April 27, 1954 B. STERNER 2,676,829

LOCK

Filed Oct. 29, 1948 2 Sheets-Sheet 1

FIG. 1.

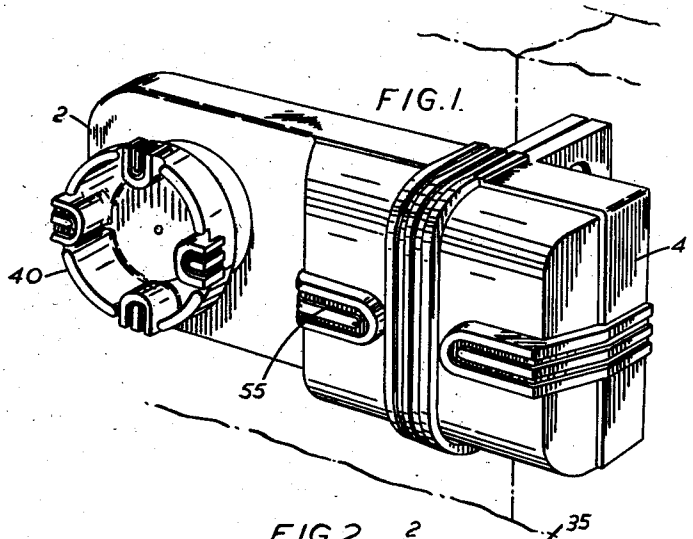


FIG. 2.

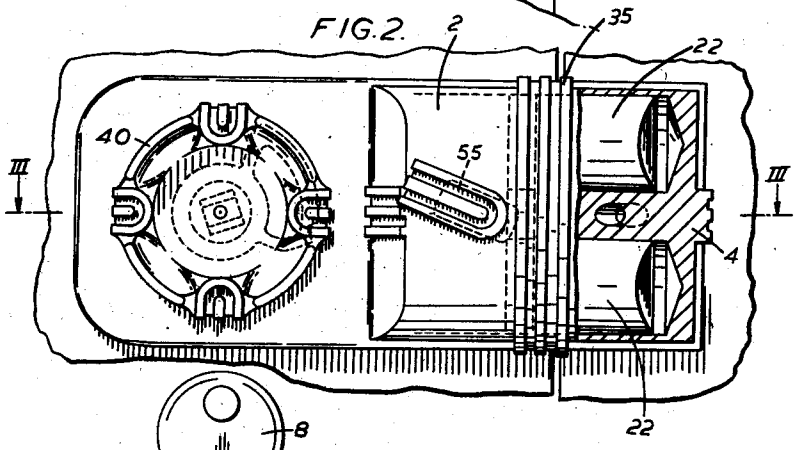
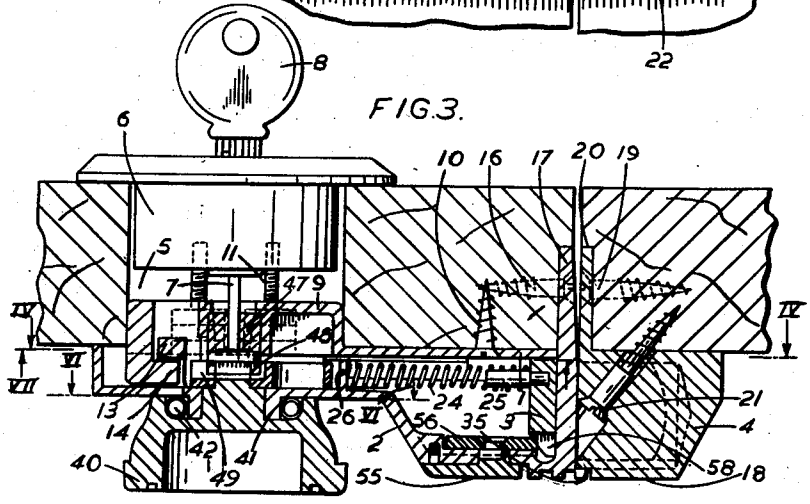


FIG. 3.



Inventor

Bernard Sterner

By Emery, Holcombe & Blair

Attorneys

April 27, 1954 B. STERNER 2,676,829

LOCK

Filed Oct. 29, 1948 2 Sheets-Sheet 2

FIG.4.

