

W. W. Harder,

Trunk Lock.

N<sup>o</sup> 57,503.

Patented Aug. 28, 1866.

Fig. 1.

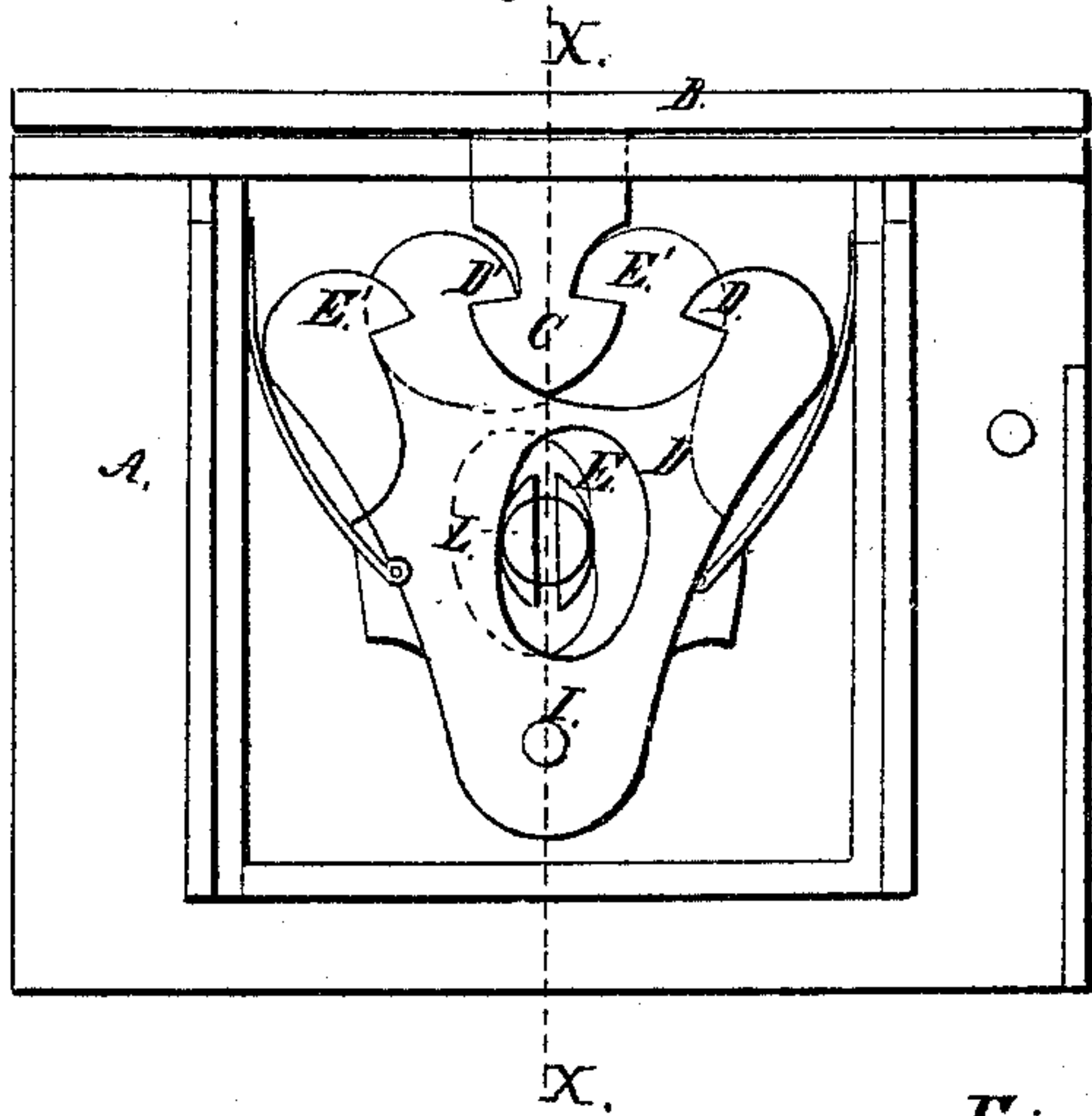


Fig. 3.

