its retracted position.

6. A lock including a case having an opening therein with guide surfaces in its opposite walls and a bottom surface, a bolt slidable in said opening with a side thereof against said guide surfaces, a pressure plate within said opening disposed against the side of the bolt opposite the guide surfaces, the said pressure plate having a downwardly extending projection engageable with said bottom surface and limiting downward movement of the plate in a direction away from the bolt, a spring resting upon the said bottom surface and yieldingly forcing the pressure plate into engagement with the bolt and the bolt into engagement with the guide surfaces, a dogging plunger carried by the bolt, interengagable means on the plunger and pressure plate for dogging the bolt in retracted and projected positions, and a key operated lever engageable with the plunger for causing disengagement of the dogging means and movement of the bolt from one of said positions to the other.

7. A lock including a case having an opening therein and guide surfaces at opposite sides of said opening, a pressure plate disposed in said opening in spaced relation to said guide surfaces and extending parallel therewith, means mounting said pressure plate for movement toward and away from said guide surfaces, a latch bolt disposed in said opening and slidably guided for movement to retracted and projected positions between said guide surfaces and said pressure plate, said bolt having abutment means on the side thereof adjacent said guide surfaces, a spring urging said pressure plate against said bolt and thereby normally retaining said bolt against said guide surfaces, actuating means for moving said bolt between retracted and projected positions including a rotatable operating lever engageable with said abutment means, the said bolt and pressure plate being movable in a direction away from the operating lever to permit movement of said lever into engagement with said abutment means whereby the said bolt is operable by levers which are longer than normal.

8. A lock as set forth in claim 3 wherein each of the openings in said pressure plate has a bevelled edge portion providing a guide surface capable of guiding the dogging portion of said dogging plunger into said opening.

9. A lock including a case, a pressure plate movably mounted in said case, a bolt slidably supported by said pressure plate for movement between retracted and projected positions, spring means yieldingly supporting said bolt, a dogging member carried by said bolt and movable relatively thereto, cooperative means on said dogging member and said pressure plate engageable for dogging the bolt in either of its said positions, key operated means for moving said dogging member out of engagement with the pressure plate and said bolt to either of its said positions, and separate spring means normally urging the dogging member into dogging engagement with said pressure plate.

10. A lock including a case having an opening therein and aligned guide surfaces at opposite sides of said opening, a pressure plate movably secured to said case within said opening, said pressure plate being spaced from and opposed to said guide surfaces, a bolt mounted for rectilinear sliding movement to retracted and projected positions between said pressure plate and said guide surfaces, a spring mounted in said case, said spring urging the pressure plate against the bolt and the bolt against said guide surfaces and thereby yieldingly supporting both the pressure plate and the bolt to permit movement thereof away from said guide surfaces, a dogging plunger carried by the bolt and movable relatively thereto, means on said pressure plate engageable by said dogging plunger for dogging the bolt in either of its said positions, spring means normally retaining the plunger in dogging position, and a key operated lever adapted to move said plunger out of dogging position and to cause movement of the bolt from one of its said positions to the other.

11. A lock including a case having spaced walls defining an opening therein and guide surfaces formed in said walls at the opposite sides of said opening, a plate secured to said case within said opening, said plate extending between said walls and being spaced from and opposed to said guide surfaces, a bolt mounted for rectilinear sliding movement to retracted and projected positions between said plate and said guide surfaces, said plate having a pair of spaced openings therein connected by a slot, said bolt having a bore extending therethrough toward said plate and a slot across the side thereof adjacent said guide surfaces intersecting said bore, a plunger having a shank portion slidable in said bore, a disc-shaped dog at the end of said shank portion disposed exteriorly of the bolt adjacent said pressure plate and adapted to fit into either of said openings therein, spring means acting upon said plunger and normally retaining said dog in one of said openings, a head plate on the opposite end of said plunger slidably disposed within the slot in said bolt, and an operating lever mounted on said case and adapted to engage said head plate to urge the dog away from said pressure plate and the bolt from one of its said positions to the other, the shank portion of said plunger being adapted to pass through the slot between said openings upon movement of the bolt.

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