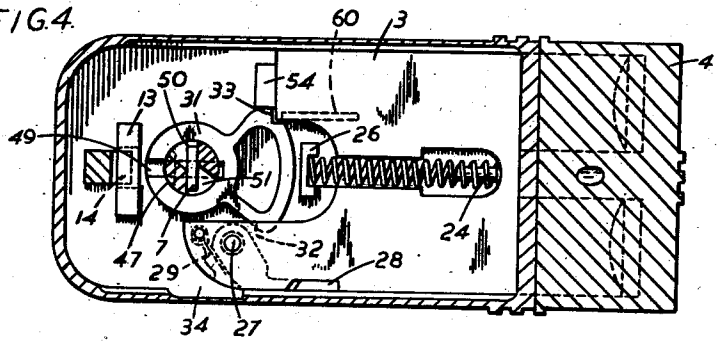


FIG.5.

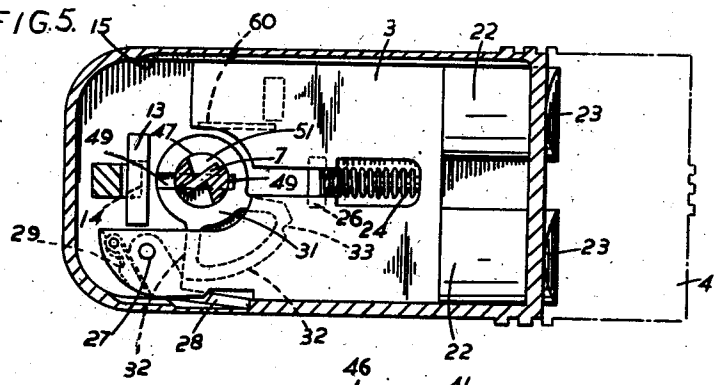


FIG.6.

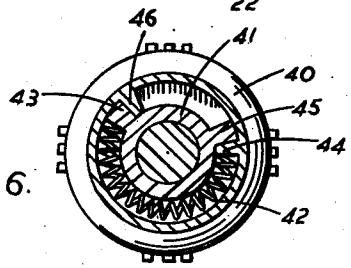
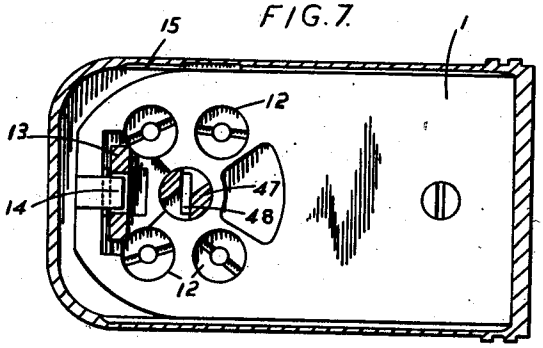


FIG.7.



Inventor

Bernard Sterner

By Emery, Holcombe & Blair

Attorneys

Patented Apr. 27, 1954

2,676,829

UNITED STATES PATENT OFFICE

2,676,829

LOCK

Bernard Sterner, London, England

Application October 29, 1948, Serial No. 57,227

Claims priority, application Great Britain November 10, 1947

9 Claims. (Cl. 292—335)

1

This invention relates to a door lock of the kind having a bolt which can be retracted against the action of a spring by a knob or handle or by a key-operated lock or by both in which latter case the handle may be fitted on the inside of the door and the key on the outside.

The invention has for its object to provide an improved door lock which combines the convenience of a simple night latch that can be slammed with the security of a mortice dead lock which normally requires to be locked by a turn of a key. The lock is proof against pushing back of the bolt by means of a flexible instrument to which the normal wedge shaped lock is vulnerable and it combines the simplicity of the rim fixing of an ordinary rim lock with the security of a mortice lock.

According to the invention, the lock is provided with means whereby, when unlocked, the bolt is held in a retracted position in which it projects to a slight extent and can be fully projected by its spring only on pressure applied to its projecting end. The bolt is preferably provided with a means whereby, when fully projected it is automatically deadlocked.