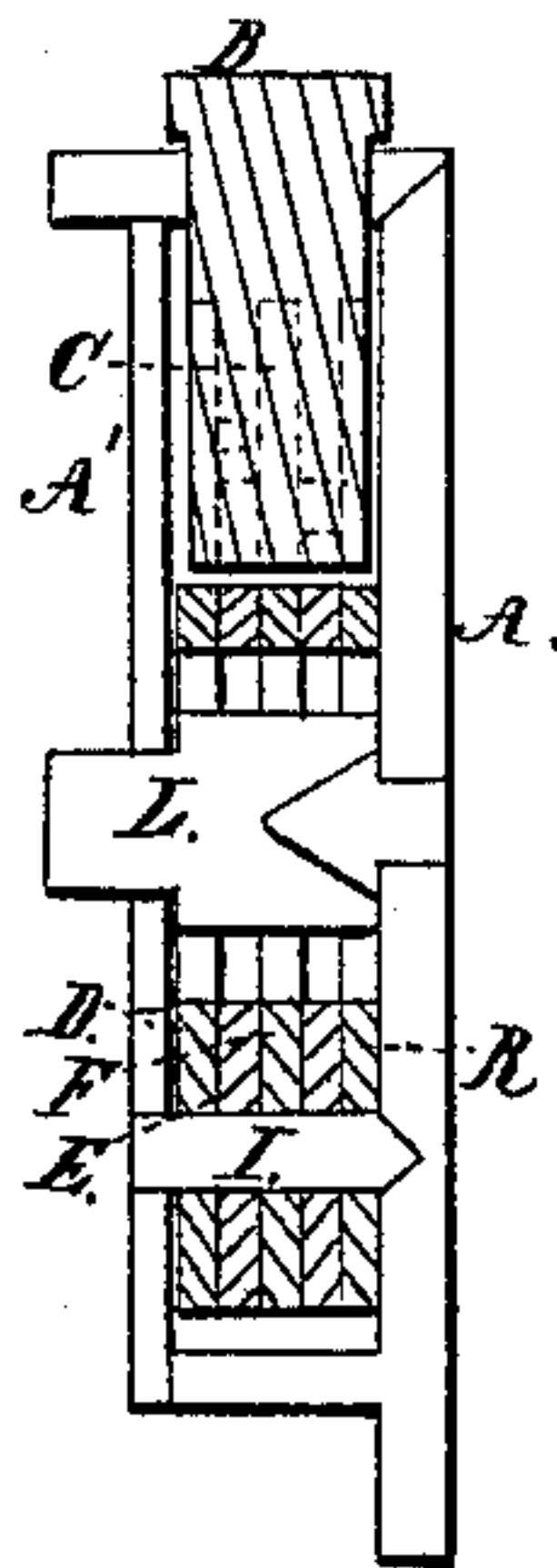


Fig. 4.

