July 28, 1925. 1,547,357

S. D. BUTTERWORTH

DOORLOCK

Filed June 16, 1922 2 Sheets-Sheet 1

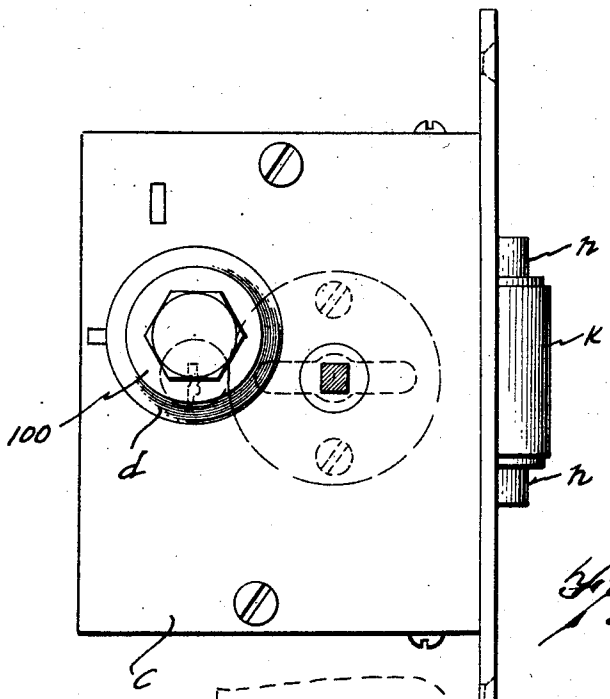


Fig. 1

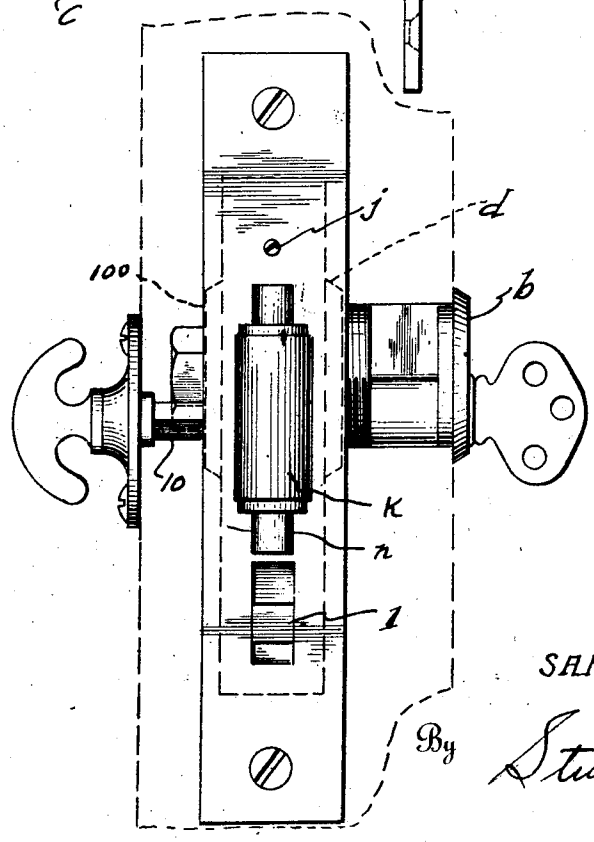


Fig. 2

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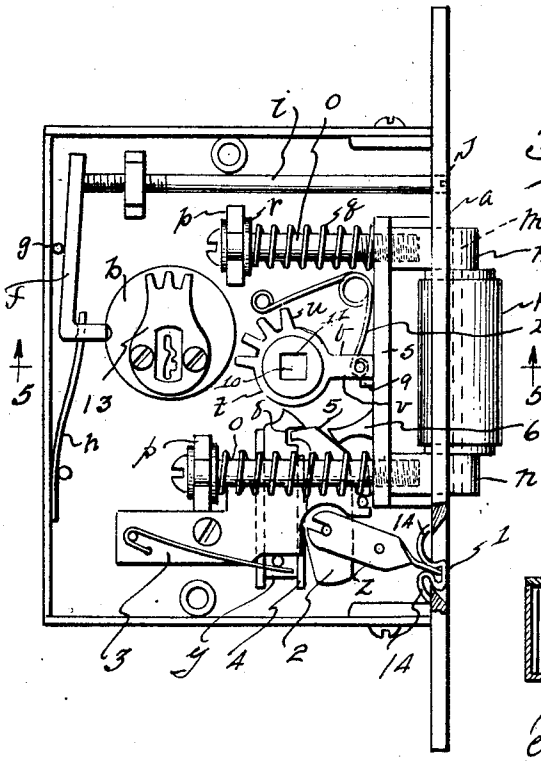