The operating means may comprise a spring which urges the bolt into its projected position, a spring-actuated pawl pivotally mounted on a plate connected to or integral with the bolt and adapted to co-operate with a stop on the lock casing, and a lever, operable by the handle or key, the operation of which first retracts the bolt, and, when the bolt is retracted, causes the pawl to engage the stop so as to retain the bolt in its retracted position. In this position the end of the bolt projects to a slight extent from its casing, and the pawl can be released only by applying pressure to the projecting end of the bolt whereby the pawl is released from its engagement with the stop and the bolt is projected by its spring. When the handle is released after being operated to retract the bolt, the handle and lever are returned to a position in which the lever bears against a stop or rib on the bolt and, when the bolt is fully projected, the stop or rib is moved out of the path of the lever which is then moved through a further small angle by its spring until a notch in the lever engages the end of the stop or rib on the bolt and so deadlocks the bolt in the projected position.

In order that the invention may be easily understood and readily carried into effect, a door lock constructed in accordance with the invention is illustrated, by way of example, in the accompanying drawings in which:

2

Figure 1 is a perspective view of the lock;

Figure 2 is a part sectional elevation of the lock as seen from the inside of the door;

Figure 3 is a section on the line III—III of Figure 2;

Figures 4 and 5 are rear sectional elevations both taken on the line IV—IV in Figure 3, looking in the direction of the arrows, showing the bolt in the projected and retracted positions respectively;

Figure 6 is a sectional view on the line VI—VI in Figure 3, looking in the direction of the arrows, through the operating knob; and

Figure 7 is a section on the line VII—VII of Figure 3.

Referring to the drawing, the lock comprises a base plate 1 and a cover 2, between which the bolt 3 and the operating mechanism are contained, and a striking block 4.

In order to fit the bolt, the door is bored with a circular aperture 5 for the reception of the barrel 6 of a cylinder lock which may be of any suitable known construction and has a transmission member 7 which can be partially rotated in the usual manner by a key 8. The invention, however, is not concerned with the actual mechanism of the cylinder lock. The base plate 1 has an inwardly projecting boss 9 which is fitted in the circular aperture cut in the door and the base plate is fixed to the door by means of a screw 10. The barrel 6 is provided in the usual manner with four projecting screws 11 which pass through four holes in the base plate, and on to which are screwed nuts 12, which are disposed in recesses in the boss 9, so that the base plate is firmly fixed to the door by means of the screw 10 and the four nuts 12. After the base plate has been fixed the cover 2 containing the operating mechanism is attached by placing the cover on the base plate which engages against ledges 15 in the sides of the cover and then sliding it to the left (in Figure 3) until a bridge member 13 provided at the end of the cover engages under a hook 14 projecting from one end of the base plate and a projecting flange 17 on the other end of the cover abuts against the other end of the base plate, the flange 17 being disposed in a recess cut in the edge of the door, as shown in Figure 3. The cover is then fixed to the door by means of two screws 16 which are passed through the projecting flange 17 on the cover. The cover is thus securely held in position by means of the screws 16 at one end

and the engagement of the bridge 13 with the hook 14 on the base plate at the other end.

The striking block 4 is fixed to the door post by means of two screws 19 which are passed through holes in an inwardly projecting flange 20 of the striking block and by a screw 21 which is passed through an inclined hole in the striking block. It will thus be seen that when the door is closed, the means by which the lock and the striking block are fixed to the door and door post are inaccessible and, therefore, the lock cannot be readily removed from the door. Further, the end 35 of the cover projects beyond the flange 17 so as to overhang the edge of the striking block, so that a tool or other implement cannot readily be inserted between these two points with the object of forcing the bolt.

The operating mechanism contained within the casing 2 comprises the bolt which is in the form of a plate 3 from one end of which two cylindrical bolts 22 extend. The ends of the bolts 22 are bevelled off slightly on each side as shown at 23. The bolt plate 3 is provided with side flanges which are guided by side flanges of the casing 1 and plate 3 is urged into a position in which the bolt is projected by means of a coiled spring 24 which is fitted at one end around a pin 25 fixed to the plate and of which the other end bears against a stop 26 provided on the cover 2. As shown in Figures 4 and 5, one side of the inner end of the bolt plate 3 is extended beyond the opposite side and carries a fixed pin 27 on which is pivotally mounted a pawl 28 which is normally urged inwardly by a spring 29 so that the outer edge of the pawl is in line with the edge of the bolt plate 3 as shown in Figure 4.

