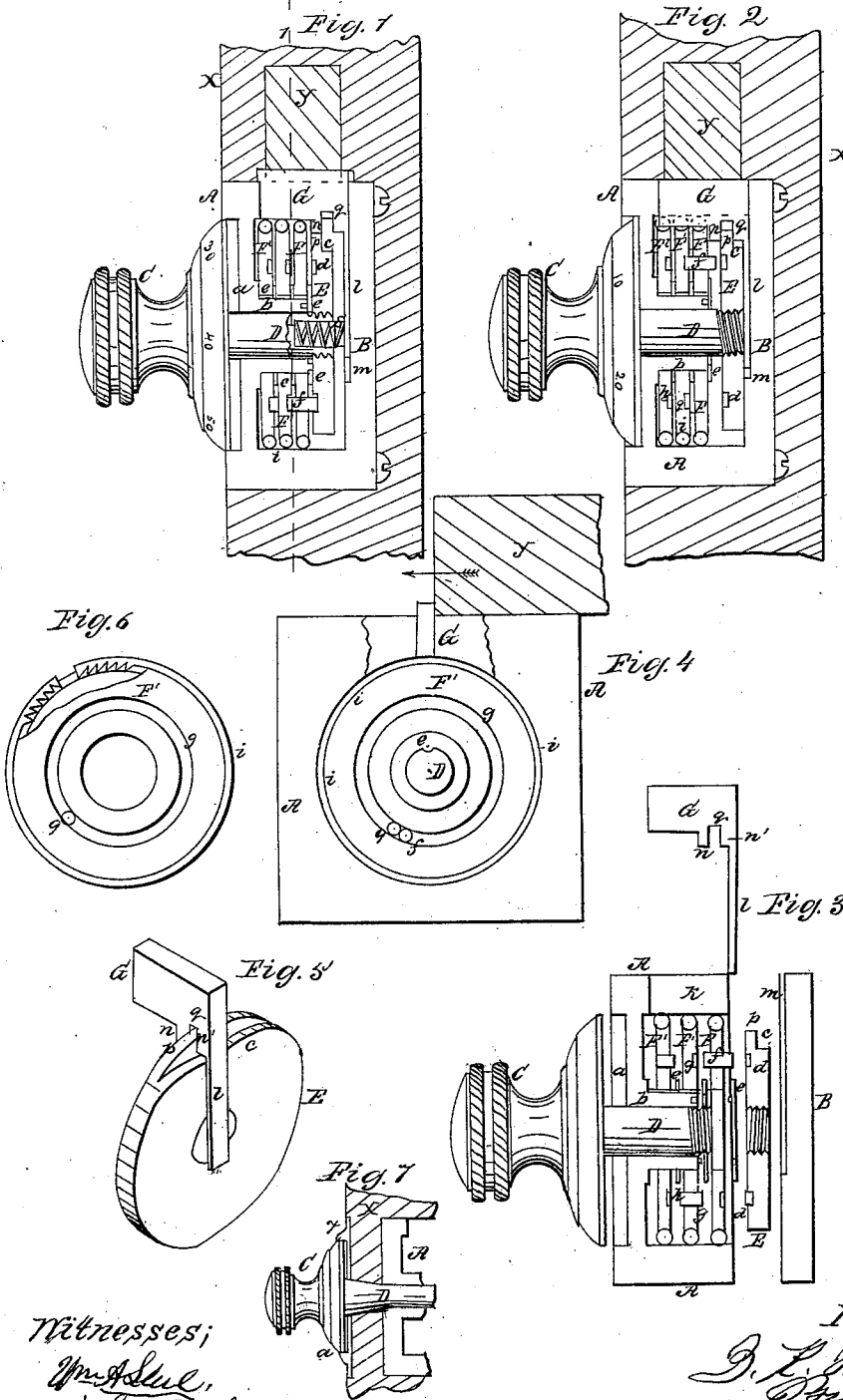


D. K. Miller,

Permutation Lock.

N^o 78,310.

Patented May 26, 1868.



Witnesses;
Wm. A. Lee,
John Parker

Inventor;
D. K. Miller
By J. H. Johnson

United States Patent Office.