Fig. 3

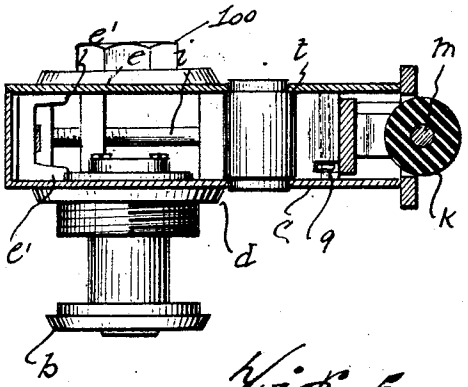


Fig. 5

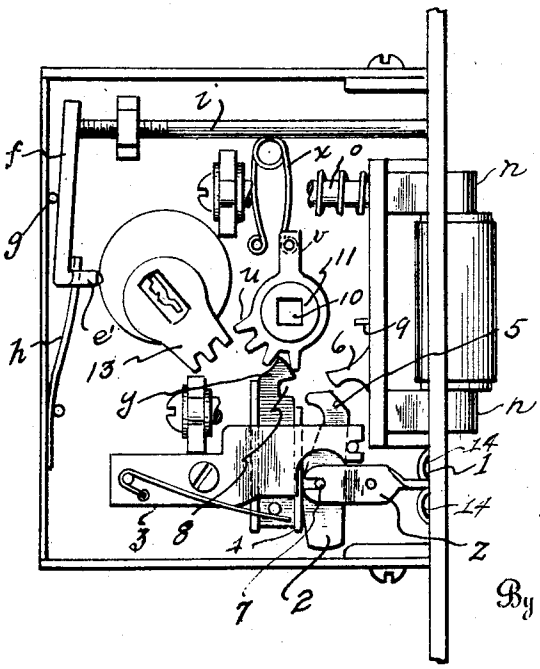


Fig. 4

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Patented July 28, 1925. 1,547,357

UNITED STATES PATENT OFFICE.

SAMUEL D. BUTTERWORTH, OF LANSING, MICHIGAN.

DOORLOCK.

Application filed June 16, 1922. Serial No. 568,684.

To all whom it may concern:

Be it known that I, SAMUEL D. BUTTERWORTH, a citizen of the United States, residing at Lansing, in the county of Ingham and State of Michigan, have invented certain new and useful Improvements in Doorlocks, of which the following is a specification.

This invention relates to door locks and especially to a door lock which has a bolt that may be dead locked. It is the object of the present invention to afford a dead lock setting device which permits the setting device to be arranged for dead locking before the door is closed. However, the dead locking action is delayed until the door is closed to permit the bolt to retract in the closing of a door.

The dead locking mechanism is especially adapted for a form of latch bolt which requires no retractor or roll back to disengage the bolt from the keeper socket. The door is opened simply by exerting force upon the door which causes the roll head of the bolt to climb out of the keeper socket. By employing a simple dead locking mechanism, the bolt which normally operates simply as a latch bolt, then becomes a lock bolt securely locking the door and also insuring against the latch being retracted by a casement knife as can ordinarily be done where the night lock applies only to the outside retractor.

Another feature of this invention is the peculiar finger piece used in connection with the dead locking setting device. This finger piece is a small piece of bent metal strip which operates not only to receive the finger contact but also has a spring action inherent in it which keeps the dead lock setting devices in any position to which they are set.

This and other features that appear are more fully described in the description following:

In the drawings:

Fig. 1 is an elevation of the lock.

Fig. 2 is an elevation of the lock looking at the face of the lock.

Fig. 3 is an elevation of the lock parts with the cover plate removed, the dead locking members being in dead-locking position.

Fig. 4 is a similar view showing the dead-locking members released.

