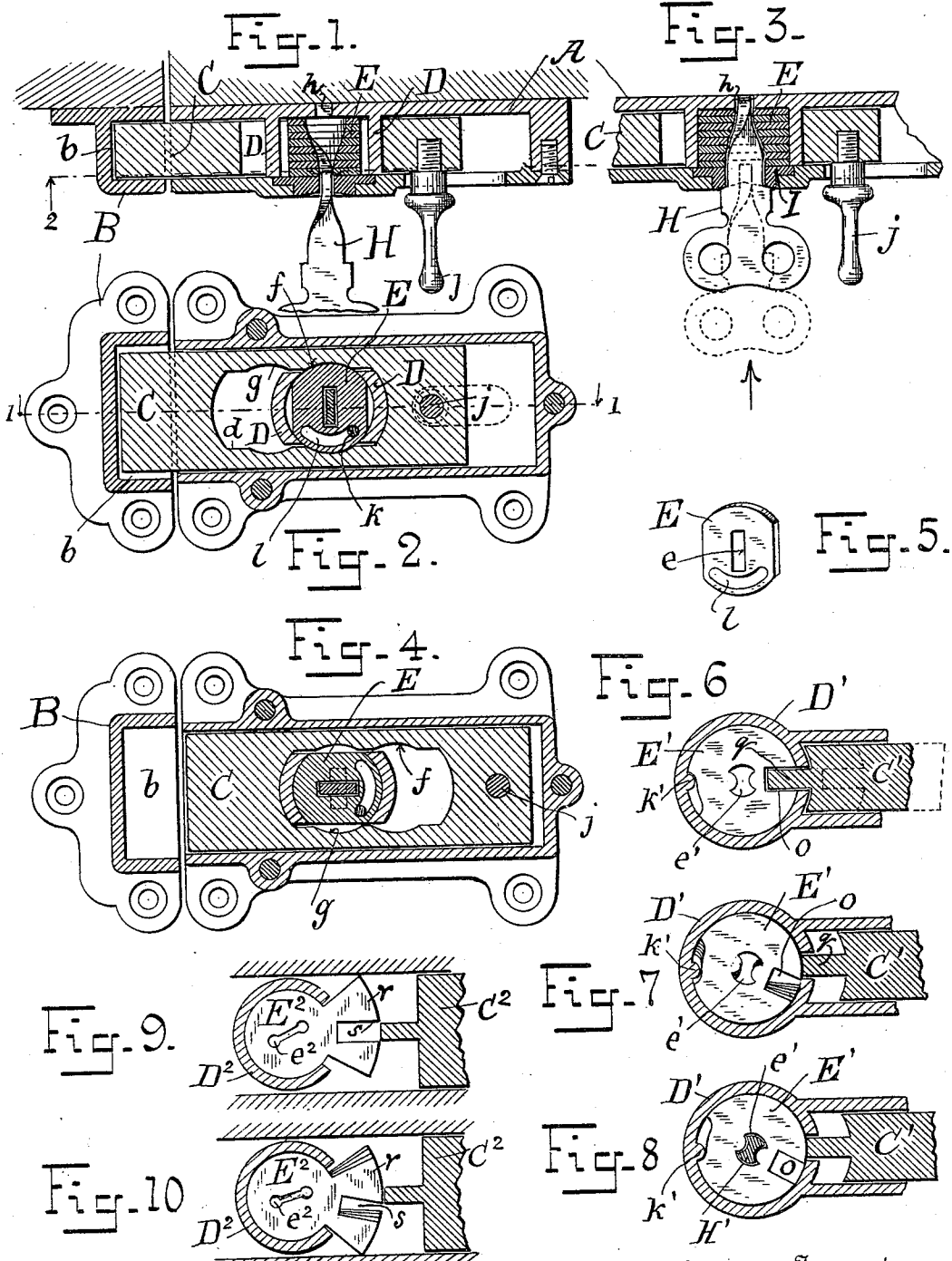


(No Model.)

J. RICHARDSON.
LOCK.

No. 583,549.

Patented June 1, 1897.



Witnesses
Chas Hanemann
Henry V. Brown.

Inventor
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By his Attorney
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UNITED STATES PATENT OFFICE.

JAMES RICHARDSON, OF NEW YORK, N. Y.

LOCK.

SPECIFICATION forming part of Letters Patent No. 583,549, dated June 1, 1897.

Application filed November 11, 1896. Serial No. 611,707. (No model.)

To all whom it may concern:

Be it known that I, JAMES RICHARDSON, a citizen of the United States, and a resident of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Bolt-Locking Devices, of which the following is a specification.

My invention relates to improvements in bolt-locking devices.

More particularly the invention consists in the combination of a key which has a spiral part adapted to enter a keyhole and of uniform cross-section and a series of independently-movable tumblers, each of which has a keyhole of the same cross-section as the key. When the key is inserted in the tumblers, each tumbler takes a position which is determined by the twist of the spiral part of the key at that point, and the tumblers are arranged to so cooperate with the bolt that the latter can only be withdrawn when the key is inserted in the tumblers and they are each brought to their several positions corresponding to the twist of the spiral part of the key. The tumblers may either be provided with gates to admit dogs on the bolt in the usual manner or may be shaped to turn into and out of recesses in the bolt, according to the position which the twist of the spiral part of the key gives to the tumblers as the key is inserted into or withdrawn from the tumblers.