D. K. MILLER, OF READING, PENNSYLVANIA.

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IMPROVEMENT IN PERMUTATION-LOCKS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, D. K. MILLER, of Reading, Berks county, Pennsylvania, have invented an Improved Permutation-Lock; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention consists of a cheap, simple, and secure permutation-lock, constructed and operating in the peculiar manner fully described hereafter, the lock being not only applicable to safes, but, owing to its cheapness, is an economical substitute for the less secure drawer and cupboard-locks, of ordinary construction.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation, reference being had to the accompanying drawing, which forms a part of this specification, and in which—

Figure 1 is a sectional view of my improved permutation-lock.

Figure 2 the same, showing the parts in a different position.

Figure 3, a sectional view, showing the several parts of the lock detached or partly detached from each other.

Figure 4, a transverse section, on the line 1-2, fig. 1.

Figure 5, a perspective view of a portion of the lock.

Figure 6, a detached view of part of the same; and

Figure 7, a modification of my invention, drawn to a reduced scale.

Similar letters refer to similar parts throughout the several views.

To the rear of the case A of the lock is secured a plate, B, the front of the case being recessed, as shown at *a*, for the reception of part of the knob C, to which the lock-spindle D is secured, the latter passing through, and being arranged to slide longitudinally to a limited extent in the tubular projection *b* of the case, and being maintained in the position shown in fig. 1, by a spring, *s*, bearing against its inner end.

To the inner end of the spindle D is screwed a disk, E, a portion of one edge of which is cut away, as shown in fig. 5, so as to form a shoulder, *c*, and projection *p*, for a purpose described hereafter, and in the front face of the said disk is a circular groove, *d*, from which projects a pin, *d'*, fig. 3.

Three disks F, F¹, and F², are arranged to turn loosely upon the projection *b*, a stationary washer, *e*, intervening between the adjacent disks, and between the disks F and E, so that the latter or any one of the disks may be turned independently of the others.

A pin, *f*, which extends through, and projects on each side of the disk F, enters the groove *d* of the plate E, the opposite end of the pin entering a similar groove, *g*, in the disk F¹, the latter having a pin, *g'*, one end of which fits in a groove, *h*, in the disk F², which has also a pin.

On the edge of each of the disks F, F¹, and F², is formed a groove for the reception of a split ring, *i*, of stout round wire, or of other suitable material, the latter being arranged to gripe the disks tightly, but so that a space, *j*, (fig. 6,) intervenes between the opposite ends of the said ring.

I prefer to make this ring *i* of steel wire, or of some material harder than the disks to which it is fitted, and its opposite ends are serrated, as shown in fig. 6, so that the said ring shall gripe the disk, and turn upon the same.

In the upper portion of the lock-case A, and directly over the disks, is an opening, *k*, for the reception of a tumbler, G, which has on its under side two projections *n* *n'*, a recess, *q*, and a tongue, *l*, the latter fitting into the recess *m* of the cap-plate B, for the purpose of guiding the said tumbler.

When the several parts of the lock are in the position shown in figs. 1 and 4, the projection *n* of this tumbler rests upon the portion *p* of the disk E, and the upper end of the tumbler projects above the lock-case. When, however, the several parts of the lock have been moved to the position shown in fig. 2, the tumbler enters the space *j*, between the opposite ends of each of the split rings *i*, and the projection *p* of the disk E enters the recess *q* of the tumbler, so that the latter falls until its upper end is flush with the upper surface of the lock-case, (see figs. 2 and 5.)

The red lines X, figs. 1 and 2, represent a portion of the door of a safe in which the lock-case A is secured;

a bolt, Y, being arranged to slide within the said door, and upon the upper portion of the lock-case, as shown in fig. 4.

