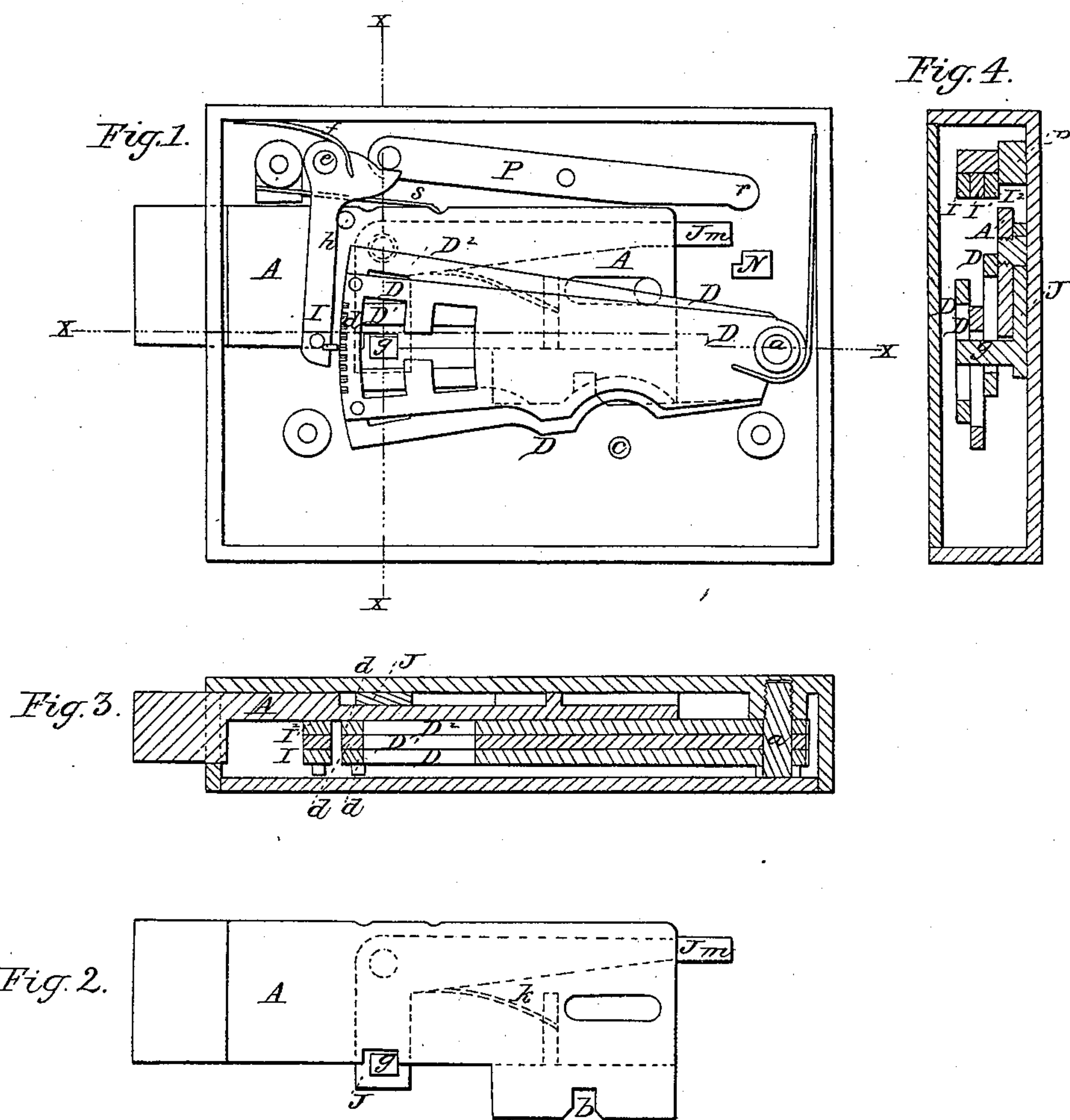


*E. S. Renwick,*

*Lock.*

*N<sup>o</sup> 42,793.*

*Patented May 17, 1864.*



*Witnesses.*  
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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN LOCKS.

Specification forming part of Letters Patent No. 42,793, dated May 17, 1864.

*To all whom it may concern:*

Be it known that I, EDWARD S. RENWICK, of the city, county, and State of New York, have invented certain new and useful Improvements in Locks; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents a side view of a lock embodying all my improvements and with the lock-plate removed to show the internal structure, the tumblers being in the positions which they occupy just before the movement of the bolt by the key. Fig. 2 represents a side view of the bolt and of the vibrating stump carried by it. Fig. 3 represents a horizontal section of the lock at the line *xx* of Fig. 1, and Fig. 4 represents a vertical section of the same at the line *yy* of Fig. 1.

The object of my invention is to increase the security of tumbler-locks; and the first part of my invention consists in the combination of a series of movable tumblers with a series of keepers operating in such manner that the keepers permit the tumblers to be set by the key, but are placed in positions to catch the tumblers before the stump of the bolt is borne against the tumblers.

The second part of my invention consists in the combination of one or more tumblers and one or more keepers (to catch the tumblers after they are set by the key and before the stump is borne against the tumbler or tumblers) with a yielding stump carried by the bolt and a stop by which the movement of the bolt is arrested when the yielding stump is misplaced.

The third part of my invention consists in the arrangement of one or more of the series of keepers in such manner relatively to the tumblers that they bear against their respective tumblers without catching them when the tumblers are properly set to open the lock, but are in positions to catch upon a slight movement of the tumblers from their proper set, while the residue of the series catch their respective tumbler or tumblers at that time.