Fig. 5 is a section on the line 5—5 of Fig. 3.

The face plate of the lock casing is designated *a*, the front plate *e* and the cover plate *c*. These lock casings are made so that they can be used either as right hand or left hand lock casings. The cylinder lock *b* may be screwed into either side of the lock casing, the opposite side of the casing being closed with a plug 100. After the lock *b* has been screwed into one of the threaded bosses *d*, designed to receive it, the lock housing may be locked against being turned out of the boss by means of locking lug *e'*. This locking lug is carried on the end of a lever *f*; this lever *f* locks on the fulcrum roll *g*. A flat spring *h* tends to rock the locking lug away from the housing of the cylinder lock. The threaded rod *i* bears against the opposite end of the lever *f* and pushes the locking lug toward the cylinder lock against the stress of the spring *h*. This threaded rod *i* protrudes through the face of the lock casing and has a slotted end *j* adapted to receive a screw driver for turning the rod in or out to adjust the locking lug with respect to the cylinder lock. There are two of these locking lugs, one on each side of the lock casing as shown at *e'* and *e'* in Fig. 5. This permits the lock to be used for either right or left hand positions.

The sliding bolt is of peculiar construction more fully detailed and claimed in my prior application No. 511,761. The lock head is formed by a rubber roll *k*. This is journaled on a pin *m* which is supported at its ends on the slides *n*. Into the inner ends of these slides screw the sliding rods *o* which are guided through the brackets *p*. The coil springs *q* abut against the washers *r* at one end and at the other end against the cross bar *s* and tend to push the bolt outwardly in the usual way.

This bolt may be retracted by simply pulling or pushing on the door as this causes the rubber roll *k* to climb out of the keeper socket (not shown) and free itself from the striker plate. This is more fully described and claimed in my prior application above referred to. This eliminates the necessity

of using knobs or other forms of retractors to operate the door, which simply needs a handle to pull the door.

The dead locking member is designated *t* and comprises a hub provided with teeth *u* and an arm *v*. The safety pin type spring *w* tends to maintain the dead locking member in working position as shown in Fig. 3, while the sliding dog *y* engaging between two of the teeth holds the dead locking member in its retracted position.

The dead lock setting devices comprise with this spring *w* and the lever *z* which is moved by the finger piece 1 protruding from the face plate of the lock. When the finger piece is in position shown in Fig. 3, it raises the dog releaser 2, which is guided in vertical reciprocation by the plate 3 and rib 4. This slide or releaser has a beveled or cam surface 5 on its top which is thereby brought into the path of the cam 6 on the cross bar *x*. As shown in Fig. 4 this slide and the cam surface 5 is out of the path of this cam 6. Now supposing one desires to set the dead locking member so that when the door is closed it will dead-lock the bolt, the setting lever *z* as shown in Fig. 4 is pulled down, this raises the slide 2 to the position shown in Fig. 3, however, the sliding dog *y* is still engaging between the teeth of the hub of the dead locking member as shown in Fig. 4. This brings the dog releaser 2 directly into the path of the cam 6. This cam will wipe the cam face 5 of member 2, causing this member to swing on the pivot 7 and the bill of member 2 will engage with the notch 8 and withdraw the sliding dog *y* from engagement with the teeth of the hub of the dead locking member *t*. The spring *x* will now rotate the dead locking member through a quarter turn until the arm *v* engages against the stop 9. The dead locking member is now "on" and the bolt cannot be retracted because the arm *v* bears directly against the cross bar *s* and resists any thrust.

It will thus be seen that the dead lock setting device may be first fixed to the "on" position, the door may then be closed permitting the bolt to retract, then automatically the dead locking member shoots into the "on" position. These dead locking setting devices are accessible only at the face of the lock and the edge of the door so they cannot be reached from either side of the lock case.

However, there are these additional features of this lock—the dead locking lever can be set from either the inside with the thumb turn or from the outside with the cylinder lock key. The thumb turn has a spindle 10 which engages in the square opening 11 in the hub of the dead locking member. This constitutes a direct connection for turning the dead locking member either to the "on" or "off" position. The sliding dog *y* is provided with a beveled head so that when the dead locking member is turned in either direction it may be caused to retreat out of the way, but the spring *x* does not have sufficient power to cause it to retreat.