The bolt may be operated from inside of the door by means of an operating knob 40 which is mounted on a boss 41 on the outside of the cover 2 and is keyed or otherwise secured to an operating lever 31 to turn therewith. The lever 31 has an arcuate surface having a notch 33 at one end, which, when the bolt is in the projected position, is adjacent to but spaced a small distance from a rib 60 extending from the back of the bolt plate 3 as shown in Figure 4. The side surface 32 of the lever 31, when the bolt is in the projected position is spaced a small distance from the pawl 28, and when the knob is operated so as to turn the lever 31 in a clockwise direction from the position of Figure 4 to that of Figure 5, the notch 33 moves clear of the corner of the rib 60 and as soon as it is clear the opposite side surface 32 of the lever bears against the pawl 28 at a point adjacent the pivot 27 so that as rotation is continued the point of contact between the lever and the pawl gradually moves away from the approximate dead centre position shown in Figure 4.

The turning moment is thus small at the start and becomes greater towards the end of the movement of the bolt when the pawl 28 is forced into the gap 34. The result is that when the knob is turned, the bolt is withdrawn against the pressure of the spring 24 until it reaches a position when the end of the pawl 28 can enter into a gap 34 provided in one side of the cover 2, whereupon the lever 31 forces the pawl 28 outwardly against the action of its spring 29 since the spring is weaker than the spring 24, until it engages the edge of the gap 34 as shown in Figure 5. When the operating knob is released, the bolt plate 3 is held by the pawl in the position shown in Figure 5 owing to the spring 24 being stronger than the spring 29.

It will be noted that, in order to allow the forward edge of the pawl to move past the adjacent edge of the gap 34, the bolt must be retracted slightly more (i. e. to the left) than shown in Figure 5 and then allowed to move forward into the position shown in Figure 5. The pawl is then able to enter the gap and is retained under the pressure of the spring 24. When, however, pressure is applied to the end 23 of the bolt, the spring 29 is able to move the pawl so that it does not engage the edge of the gap and the bolt is therefore released.

A coiled spring 42 is fitted in a groove around the knob between a stop 44 which projects into the groove and a stop 43 which extends from the boss 41 in the cover 2. Similar stops 45 and 46 project from the boss 41 and from the knob respectively, whereby the angle through which the knob can be turned is limited. These stops are so arranged that after the pawl 28 has entered the gap in the cover, the knob can be given a slight further rotation so that the bolt is completely retracted beyond the position shown in Figure 5 in which the end projects slightly and the pawl 28 is released from engagement with the edge of the gap.

In order to provide a connection between the cylinder lock 6 and the knob 40 the base plate 1 is provided with a circular aperture in which is rotatably mounted a cylindrical connecting member 47 provided on one face with a transverse rib 48 which engages in a transverse slot 49 in the operating lever and in the part of the knob 40 which is fixed to the lever, as is best shown in Figure 3. The provision of this rib and slot enables the cover to be moved laterally after it has been fitted to the base plate so as to engage the bridge 13 with the hook 14 as previously described.

The member 47 is provided on the side facing the transmission member 7 with two sector shaped recesses into which the transmission member 7 enters. These sector shaped recesses provide a certain amount of lost motion between the transmission member and the operating knob, so that the knob can be turned without effecting the cylinder lock, while not preventing the transmission member from actuating the mechanism when the key is turned.

The operation of the bolt is as follows.

Assuming the bolt 3 to be in the projected position shown in Figure 4 in which the bolts engage in corresponding circular recesses in the striking block, the rib 60 of the bolt plate 3 is adjacent to but clear of the notch 33 in the lever 31 and therefore, the bolt is deadlocked and cannot be retracted by pressure applied to the end surfaces of the bolts. In this position the transmission member 7 engages the right-hand side of the recess 50 and the left-hand side of the recess 51 in the connecting member 47 as shown in Figure 4 and, when the lock is operated by the key, the transmission member is turned clockwise, as seen in Figure 4, so that the operating lever 31 is rotated. The notch 33 then moves clear of the rib 60 and the lever 31 bears against the pawl 28 and withdraws the bolt against the action of the spring 24 until the pawl 28 clicks into the gap 34 in the side of the casing as previously explained. The bolt is then in the position shown in Figure 5 with the ends 23 of the bolt slightly projecting and is held in this position by the pawl engaging in

