S. MILLER.

Permutation Locks.

No. 145,223. Patented Dec. 2, 1873.

Fig. 1.

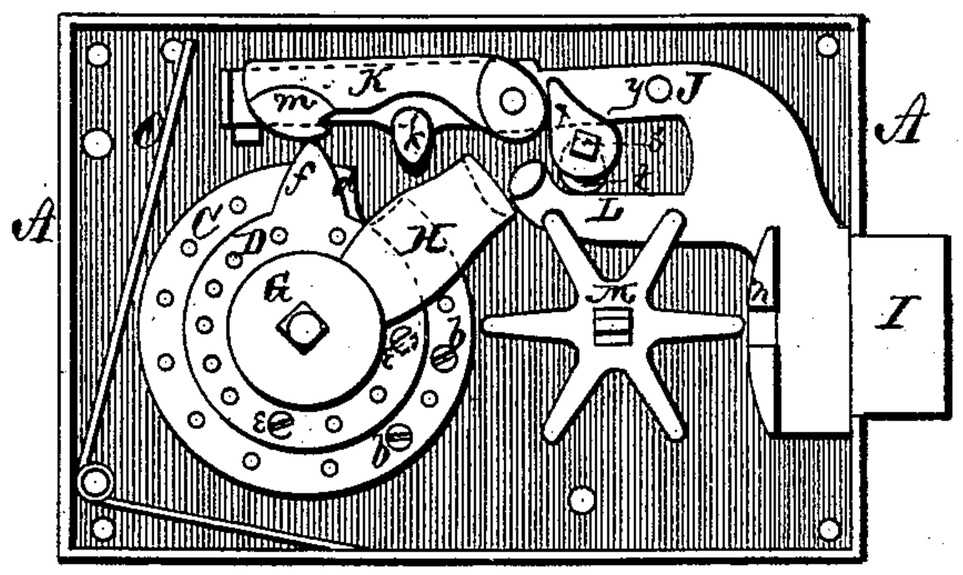


Fig. 3.

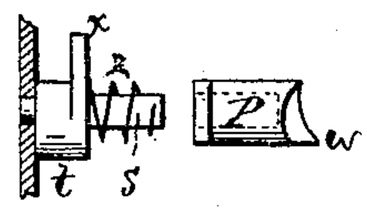


Fig. 4.

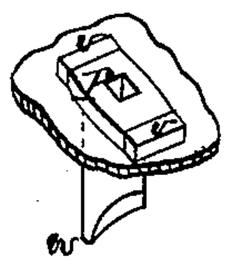
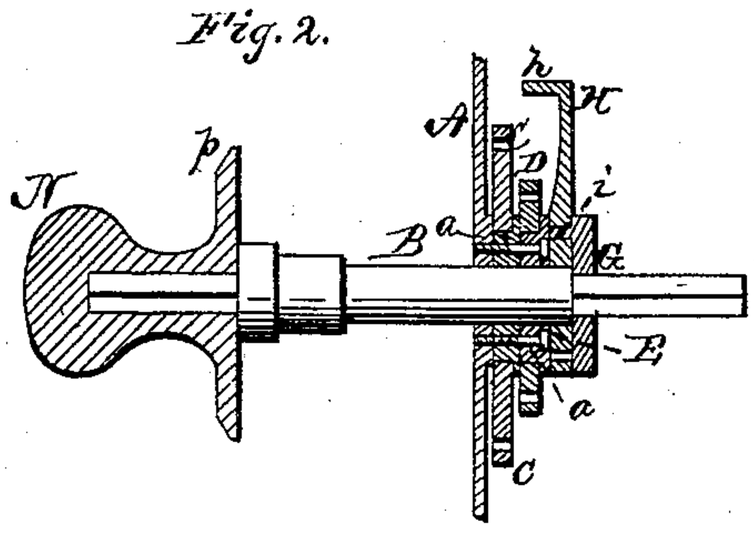


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

SAMUEL MILLER, OF GRATIS, OHIO.

IMPROVEMENT IN PERMUTATION-LOCKS.

Specification forming part of Letters Patent No. **145,223**, dated December 2, 1873; application filed April 26, 1873.

To all whom it may concern:

Be it known that I, SAMUEL MILLER, of Gratis, in the county of Preble, and in the State of Ohio, have invented certain new and useful Improvements in Permutation-Locks; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists, first, in the construction and arrangement of the tumblers of the lock; second, in the combination of the tumblers, as constructed, and a notched projection on a bar pivoted to the lock-bolt arm; third, in the combination of an arm, extending from a disk upon the lock-spindle, a spoke-wheel, and a slotted flange on the bolt; fourth, in the construction and arrangement of the lock-bolt; and, fifth, in the combination, with the lock-bolt arm, of a device for transforming the lock into a common latch, and vice versa, all of which will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is an interior view of the lock. Fig. 2 is a section of the devices on the knob-spindle, and Figs. 3 and 4 show a device for converting the lock into a simple latch.

