

**D. WOLF.**  
**Locks for Doors, &c.**

No. 148,274.

Patented March 3, 1874.

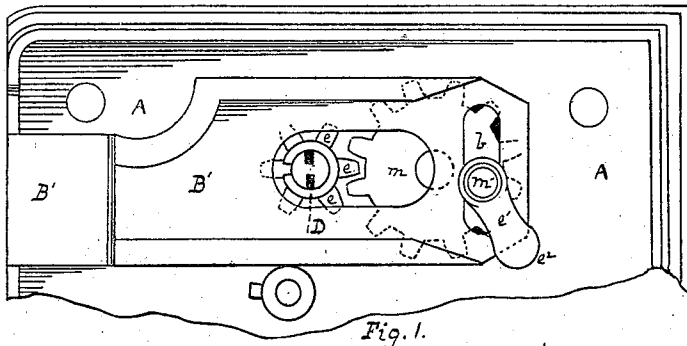


Fig. 1.

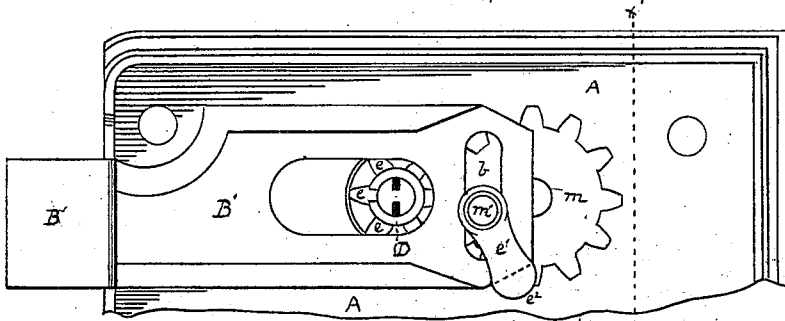


Fig. 2.

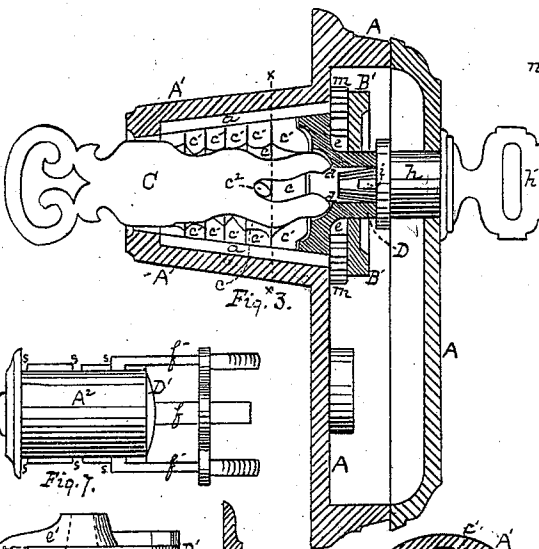


Fig. 3.

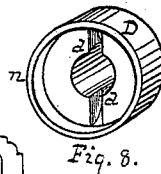


Fig. 8.

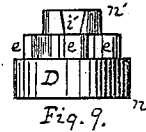


Fig. 9.

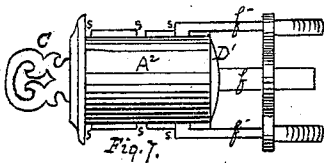


Fig. 7.

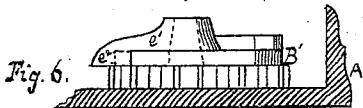


Fig. 6.

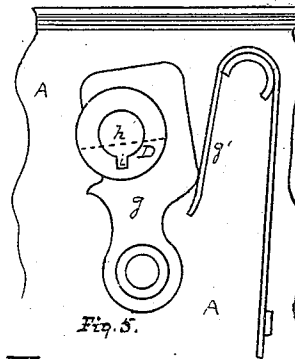


Fig. 5.

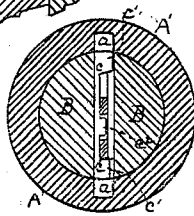


Fig. 4.

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# UNITED STATES PATENT OFFICE.

DANIEL WOLF, OF PITTSBURG, PENNSYLVANIA.

## IMPROVEMENT IN LOCKS FOR DOORS, &c.

Specification forming part of Letters Patent No. 148,274, dated March 3, 1874; application filed June 4, 1873.