The invention admits of a variety of applications, all of which depend upon the fact that the twist of the spiral part of the key causes the several tumblers to assume positions which are determined for each tumbler by the particular twist of that part of the key which corresponds with that particular tumbler when the key is inserted in the tumblers.

Referring to the drawings which accompany the specification to aid the description, Figure 1 is a longitudinal section on the line 1 1 of Fig. 2 and showing the bolt locked in the outward position. Fig. 2 is a front view of the lock, the front plate having been removed. Fig. 3 is a broken section on the line 1 1 of Fig. 2, but with the tumblers shifted. Fig. 4 is a front view of the lock, the front plate being removed and the bolt shown in the withdrawn position. Fig. 5 is a front

view of a tumbler. Fig. 6 is a front view of a barrel with tumblers provided with gates to receive the tail or dog of a bolt. The tumblers are in the unlocked position and the bolt drawn back. Fig. 7 is a front view of the same parts, but showing how with any other than the proper key some of the tumblers will be displaced so as to prevent withdrawing the bolt. Fig. 8 is a front view of the same parts, but showing at least one of the tumblers fully thrown to the locked position. Figs. 9 and 10 are front views of a barrel with tumblers which are provided with an extension to multiply the movement of the gates. Fig. 9 shows the tumblers in the unlocked position, and Fig. 10 in a locked position.

A, Fig. 1, is the case; B, the strike-plate with bolt-socket *b*.

C is the bolt which slides in the case A. The body of the bolt is cut through, as shown at *d*, to enable it to pass the barrel D. In this construction, wherein the bolt is locked both in the outward and the withdrawn positions, the barrel D is preferably in two parts, as shown, which may be cast integral with the back plate of the lock-case. Centered in the barrel D are a number of tumblers E, fitting nicely in and concentric with the barrel, and said tumblers E are segments of circles, as shown. In this form the tumblers will be first threaded on the key with which they are to be used and will then be cut to shape, as shown. Recesses *f g*, one for the withdrawn and the other for the outward position, are formed in bolt C to receive the curved parts of the tumblers when the bolt is locked in either position. (See Figs. 2 and 4.) A pin *k*, fixed in the case and playing in a slot *l*, limits the throw of each tumbler.

A keyhole *e*, corresponding in shape and size to the cross-section of the key H, is made through each tumbler, and said tumblers are without springs, are held in the barrel D between the front and back plates of the lock, and are independent of each other. Outside of the series of tumblers is a revoluble flanged plate I, turning in a proper circular groove in the front plate and provided with a keyhole. I can of course employ only one tumbler E, but a number is preferable. Said key H, which may be of any cross-section, is readily formed by taking a rod of the desired

section, heating it to red heat, and then giving it an axial twist, generally similar to a twist-drill, but of a long easy pitch. The end of the key H may be tapered to assist in picking up the tumblers and when home to place will enter a slot *h* in the back plate. A knob *j*, working in a slot in the front plate, serves to shift the lock.

The lock operates as follows: Suppose the bolt to have been drawn back out of the socket and locked in that position, Fig. 4. Now that key on which the tumblers were threaded when cut to shape (or the exact duplicate thereof) is inserted through the keyhole of plate I and turned a little until it enters the keyhole of the first tumbler, and thus by turning the key a little one way or the other it threads through all the tumblers and enters the slot *h* in the back plate, which slot determines the final position of the key. As the key passes through each tumbler its twist turns that tumbler to the unlocking position until finally all the tumblers become unlocked, Fig. 4, and the bolt may be shot into the socket *b* by the knob *j* and the door, for example, locked. Now as the key is withdrawn it rotates each tumbler back to a locked position, wherein the tumblers turn into the socket *f* of the bolt C, and thus lock it and prevent opening the door until that key or its duplicate is again used.

In Figs. 6, 7, and 8 the tumblers E' are shown provided with a gate *o*, adapted to receive the tail or dog *q* of the bolt C' when the key is inserted. Upon withdrawing the key at least one of the tumblers will be turned clear to the locking position of Fig. 8. If any other than the right key is inserted, the tumblers will take some such position as shown in Fig. 7 and the drawing back of the bolt will be prevented. In these figures the keyhole *e'* is shaped like the cross-section of an

ordinary twist-drill and the cross-section of the key H' will be similar.

In Figs. 9 and 10 the tumblers E² are shown each provided with a wing *r*, in which is the gate S for the tail of the bolt. This arrangement multiplies the movement of the gate as the tumbler revolves and is useful when the tumbler is small.

In the case of tumblers with gates the tumblers are first strung on the desired key and then the gates are cut across the edges of the tumblers, so that the gates will register only when that key or its duplicate is pushed clear home.

Now, having described my improvements, I claim as my invention—

1. The combination in a bolt-locking device, of a key having a spiral part of uniform cross-section and adapted to enter a keyhole, and a series of independently-movable tumblers each of which has a keyhole of the same cross-section as the said spiral part, substantially as described.

2. The combination in a bolt-locking device, of a key having a spiral part of uniform cross-section and adapted to be inserted in a keyhole, and a series of independently-movable tumblers each of which has a keyhole of the same cross-section as the said spiral part and a surface adapted to permit the moving of the bolt when the tumbler is in one position and prevent the moving of the bolt when the tumbler is in another position, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 4th day of November, 1896.

JAMES RICHARDSON.

Witnesses:

BERNARD J. ISECKE,
HENRY V. BROWN.