A represents the lock-case, through which passes the knob-spindle B. *a a* represent two flanged collars, placed on the spindle B, and secured to the inside of the lock-case, as shown in Fig. 2. On these collars are placed the tumblers C and D, the flanges on the collars preventing said tumblers from rubbing against each other, and from coming off. The tumblers C and D are both circular in form, and both provided with a number of holes, in circular form, at equal or unequal distances apart. The tumbler C, next to the case, is larger in diameter than the next tumbler D, so as to expose the holes. In two of the holes in the tumbler C are inserted pins *b b*, and on one side, in the edge of the tumbler, is made a deep notch or recess, *d*. In two of the holes in the tumbler D are inserted pins *e e*, and from one side of said tumbler projects a tooth, *f*. A disk, E, is placed on the outside of the tumbler D on the spindle. This disk E is also perforated, and fastened by means of a pin, *i*, projecting from a disk, G, secured by a nut or other suitable means on the spindle. By changing one or more of the pins *b* and *e*, and the position of the pin *i* in the disk E, the combination for opening the lock is changed. From one side of the disk E extends an arm, H, which is cut out on its under side, as shown in Fig. 2, and a flange, *h*, extending at right angles at its outer end. I represents the lock-bolt, provided with an arm, J, which is curved upward, and extends backward over the tumblers, and has a tooth, *k*, extending downward from its under side. To the arm J is pivoted a bar, K, which is, at its rear end, provided with a curved projection, *m*, notched on its front side, as shown in Fig. 1. L represents a shorter arm extending from the bolt below the arm J, and is to be used only in locking the lock. On the back of the lock-bolt I is a slotted flange, *n*, and between this flange and the tumblers is placed a spoke-wheel, M. On the outer end of the spindle B is secured the knob N, provided with a flange or disk, *p*, having any desired numbers upon it.

The lock being locked, to unlock the same the door-knob N is turned to the left until a certain number, 11, on the dial *p* comes opposite the indicating-mark on the door. By this movement of the knob and spindle, the arm H on the disk E comes in contact with one of the pins *e* in the tumbler D, turning the same, and the tooth *f* on said tumbler comes in contact with one of the pins *b* in the tumbler C, and turns said tumbler until, when the number 11 is opposite the indicating-mark, the notch *d* in the tumbler C will be in proper position to receive the projection *k* on the arm J. During all the preliminary movements of the knob and spindle, the flange *h* on the arm H passes over the projection *m* on the pivoted bar K. The knob is now turned to the right until a certain number, $9\frac{3}{4}$, comes opposite the indicating-mark, when the arm H will turn and set the wheel M, so that one of its spokes will be directly on a line with the slot in the flange *n* on the lock-bolt. The knob is then turned to the left again until a certain number, $7\frac{1}{2}$, is opposite the indi-

cating-mark. In this movement the arm H, by coming in contact with one of the pins *e*, turns the tumbler D until the tooth *f* on the tumbler comes in contact with the projection *m* on the bar K, raising the same, and sustaining it in that position, as shown in Fig. 1. By now turning the knob N again to the right, the flange *h* on the arm H will strike in the notch on said projection, and move the bolt inward, the projection *k* entering the notch *d*, and the slot in the flange *n* passing over one of the spokes in the wheel M. By turning the knob to the left, the arm H strikes the arm L, and moves the bolt outward again.

Between the arms J and L is placed a short shaft, *s*, upon which is formed or attached an eccentric, *t*, which, when turned upward, raises the whole bolt, so that the flange *h* on the arm H will come in the notch on the projection *m*, and move the bolt inward without using the combination. When the arm J is thus raised by the eccentric, and moved inward, its inner end comes against a spring, O, to force the bolt outward again, thus making a latch only of the lock. When it is used as a lock, the inner end of the arm J passes under the spring O, and does not come in contact with the same. On the shaft *s* is a finger or tooth, *x*, to operate against a pin, *y*, on the arm J, in the following manner: If the bolt is drawn back, and it is desired in this position to change it to a latch, the finger *x* will first strike the pin *y*, and move the bolt outward before the eccentric *t* will raise the arm J, as said arm could not be raised while its inner end is under the spring O. The end of the shaft *s* is square, and has a spiral spring, *z*, surrounding it. Over this end of the shaft fits a square-headed key, P, arranged in the inner plate of the lock-case between two guides, *v v*, as shown in Fig. 4, so that the shaft *s* cannot be turned without first pressing the key P inward, and said key will, so to say, be locked in the desired position by the spring forcing the head between the guides *v v*. On the end of the key P is a finger or point, *w*, as shown, whereby the position of the eccentric may be known.

The inner plate of the lock-case I propose to make in two parts, so that one part only need be removed when it is desired to change the combination.

I do not confine myself to any specific number of tumblers, as any desired number may be used, all arranged substantially in the same manner as described above.

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

1. The combination of the perforated tumbler C with pins *b b* and notch *d*, the perforated tumbler D with pins *e e* and tooth *f*, the perforated disk E with arm H, and washer G with pin *i*, all constructed and arranged substantially as and for the purposes herein set forth.

2. The combination of the tumbler D, disk E, tooth *f*, and arm H with the notched projection *m* on the bar K, pivoted to the arm J, substantially as and for the purposes herein set forth.

3. The combination of the arm H on the disk E, the spoke-wheel M, and the slotted flange *n* on the bolt, substantially as and for the purposes herein set forth.

4. The combination of the bolt I, slotted flange *n*, arms J L, projection *k*, and the pivoted bar K with notched projection *m*, all constructed as described, and operating in connection with suitable tumblers, substantially as and for the purposes herein set forth.

5. The combination, with the lock-bolt arm J, having pin *y*, and the spring O, of the shaft *s*, eccentric *t*, finger *x*, spring *z*, and key P, all constructed and arranged substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 25th day of April, 1873.

SAMUEL MILLER.

Witnesses:

A. N. MARR,

C. L. EVERT.