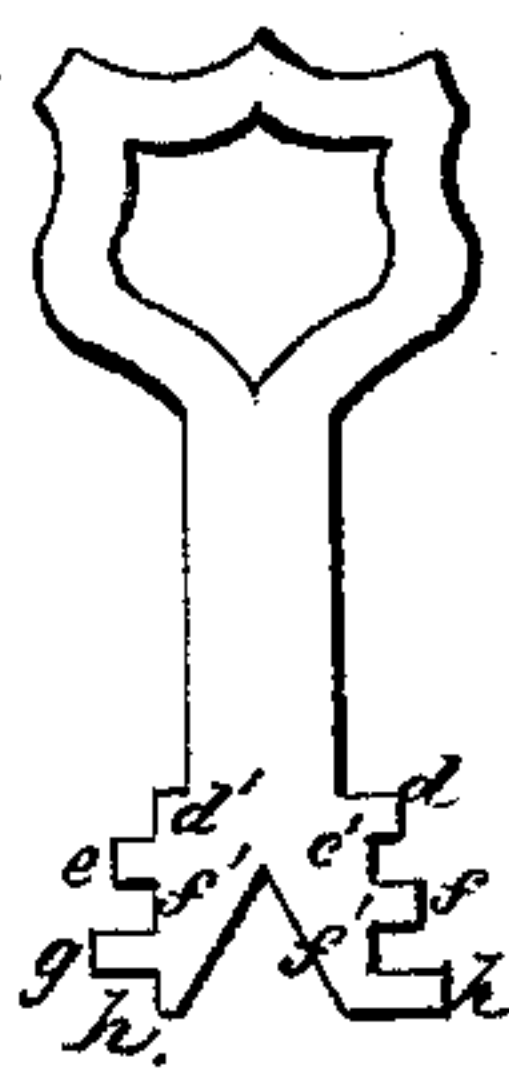
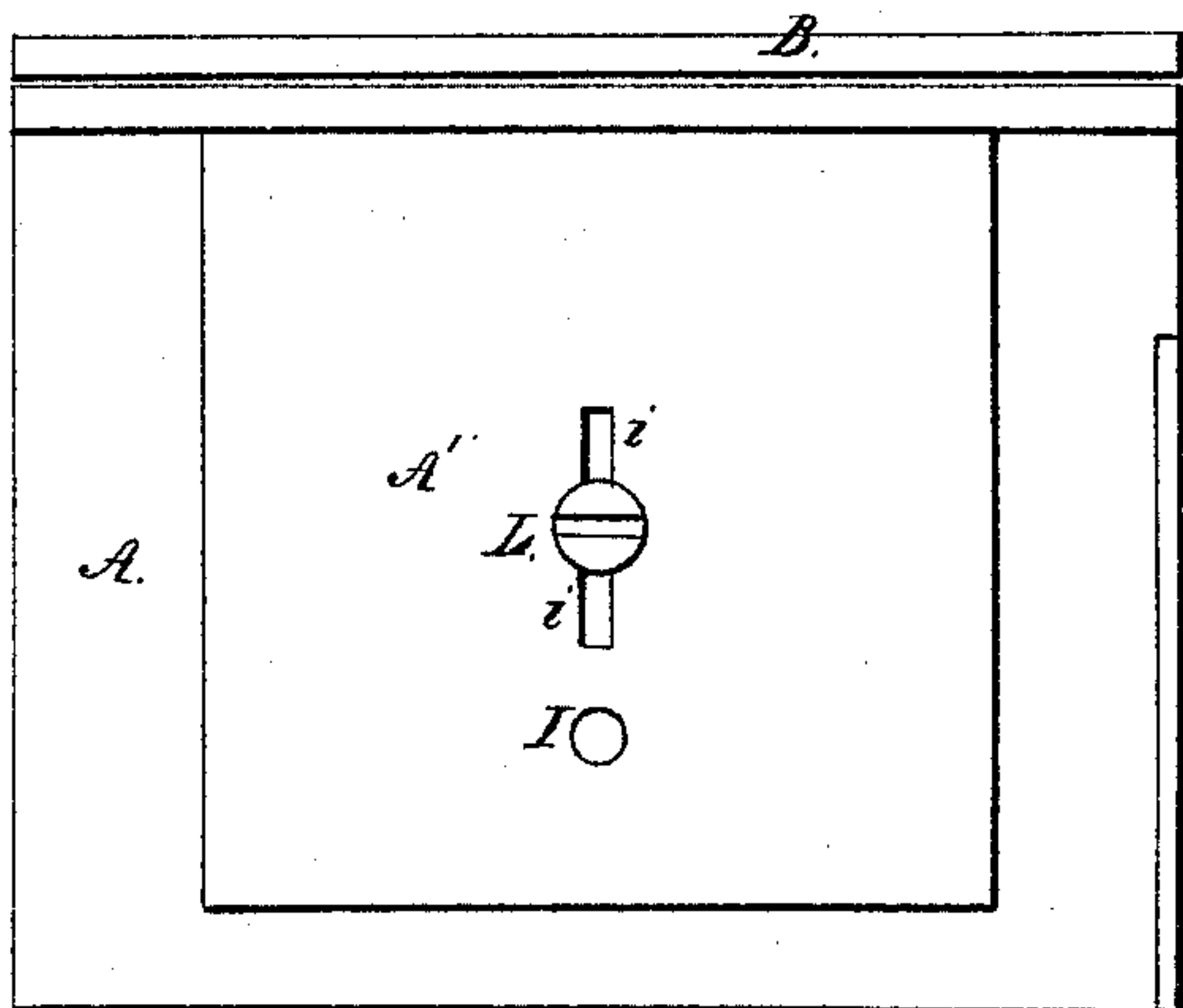