The lock represented in the accompanying drawings embodies all parts of my invention. It has a sliding bolt, *A*, which is guided so as to slide in a straight line when moved by the key, and has a talon or notch, *b*, in which the bit of the key engages when the key is turned upon the key-spindle *c*. In the present exam-

ple there are three tumblers, *D D' D<sup>2</sup>*, constituting the series, and each tumbler is combined with a separate keeper, *I I' I<sup>2</sup>*, so that there are three keepers in the lock. The improvements are in this example applied to a lock having vibrating tumblers. The tumblers are constructed to vibrate upon a pivot, *a*. Each tumbler has an H-shaped mortise in it, the longer two parts of which permit the tumbler to play up and down upon the stump *g* of the bolt when the bolt is locked and unlocked, while the cross-slot permits the passage of the stump *g* through the tumbler when the latter is properly set by the key. The outer end, *d*, of each tumbler is curved to a circle, of which the center of the pivot *a* is the center, and has a series of notches formed in it to receive a tooth secured to the keeper.

In order that the lock may embody the first part of my invention, there are three keepers, each of which is fitted with a tooth. These keepers vibrate upon a pivot, *e*, and each of them is fitted with a spring, *f*, which tends to press it toward the adjacent end of the tumbler. The lock-bolt *A* is fitted with a pin, *h*, which bears against all the keepers *I I' I<sup>2</sup>*, and holds them out of contact with the adjacent ends of the tumblers when the bolt is locked; but the relative positions of the stump *g* and keeper-pin *h* are such that the movement of the lock-bolt inward permits the teeth of the keepers to bear against the ends of the tumblers before the stump bears against the edges of the slots in the tumblers; hence the first movement of the bolt by the key places the keepers in positions for their teeth to engage in the notches of the tumblers and hold them from moving. The keepers thus constructed provide, it is believed, an effectual security against the picking of the lock by playing the tumblers, as the first effort to play a tumbler after starting the bolt causes the tumbler to be caught by one of the keepers, which thus prevents further play.

In order to insure the lock against picking by measuring the distance the bolt can be moved at different sets of the tumblers, the stump *g*, instead of being fixed to the bolt, is secured to an elbow-lever, *J*, which is pivoted to the back of the bolt, and is fitted with a spring, *k*, which holds it in its proper position for entering the slots of the tumblers when the latter are properly set, but permits the



stump to yield and be misplaced when it is pressed against the edge of any one or more tumblers instead of entering their cross-slots. The longer arm *m* of this stump-lever is arranged to pass by a fixed stop, *N*, secured to the lock-plate when the stump *g* is not misplaced; but when this stump is misplaced by contact with any one of the tumblers the end of the stump-lever is depressed so as to strike the stop *N* and interpose an effectual obstacle to the further movement of the bolt. The face of the stop *N* may be curved to a circle of which the length of the longer arm of the stump lever is the radius, so that the bolt may be stopped at the same point whether the stump-lever be more or less moved by reason of a slight difference in the length of the tumblers when they are set in different positions.

If the teeth of all the keepers were arranged to engage in notches in their respective tumblers when the tumblers were properly set to shoot the bolt through their slots, the keepers would to a certain extent form a guide by which the tumblers could be set, for it would only be necessary to try as many combinations of positions of tumblers as the compound multiple of the keeper notches in the tumblers. In order to increase the difficulty of setting tumblers and the number of the combinations to be tried, but one of the keepers, *I*, in the present instance, is arranged to engage in a notch of its tumbler when the tumblers are properly set, while the other two then bear against the spaces of the tumblers between the notches. Hence a lock-picker who does not see the interior of the lock or know the precise positions in which the tumblers must be set must not only try over the combinations of the notches, but also the combinations of the spaces with themselves and with the notches, and as the tooth of one keeper may rest upon a part of a space nearer a notch below it, while that of another may rest upon a part of a space nearer the notch above it, and as but one keeper in one lock may engage in a notch of a tumbler at the time the tumblers are properly set, while in another two may then so engage, the difficulty of finding the proper positions of the tumblers for opening the lock is increased in a very high ratio.

It is an advantage in a lock to have the tumblers free to play when the bolt is unlocked and the key is withdrawn. In order that this

advantage may be obtained in the lock represented, the keepers *I I' I<sup>2</sup>* are combined with a lever, *P*, whose butt *r* is in position to be acted upon by the butt of the bolt *A* at the latter part of its movement, so that the keepers are then moved from their respective tumblers so as to leave them free to be played when the bolt is unlocked, and the key is withdrawn.

The keepers *I I' I<sup>2</sup>* are borne against the keeper-pin *h* by their springs, and therefore tend to move the bolt. In order to prevent movement from taking place except by the key or some instrument inserted through the key-hole, a spring, *s*, is provided to act upon the bolt, and prevent its movement by the pressure of the keepers against the keeper-pin *h*.

My invention is applicable to locks with tumblers which slide in straight lines as well as to those which vibrate. The first and third parts of it are limited to locks having two or more tumblers and two or more keepers.

Having thus described a lock embodying all parts of my invention, it is proper to state that, although the lock above-described embodies all parts of my invention, the invention is not restricted to the precise form or arrangement of parts therein represented.

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

1. The combination, in a lock, of a series of movable tumblers with a series of keepers operating substantially as herein set forth.
2. The combination, in a lock, of a tumbler, a keeper, a yielding stump, and a stop, the whole operating substantially as set forth.
3. The arrangement, in a lock, of the members of a series of tumbler keepers in such manner that an engagement takes place between some one or more of them and their tumblers when the latter are properly set to permit the unlocking of the bolt, while one other or more of the said members then bear against spaces without engagement, the whole operating substantially as set forth.

In testimony whereof I have hereunto subscribed my name, the 28th day of November, A. D. 1863.

EDWARD S. RENWICK.

Witnesses:

MELVILLE BIGGS,  
W. L. BENNEM.