The cylinder lock is provided with an arm 13 having teeth on its end and adapted to engage with the teeth *u* of the hub of the dead locking member. The rotating paths of these two sets of teeth intersect, consequently the dead locking lever may be turned in either direction by the cylinder lock to either put the dead locking lever on or release the dead locking lever. The arm 13 of the cylinder lock may be turned to complete its 360 degrees so that the key can be extracted in the well known manner required in connection with pin tumbler locks.

From the above description it will be apparent that this single bolt lock has the features of very much more complex locks requiring more mechanism and some of them several bolts. The single bolt used in this lock may be used as a latch bolt and it may be dead locked from either the inside or outside and the dead lock released from either the inside or outside; furthermore, the dead lock may be set while the door is open and its action delayed so that the dead lock does not become effective until the door is closed, thereby doing away with the necessity of using a key to dead lock the door when going out.

Attention is also called to the finger piece *l* used on the dead lock setting lever. This finger piece comprises a strip of spring metal bent to hook on the end of the dead locking lever and provided with a pair of bowed ends 14 which are always under stress by reason of engaging the inside of the face plate of the lock, consequently they always insure friction to hold the dead lock setting lever in any position of its travel.

When the dog releaser 2 is set to automatically dead lock the sliding latch bolt upon the closing of the door, it assumes the position as shown in Fig. 3. When the dead locking member is actuated by the key or thumb turn, the teeth *u* will engage the sliding dog *y* to force it down which will carry with it the dog releaser 2, throwing dog setting devices into an "off" position. When the dog *y* returns to the position as shown in Fig. 4 the dog releaser will be thrown out of the notch 8, and remain in an inoperative position.

What I claim is:

1. In a lock, the combination of a case, a bolt slidable in the case, a dead locking member, means for engaging said dead locking member to turn the same into "on" and "off" position, and dead lock setting devices which may be set when the door is open to automatically cause the dead locking

member to turn to locking position when the door is closed.

2. In a lock, the combination of a case, a sliding bolt guided therein, means for yieldingly projecting said bolt, a dead locking member comprising a toothed hub and an arm arranged to engage a portion of the bolt to hold it in its projected position, and a cylinder lock provided with an arm adapted to engage the toothed hub of the dead locking member to turn the dead locking member to "on" or "off" position, but which permits the arm of the cylinder lock to complete its turn of 360 degrees for the extraction of the key.

3. In a lock, the combination of a case and sliding bolt therein, means for yieldingly projecting the bolt, a dead locking member comprising a toothed hub and an arm that may be turned to engage a portion of the bolt to hold the same against retraction, and a cylinder lock provided with an arm that has an intersecting path of rotation with the teeth of the hub to turn the dead locking member to "on" or "off" position.

4. In a lock, the combination of a case, and a bolt slidable therein, means for yieldingly projecting the bolt, a dead locking member provided with a toothed hub and having an arm which may be engaged with a portion of the bolt to lock the same against retraction, a spring normally tending to turn the dead locking member into engaging position, a dog engaging the toothed hub for preventing said spring turning said dead locking member, and means which may be set so that the retracting of the bolt into the case on the closing of the door causes said means to withdraw said dog and permit the spring to turn the dead locking lever to working position.

5. In a lock, the combination of a case, a bolt slidable therein, means for yieldingly projecting the bolt, a deadlocking member, a spring tending to force said deadlocking member to a position to hold the bolt against retraction, separate means countervailing the action of said spring so as to hold the deadlocking member in a non-working position, deadlock setting devices which can be set in the path of a portion of the bolt so that when the bolt retracts into the case upon the closing of the door said means is actuated to release the said countervailing means and permit the spring to force the deadlocking member into working position to prevent retraction of the bolt.

6. In a lock, the combination of a case and a sliding bolt guided therein, means for yieldingly projecting said bolt, a rotatable dead locking member, a spring tending to turn the dead locking member into a position to encounter part of the projected bolt to prevent the retraction of same, a dog arranged to engage the dead locking member to countervail the action of the spring and to hold the member in released position, a dog releasing member provided with a cam face, a cam carried by the bolt and means for moving the dog releasing member into the path of the cam, whereby on retraction of the bolt, the cam strikes the cam surface which causes the dog releasing member to engage and withdraw the said dog from the dead locking member and permits the spring to turn the dead locking member into position to prevent the retraction of the bolt.