the gap in the side of the lock casing. Then, if pressure is applied to the projecting ends **23**, for example, by closing the door so that the ends **23** bear against the striking block, the bolt is further retracted until the pawl **28** is clear of the edge of the gap **34**. The pawl, however, is then moved inwardly by means of its spring **29** since it is no longer being urged outwardly by the lever **31**, so that the bolt is moved into its projected position by means of the spring **24**. The bolt is then deadlocked owing to the rib **60** of the bolt plate **3** coming into engagement with the notch **33** if pressure is applied from the outside to the end of the bolt.

After the bolt has been retracted by means of the key, the lock mechanism and transmission member can be returned to the position shown in Figure 4, owing to the lost motion in the member **47**, so that the key can be withdrawn. At the same time the lever **31** returns until its upper edge (in Figure 4) bears against the rib **60**, and, when the bolt is projected, the lever is rotated by the spring **42** a slight distance further until the upper edge bears against the stop **54** and the notch **33** comes opposite the end of the rib **60** and so deadlocks the bolt.

If the bolt, when in the position shown in Figure 4, is operated by the knob instead of by the key, the action is similar except that the transmission member will not move owing to the lost motion provided by the sector-shaped recesses **50** and **51**.

After the pawl **28** has engaged the notch **34** and the knob is released, the knob is returned to its original position by means of its spring **42**, this being possible owing to the lost motion provided in the member **47**.

A stop **54** is provided for limiting the movement of the lever **31**, so as to ensure that the notch **33** engages the rib **60** on the bolt when the bolt, after projection, is urged toward its retracted position, thereby locking the bolt in projected position.

On the cover **2** is pivotally mounted a catch **55** which is connected to a member **56** which, while the catch **55** is in the position indicated in Figure 1, passes through an aperture **58** in a wall of the bolt plate **3** when the bolt is operated. The catch **55** may be moved into the position shown in Figure 2, in which case it bears against one side or the other of the above mentioned wall, according as the bolt plate is in the projected or retracted position, and thus locks the bolt in either position.

The catch **55** may be so dimensioned (as shown in dotted lines in Figure 2) that the bolt may be locked in a position in which it is completely projected or in the slightly projecting position shown in Figure 5 in which it may still be completely retracted by pressure applied to the projecting end, so that it may then act as a ball catch. When the bolt is thus disposed it will yield to permit closing of any door to which it may be attached and then move outwardly so as to project slightly into the striking block to prevent free swinging of the door. However, a firm pull on the door will force the rounded end of the bolt against the edge of the inner wall of the striking block, so as to force the bolt into fully retracted position and permit the door to open.

It will be seen that, after the bolt has been retracted either by means of the operating knob or by means of the key, it can only be projected again by pressure applied to the end of the bolt,

the pressure required is only light and it is sufficient to close the door gently so that the ends of the bolts bear against the striking block.

I claim:

1. A door lock comprising a casing, a bolt slidable in said casing, a spring urging said bolt into a projected position, means for automatically deadlocking said bolt in projecting position and for retracting said bolt against the action of said spring, means whereby the bolt, when retracted, is automatically retained in a position in which the end of the bolt projects slightly from said casing, means whereby, when pressure is exerted on said projecting end of said bolt, said retaining means is released and the bolt is moved by its spring into its fully projected position, and manually positionable means for preventing such outward movement of said bolt into its fully projected position from its slightly projecting position while permitting inward movement of said bolt due to pressure on its projecting end.

2. A door lock comprising a casing, a bolt slidable in said casing, a spring urging said bolt into a projected position, means for automatically deadlocking said bolt in projecting position and for retracting said bolt, means for retaining said bolt in its retracted position comprising a spring-actuated pawl pivotally mounted on said bolt, a stop on said casing engageable by said pawl to retain said bolt in a position in which the end of the bolt projects slightly from said casing and means whereby said pawl can be disengaged from said stop only by pressure applied to said projecting end of said bolt, in combination with latch means manually positionable to engage the bolt to deadlock it in fully projected position and to hold it in the position in which it projects slightly, subject to being completely retracted by pressure applied to the projecting end, so that the bolt may serve as a spring catch.