Fig. 2.



Witnesses:

James E. Ewin

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# UNITED STATES PATENT OFFICE.

WILLIAM W. HARDER, OF NEW YORK, N. Y.

## IMPROVEMENT IN LOCKS.

Specification forming part of Letters Patent No. 57,503, dated August 28, 1866.

*To all whom it may concern:*

Be it known that I, WILLIAM W. HARDER, of the city, county, and State of New York, have invented certain new and useful Improvements in Locks for the Securing of Property, that may be self-fastening, or be controlled by the hand of an individual, with or without a key; and I do hereby declare the following to be a full, clear, and exact description thereof, so that any one skilled in the art to which this branch of manufacture belongs will be enabled to construct the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a view of the lock with the plate through which is the key-hole removed to show the interior. Fig. 2 is a view of the lock, showing the key-hole. Fig. 3 is a section on the line *x x* of Fig. 1, and Fig. 4 is the key.

In all the figures like parts are indicated by the same letters of reference.

The subject of my invention is a lock of any suitable form for a padlock, till-lock, safe-lock, or other purpose, having a rotary slotted post and a series of double-hooked tumblers so formed and arranged that they will permit an unrestricted forward movement of the key, and will be released, so as to be again thrown forward, when the key is moved beyond the point at which it retracts them from the catch, stump, bolt, or other object which they are designed to engage with.

In the following description the form technically known as a "trunk-lock" is adopted to illustrate my invention, but without any intention of limiting the claim thereto.

In the accompanying drawings, A A' is the case or box containing the working parts of the lock. B is the plate, to be attached to the lid of a trunk or similar receptacle, and has attached to it the double catch C, having a wedge-shaped head with straight or curved opposite faces for facility in entering between the hooks that are to hold it after it shall have passed through the opening in the top of the lock-case. D E F G H are tumblers, two or more in number, which in most applications of the invention may be made alike in their general contour for the same lock, and in such case any number of them may be cast in one mold or struck from sheet or plate metal by

a die constructed for the purpose. I have shown in the drawings five of these tumblers, (see Fig. 3,) and the key, Fig. 4, has a corresponding number of wards, *d e f g h*, placed alternately on opposite sides of the key. These tumblers are centered upon a stem, I, permanently attached to one or both the plates A A' of the lock-case, upon which they are free to vibrate.

The upper ends of the tumblers terminate in two hooks, D' D' E' E', &c., having just space sufficient between their points to permit the passage of the head of the catch C.

Attached to one edge of each of the tumblers is a spring, K, which, by pressing with its end against one or the other of the inner sides of the case A A', tends, by its reaction against the tumbler, to force the hook nearest to it over onto the catch C.

The tumblers are laid one on the other, the stem I passing through them; but they are so arranged that the spring K of each one is on the opposite side from the springs of the next contiguous tumblers, and the catch C is held on both sides by the hooks of the tumblers alternately.

In the center of each tumbler is an opening, into which the key will pass to operate the tumbler. This is shown of an oval or elliptic form in the drawings; but it may be circular or of any form, which variation will depend principally on the manner in which the key is constructed, as will be hereinafter more fully explained.

L is a revolving slotted post turning on bearings in the plates A A' of the lock-case, and having a deep nick or slot corresponding in width with the thickness of the key, which, it may be here remarked, is made of sheet or thin plate metal. This revolving post extends from one plate of the lock-case, through the openings in the tumblers, to the other plate, and is oval in its cross-section, having its greatest diameter a little less than the shorter width of the openings through the tumblers.