*To all whom it may concern:*

Be it known that I, DANIEL WOLF, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Locks; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 shows the inside of a lock-case, the inner plate being removed, with a bolt, and devices therewith connected, in an unlocked position. Fig. 2 is a like view of the same devices, showing the bolt in a locked position. Fig. 3 is a vertical sectional view through the lock-case and cylinder, within which latter the sliding tumblers are arranged. Fig. 4 is a cross-section through  $xx$  of Fig. 3. Fig. 5 illustrates the arrangement of the spring with reference to the follower. Fig. 6 is a sectional view through  $x'x'$  of Fig. 2, showing the rear end of the locking-bolt, the gear-wheel which operates it, and the stop which limits its motion either in locking or unlocking. Fig. 7 shows the construction of the cylindrical attachment of the lock-case, such as is required in connection with the tumblers and key of Fig. 3, for use with doors of different thicknesses in connection with the locking devices of Figs. 1 and 3; and Fig. 8 is a perspective view, and Fig. 9 a side elevation, of the key-follower.

Like letters of reference indicate like parts in each.

To enable others skilled in the art to make and use my improvement, I will proceed to describe its construction and mode of operation.

The lock-case A is of any suitable construction, suitable for carrying and operating a lock-bolt, B'. On the outer face of the case, and either made as a part thereof, or made separately and attached thereto, is a cylindrical extension, A'. This extension is open at both ends and bored out to a conical or cylindrical form, and inside of it is arranged the block B, which is preferably made in two parts, as shown in Fig. 4, with such space between them as may be necessary for the arrangement and operation of the sliding tumblers  $c$ . The inside of the cylindrical extension A' has one or more grooves,

$a$ , which are opposite each other. Between the two parts of the block B I arrange a series of sliding tumblers,  $c$ , in any desired number, and make each tumbler  $c$  somewhat of a U shape—that is to say, with an upwardly-projecting lug,  $c^1$ , on each end.

When the block B is made in two parts, as set forth, the space between their contiguous plane faces is of suitable size for the operation of the tumblers therein. These tumblers are capable of a sliding motion in the direction of their length into and out of the grooves  $a$  in locking and unlocking—or, in other words, in throwing the bolt—but they are capable of this motion only when their ends come opposite to the grooves, and the devices are so arranged that they necessarily come to this position at the beginning and end of the throw of the bolt. The key C is made for insertion between the lugs  $c^1$  of the sliding tumblers  $c$ , and its opposite edges are irregular and parallel with each other, or nearly so. The shape of the inner faces of the lugs  $c^1$  and the shape of the outer edges of the key C are such that as the key is being inserted or removed it shall move one or more of the sliding tumblers  $c$  endwise, and thereby bring their ends into the grooves  $a$ . Consequently, while the key is being inserted or removed, and also after it is removed, the ends of one or more of the tumblers will be brought into one or the other or both of the grooves  $a$ , and thereby the rotation of the block B will be prevented, and in such case, the bolt cannot be thrown either way. But they are also so shaped relatively to each other that when the key is fully inserted in the lock, the inner faces of the lugs  $c^1$  will bear against the opposite edges of the key C, so as to be held with the ends of each tumbler clear of the grooves, whereby the block B is free to be rotated, so that thereby the bolt may receive the desired throw. But instead of lugs  $c^1$  on each end of each tumbler  $c$ , a single lug at or about the middle of each tumbler may be arranged, as shown at  $c^2$ , so as to secure the same result. But in such case the key C must be bifurcated or slotted, as shown at its forward end in Fig. 3, and with the edges of such slot or bifurcation forming

irregular, or other than straight, but parallel, lines. In such case, the lug  $e^2$  passing along the slot or bifurcation of the key as the latter is inserted will be moved so as to shift the tumbler to which it is attached endwise, and thereby bring one end of the tumbler in one of the grooves  $a$ , and thereby prevent the operation of the lock until the key is fully inserted, at which point the tumbler will be clear of the grooves. In this connection it is only essential that the sliding tumblers  $c$  have, by means of lugs, one at each end, or by a lug between their ends, bearing in opposite directions on some part of the key. The inner end of the key  $C$  on being fully inserted engages by means of recesses, at  $d$ , or other equivalent device, a rotating key-follower,  $D$ . This key-follower is somewhat in the nature of a hub. Its outer end works in the cylindrical cavity of the extension  $A'$ , and its opposite end projects into the lock-case and through a mortise in the bolt.