3. A door lock comprising a casing, a bolt slidable in said casing, a spring urging said bolt into a projected position, an operating member automatically deadlocking said bolt in projecting position, a spring-actuated pawl pivoted on said bolt, a stop on said casing, a lever connected to said operating member and adapted to co-operate with said pawl whereby, when said operating member is operated, said bolt is retracted until its end projects slightly from said casing and when said operating member is released, said pawl engages said stop and retains said bolt in said retracted position and means whereby the said pawl can be disengaged from said stop only when pressure is applied to said projecting end of said bolt, in combination with latch means manually positionable to engage the bolt to deadlock it in fully projected position and to hold it in the position in which it projects slightly, subject to being completely retracted by pressure applied to the projecting end, so that the bolt may serve as a spring catch.

4. A door lock comprising a casing, a bolt slidable in said casing, a spring urging said bolt into a projected position, an operating handle, a pawl pivoted on said bolt, a stop on said casing, a spring urging said pawl away from said stop, a lever connected to said operating handle having a position in which it deadlocks said bolt and whereby said bolt may be retracted and said pawl moved into engagement with said stop, said bolt being thereby retained in a retracted position in which the end of the bolt projects slightly from said casing, said pawl spring being weaker than

said bolt spring whereby when pressure is applied to said projecting end of said bolt, said pawl is moved by its spring away from said stop, and means whereby when pressure is applied to said projecting end further projection of said bolt is prevented so that it may act as a spring catch.

5. A door lock comprising a casing, a bolt slidable in said casing, a spring urging said bolt into a projected position, means for retracting said bolt against the action of said spring, means whereby said bolt, when retracted, is retained in its position in which the end of said bolt projects slightly from said casing, means whereby the said retaining means can be released only when pressure is exerted on said projecting end of said bolt, means whereby said retracting means on being released after being operated to retract said bolt is returned towards its original position, in which position it serves to deadlock said bolt when said bolt is in projected position and means whereby when pressure is applied to said projecting end of said bolt and is followed by removal of said pressure further projection of said bolt beyond said slightly projected position is prevented so that said bolt may act as a spring catch.

6. A door lock comprising a casing, a bolt slidable in said casing, a spring urging said bolt into a projected position, an operating member automatically deadlocking said bolt in its projected position, a spring-actuated pawl pivoted on said bolt, a stop on said casing, a lever connected to said operating member and adapted to co-operate with said pawl whereby, when said operating member is operated, said bolt is retracted until its end projects slightly from said casing and, when said operating member is released, said pawl engages said stop and retains said bolt in said retracted position, and means whereby the said pawl can be disengaged from said stop only when pressure is applied to said projecting end of said bolt, said lever, when the bolt is fully projected, being situated in the path of movement of the bolt so as to deadlock the bolt, and manually positionable means adapted to engage said bolt in slightly projected position to prevent movement thereof toward fully projected position so that said bolt may act as a spring catch.

7. A door lock as claimed in claim 1, in which said last-mentioned means comprises a latch member pivotally mounted on the casing, an aperture in the bolt through which said latch member normally passes and a stop on the bolt with which said latch member can engage.

8. A door lock comprising a casing, a bolt slidable in said casing, a spring urging said bolt into a projected position, means automatically deadlocking said bolt in a projected position and for retracting said bolt against the action of said spring, means whereby said bolt when retracted is retained in a position in which its end projects outward slightly from said casing, means whereby said retaining means can be released by pressure applied to said slightly projecting end of said bolt, and latch means whereby said bolt may be deadlocked in its projected position and prevented from outward movement from its retracted position.

9. A door lock as claimed in claim 8, in which the latch means is manually positionable to engage the bolt to deadlock it in fully projected position and to hold it in its position in which it projects slightly subject to being completely retracted by pressure applied to the projecting end, so that the bolt may act as a spring catch.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,060,413	Augenbraun	Apr. 29, 1913
1,184,919	Bock	May 30, 1916
2,268,743	Falk	Jan. 6, 1942
2,279,591	Heyer	Apr. 14, 1942

FOREIGN PATENTS

Number	Country	Date
232,717	Great Britain	Apr. 30, 1925