The central openings through the tumblers are to be dressed so as to vary in their forms one from another, and it is to this variation and a corresponding difference in the wards of the key, coupled with the narrowness of the key-hole, that the difficulty of picking the lock



is due. The variation, however, is very slight, and may be effected by simply dressing with a file after the tumblers are struck from the die.

In the drawings the key, Fig. 4, is shown as having its longest ward *h* at the end, the other wards diminishing by any assumed constant or variable difference on alternate sides of the key toward the shank of the handle.

Opposite each ward—that is, on the opposite edge of the key—is a recess, *d' e' f' g' h'*, so deep that the width of metal between it and its corresponding ward is a little less than the shorter width of the opening in the tumbler corresponding with and operated by any particular ward of the key, so that the key will not jam in the openings of the tumblers as it pushes them to one side or the other in its revolution, which must be only so far as to bring the space between the hooks on each tumbler opposite to the catch, so that this last shall be free to pass out from between them.

In the plate *A'* is a slot, *i*, extending in opposite directions from the head of the post *L*, of the same width as the slot in the stump, to a distance in each direction nearly equal to the greatest extent of the opening through the tumblers. In Fig. 2 this slot *i* is shown as interrupted by a quarter-revolution of the revolving stump *L* in its bearings, the slot in which is now at right angles with the slot or key-hole *i*, as it will be after the key has been inserted and turned to operate the tumblers, that the catch *C* may be free from the hooks of the tumblers, when the key may be still continued in its revolution until the slot *i* and the slot in the stump *L* are in line, when the key may be drawn.

It will be evident that if the catch *C* be not lifted out of the lock when disengaged from the hooks the continued motion of the key will permit the springs *K* to force the hooks of the tumblers to renew their hold upon the catch *C*.

Fig. 2 also shows that a pick introduced into the key-hole would have a very limited field of action, while the tumblers that are farthest from the key-hole would be completely protected from its action by the triangular base of the slot in the stump *L*. (Seen in the section Fig. 3.)

As the hooks on the heads of the tumblers catch alternately on both and opposite sides of the catch *C* at the same time, it will be seen that the narrow space of the key-hole, especially when partially closed, as in Fig. 2, which would happen by the turning of the pick, must

effectually bar any action against any two opposite tumblers—that is, that take hold on opposite sides of the catch, and would render it an impossibility to operate on more than two tumblers at the same time. If the pick should be successful in accomplishing the movement of only one tumbler, it would be likely to disengage it from the catch on one side only to cause it to take hold on the other, and, being out of sight, the operator could not tell whether a particular tumbler was disengaged or not, there being no noise or clicking that could guide the operator. The extreme narrowness of the key-hole and the interruption of its length by the partial revolution of the stump, moreover, prevents the introduction of more than one pick to operate in opposite directions, as one would interfere with and displace the other.

The key may be constructed with the different lengths of wards arranged in any manner, and, of course, the center openings of the tumblers must be adjusted accordingly. When the key is so constructed that the shorter wards enter the lock first and then gradually increase in length toward the shank, the openings in the tumblers may be circular, the largest in diameter being next to the key-hole. The shank of the key, of course, will be narrow enough to turn in the circular opening in the plate *A*, which forms the bearing for the head of the stump *L*.

An advantage of my mode of constructing locks and arranging the parts thereof is derived from the ease with which the tumblers are operated by the key, comparatively but little wear of the parts taking place, owing to the application of the small force required near the hooks of the tumblers and in a nearly direct line between the center of vibration *I* and the points of their effect on the catch *C*.

Instead of a double-headed catch, *C*, a plain stump or pin attached to a bolt may be taken hold of by the hooks of the tumblers when my lock is adapted for use upon a door or gate.

Having thus fully described my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

The combination of the doubly-hooked tumblers *D E F G*, key, and rotating slotted post *L*, when constructed, arranged, and operating as and for the purposes set forth.

W. W. HARDER.

Witnesses:

OCTAVIUS KNIGHT,  
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