The peculiar form of this key-follower is more fully represented in Figs. 8 and 9, where  $n$  represents the end, which comes into the extension  $A'$ , and inside which are the recesses  $d$ , and  $n'$  represents the part which projects through the mortise in the lock-bolt. On this key-follower is a series of gear-teeth,  $e$ , which come between the end  $n$  and the adjacent face of the lock-bolt, and these teeth mesh into a gear-wheel,  $m$ , as shown. This latter wheel is arranged in its bearings so as to be rotated by the turning of the key  $C$ ; but has on one side of its center an eccentric pin,  $m'$ , which plays in a slot,  $b$ , in the lock-bolt  $B'$ , and such eccentric pin is arranged in such position that as the gear-wheel  $m$  rotates the pin  $m'$  will move from the position shown in Fig. 1 to that shown in Fig. 2, and vice versa, and in so doing will bear against the edges of the slot  $b$ , and impart to the bolt  $B'$  the motion desired in locking and unlocking; but in order to arrest the movement of the bolt at the desired point, whichever way it may be moving, I arrange on the pin  $m'$  a swinging stop,  $e^1$ , which is arranged with a hook end,  $e^2$ , in such position that as the pin  $m'$  goes upward near the end of the outward throw of the bolt the hook  $e^2$  will engage the lower edge of the bolt, as shown, Figs. 1, 2, and 6, and thereby arrest such motion, and prevent the bolt from receiving a throw longer than that desired. When the retrogressive motion of the bolt is complete, the same stop arrests its motion, as illustrated in Fig. 1. In this way the lock-bolt is thrown to the position desired, whether in locking or unlocking, and such throw is limited, as set forth.

I thus construct a sliding tumbler-lock, adapted for use as a right or left hand lock, the only change of lock which is necessary in such change of use being the inversion of the lock, or turning it upside down. As the stop  $e^1$  swings freely on the pin  $m'$ , it will, when

the lock is inverted, swing around and engage the opposite, or what then becomes the lower, edge of the bolt, and the slot  $b$  is made of suitable length for the movements of the pin  $m'$  downward and upward, as before, in imparting the desired motion to the bolt.

This lock is particularly designed for the uses to which spring-locks are ordinarily applied, and the extension  $A'$  is arranged toward or on the outer side of the door; but, for convenience in operating the lock from the inside, I attach to the corresponding plate of the lock-case a spindle,  $h$ , which is operated by a T-head or key,  $h'$ , and the inner end of which enters, and by a tooth or lug,  $i$ , engages a notch,  $i'$ , Fig. 9, in the adjacent end of the rotating key-follower  $D$ ; consequently, by means of the key  $h'$ , the key-follower  $D$  can be as readily rotated from the inside as by means of the key  $C$  from the outside, and through the devices already described the bolt  $B'$  will receive the throw desired in either direction. To make the bolt work more quickly toward the end of its throw, I cut away the neck of the shank  $h$ , as illustrated by dotted lines in Fig. 5, and combine therewith the usual swinging arm  $g$  and spring  $g'$ .

To adapt the devices described for use with doors varying in thickness, I make the extension  $A^1$  separate from the lock-case, and such construction is illustrated at  $A^2$  in Fig. 7. This case contains an arrangement of sliding tumblers like that already described, and which are operated by the insertion and removal of the key  $C$ , which key engages the key-follower  $D'$  in the opposite end of the cylinder, and this key-follower, by means of a spindle,  $f$ , of other than circular shape, makes connection with a gear-wheel, which is arranged in the position and with the same function as that of the gear-teeth  $e$ , and the length of the spindle  $f$  will vary with the thickness of the door to which it is to be applied. The case  $A^2$  is inserted in a hole bored in the door to the required depth, and held there, and prevented from coming out by means of hooks  $f'$ , which engage any desired one of a series of notches,  $s$ , made on the outer periphery of the case. The shank ends of these hooks  $f'$  project through the door, and are there secured by escutcheons or nuts, or in other suitable way. The stem  $f$  being made of proper length, the lock-case is applied thereto, and with the operation and result already described.

The position of the tumblers, when the door is locked or unlocked, is vertical; hence, whether the lock be used as a right or left hand lock, the tumblers, on the removal of the key, will drop with their lower ends into the lower groove  $a$ , and prevent the throwing of the bolt from without, except by the use of the proper key.

It will be noticed that the gear-wheels described should be of such relative diameter that the ends of the tumblers shall come oppo-

site the grooves *a* at the beginning and end of the throw of the bolt.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The swinging stop *e*<sup>1</sup>, as a device for limiting in either direction the throw of the bolt *B'*, and in combination therewith, substantially as set forth.

2. In combination with one or more tumblers, *c*, and one or more grooves, *a*, the key-

follower *D* and gearing *e m*, substantially as set forth.

3. The gear-wheel *m* having an eccentric pin *m'*, in combination with the bolt *B'* and stop *e*<sup>1</sup>, substantially as set forth.

In testimony whereof I, the said DANIEL WOLF, have hereunto set my hand.

Witnesses:

DANIEL WOLF.

T. B. KERR,  
JAMES I. KAY.