7. In a lock, the combination of a case, a bolt slidable therein, means for yieldingly projecting the bolt, a dead locking member comprising a toothed hub and an arm which may be turned to have the arm engage behind the bolt to prevent its retraction, a spring normally tending to turn the dead locking member into such position, a dog provided with beveled head engaging between two teeth of the head and which may be disengaged only when the dead locking member is turned by a direct application of force, a dog releasing member having a cam surface and a cam on the bolt arranged to engage the cam surface of said dog releasing member upon the retraction of the bolt and thereby causing the dog releasing member to engage said dog and withdraw the same from the hub.

8. In a lock, the combination of a case, a bolt slidable therein, means for yieldingly projecting the bolt, a dead locking member having a toothed hub and an arm which may be turned to engage part of the bolt to prevent retraction of the same, a sliding dog having a beveled head adapted to engage between the teeth of the hub, a dog releasing member in the form of a member which may both slide and pivot and is provided with a cam surface, a lever accessible from the face of the lock which may be operated to swing the dog releasing member so that the cam surface encounters a part of the bolt, whereby upon retraction of the bolt a part engages the cam surface of the dog releasing member and causes this member to pivot and swing against the said dog to withdraw the same from the dead locking member, and a spring for turning the dead locking member to a position to prevent the retraction of the said bolt when the dog is released.

9. In a lock, the combination of a case provided with a threaded socket on each side, a bolt slidable in the case, means for yieldingly projecting the bolt, a plug and a cylinder lock barrel that may be interchangeably engaged in either the threaded socket to make the lock a right or left hand lock, the dead locking member arranged to be actuated by the cylinder lock to engage behind the bolt to prevent the retraction of same, and a thumb turn which may engage

directly with said dead locking member interchangeably from either side of the case and which is located in eccentric relation with the cylinder lock and with the plug.

10. In a lock, the combination of a casing, provided with a threaded socket on each side, a plug and cylinder lock provided with an actuating arm and which may be interchangeably engaged with the socket for right or left hand lock position, a rotatable dead locking member offset to one side of the said threaded sockets but in the path of the cylinder lock arm and a thumb turn which may be directly engaged interchangeably from either side with the dead locking member.

11. In a lock, the combination of a case, a bolt slidable in the case, a dead locking member, thumb turn means for operating said dead locking member to position the same in "on" or "off" position from the inside of the door, key operating means for operating the dead locking member to position the same in "on" or "off" position from the outside of the door, and dead lock setting devices which may be set in the face of the lock when the door is opened to automatically cause the dead locking member to take the locking position when the door is closed.

12. In a lock, the combination of a case, a bolt slidable in the case, a dead locking member, means operating from the inside of the lock to turn the dead locking member to "on" or "off" position, a key operating means operating from the outside of the door to place the dead locking member in the "on" or "off" position, and dead lock setting devices which may be set when the door is opened to automatically cause the dead locking member to take the locking position when the door is closed.

13. In a lock, the combination of a case, a bolt slidable in the case, a dead locking member, a key operating means for operating said dead locking member to position the same in the "on" and "off" positions from the outside of the door, and dead lock setting devices which may be set when the door is opened to automatically cause the dead locking member to take the locking position when the door is closed.

14. In a lock, the combination of a case, a bolt slidable in the case, a dead locking member, means for engaging said dead locking member to turn the same into "on" and "off" position, dead lock setting devices which may be set when the door is open to automatically cause the dead locking member to turn to locking position when the door is closed, and means for returning said dead lock setting devices to inoperative position when the dead locking member is turned to "off" position.

15. In a lock, the combination of a case, a bolt slidable in the case, a dead-locking member, means for engaging said dead-locking member to turn the same into an "on" or "off" position, dead-lock setting devices which may be set to automatically cause the dead-locking member to turn to locking position when the door is closed and means for temporarily moving the said dead-locking member to a non-interfering position when the door is opened by a key from the outside.

In testimony whereof I affix my signature.

SAMUEL D. BUTTERWORTH.