This bolt is operated by any ordinary mechanism, but cannot be drawn back when locked, until the tumbler G, against which its rear end bears, is depressed, as clearly shown in fig. 4, and the tumbler can only be depressed when the several parts of the lock are brought to the position shown in fig. 2, which is done by operating the handle C in the following manner:

The spring s, (fig. 1,) has a tendency to force the handle back, as shown, and to bring the disk E in close proximity to the disk F. The handle is turned in either direction, until the pin *d'* of the disk E, strikes the pin *f* of the disk F, the latter then revolving with the disk E. The handle C is still turned in the same direction, until all of the disks F, F¹, and F², are caused to revolve, and the motion of the handle is continued until the space *j* of the third disk F² has been brought directly beneath the opening *k* of the lock-case, as shown in fig. 2, and which is indicated to the operator by a determined number on the handle C coming opposite to a fixed point in front of the lock.

The motion of the handle is then reversed, and the disks E, F, and F¹, are turned in the opposite direction, until the space *j* of the latter disk has also been brought beneath the opening *k*, and in line with the space *j* of the disk F², which is in like manner indicated to the operator by one of the numbers on the handle coming opposite to a certain fixed point.

The motion of the handle is again reversed, and the disk F is turned until its space *j* is in the same position, in respect to the opening *k*, as the spaces *j* of the former disks.

All that now remains to be done is to push the handle C inwards, and then to turn it in either direction, until the projection *p* and shoulder *c* of the plate E are directly beneath the tumbler, when the latter will fall into the spaces *j* of the disks, the projection *p* will enter the recess *q* of the tumbler, and the projection *n* of the latter pass to one side of the plate E, as clearly shown in figs. 2 and 5.

After thus removing the obstructing tumbler, the bolt Y of the safe may be drawn back.

When the parts are in the position shown in fig. 1, the projection *n* of the tumbler resting on the portion *p* of the disk E, prevents the said tumbler from descending to such a point as to interfere with the free movements of the disks F, so that it will be impossible for a person unacquainted with the proper numbers to determine the positions of the recesses *j* of the said disks; thus the picking of the lock is effectually prevented.

When the parts are in the position shown in fig. 2, the spring *s* is compressed, and the disk E cannot be moved toward the disks F, in order to operate them, until the tumbler is raised and its projection *n* removed from the path of the said disk E.

When the safe is bolted, and it is desired to elevate the tumbler to its position behind the bolt, the handle must be turned in either direction, until the tumbler is raised clear of the disks F, by the cam-like shoulder *c* of the disk E, (fig. 5.) The projection *n* of the tumbler is thus raised from contact with the side of the disk E, so that the latter and the handle are free to move, and may be turned in any direction until the disks are caused to revolve, after which it will be impossible for the tumbler to again descend until the disks have been carefully turned, as before described.

The modification shown in fig. 7 shows a simple method of applying my improved lock to a door. In this instance, the lock-case is enclosed entirely within the door, the lock-spindle being lengthened so as to extend through the front portion of the door, and on the latter is secured a ring or flanged plate, *x*, in which is formed the recess *d* for the reception of part of the knob, and on which is marked the fixed point to which the numbers are to be turned.

The size or form of the tumbler G may be modified, if necessary, without departing from my invention, and the number of the disks F may be increased or diminished, if desired.

The above lock can be applied not only to safe-doors, but can be used for any purpose to which ordinary locks are applied, and it is especially applicable as a drawer-lock, the tumbler G being in the latter case used independently as a bolt, and in some cases the tumbler, especially when used horizontally, may be actuated by a spring.

The lock is simple in its details, is not liable to get out of order, and can only be operated by a person perfectly acquainted with the number or series of numbers that form a key to the positions of the disks, and this number or combination of numbers may readily be changed from time to time, by properly adjusting the rings *i* of the several disks so as to bring their spaces *j* to other positions in respect to the pins by which the disks are turned.

I do not claim broadly the notched disks F in combination with a plate, adapted to the notches in the disk, and so operated and arranged as to retain and release a bolt; neither do I claim broadly a split ring, arranged upon the edge of a disk F; but

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

1. The disk E with its projection *p* and shoulder *c*, and secured to a shaft, D, in combination with disks F, or their equivalents, and with a tumbler, G, having a recess and a projection adapted to the projection and recess of the disk E, the whole being constructed and arranged within a casing, A, and operating substantially as and for the purpose described.

2. The serrations or teeth upon the ends of the split ring *i*, for the purpose described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

D. K. MILLER.

Witnesses:

JOHN WHITE,
C. B. PRICE.