

D.K Miller—Improved Permutation Lock.

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PATENTED JUL 4 1871

Fig. 1.

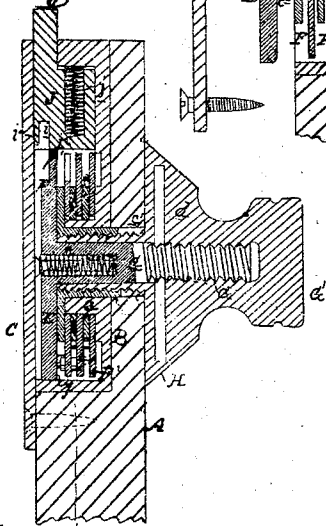


Fig. 3.

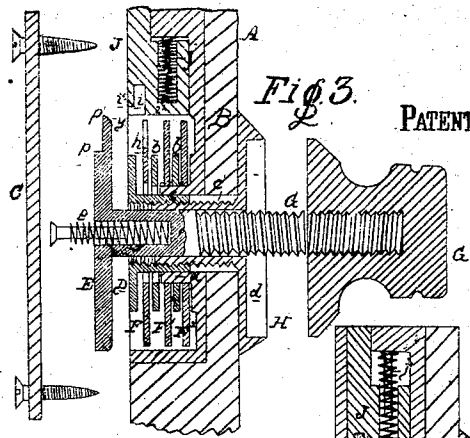


Fig. 2.

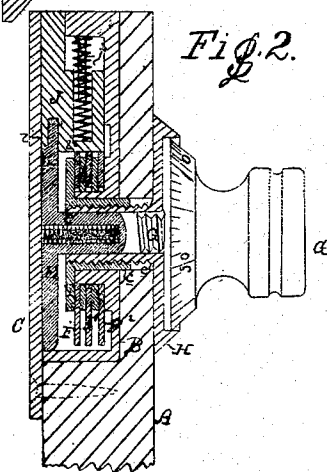


Fig. 4.

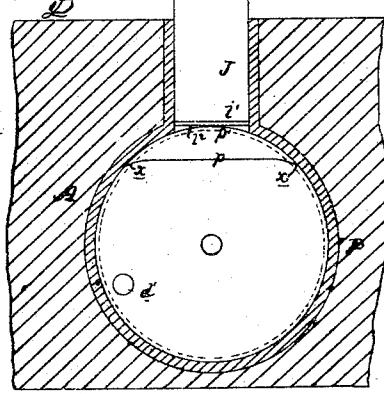


Fig. 5.

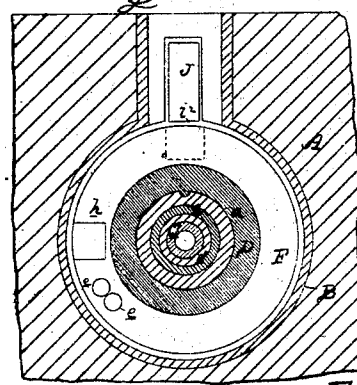


Fig. 6.

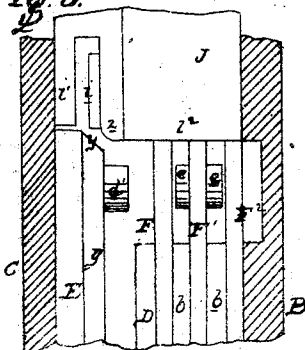


Fig. 7.

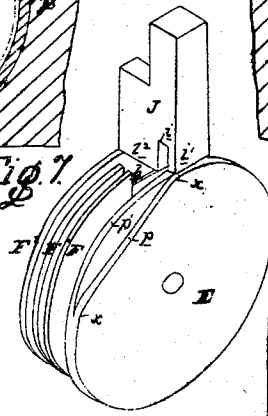
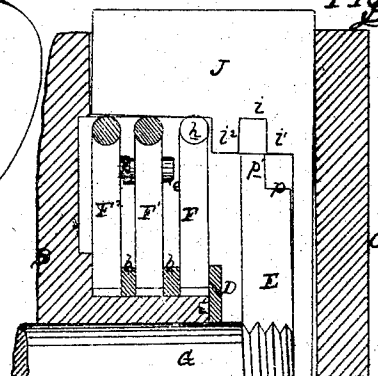


Fig. 8.



Witnesses { *W. A. Stal*
Geo. B. Harding.

D. K. Miller
Permutation Lock
Pat. July 4, 1871

UNITED STATES PATENT OFFICE.

D. K. MILLER, OF READING, PENNSYLVANIA.

IMPROVEMENT IN PERMUTATION LOCKS.

Specification forming part of Letters Patent No. 116,737, dated July 4, 1871; antedated June 23, 1871.

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 certain improvements, fully described hereafter, in the permutation lock for which Letters Patent were granted to me on the 26th day of May, A. D. 1868.

In order to enable others skilled in the art to make and apply 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; Fig. 2, the same with the parts in a different position; Fig. 3, a sectional view showing the several parts of the lock detached from each other; Fig. 4, a view of the rear side of the lock with the cover-plate removed; Fig. 5, a transverse section on the line 1 2, Fig. 1; Fig. 6, an enlarged sectional view of part of the lock; Fig. 7, a detached perspective view; and Fig. 8, a sectional view of the lock before mentioned, for which Letters Patent have been granted to me.

Similar letters refer to like parts throughout the several views.

A represents a portion of the front of a drawer, into a recess in the rear of which the case B of the lock is received, the latter being, in the present instance, secured to the said drawer by screws passing through the cover-plate C. Within the lock-case there is a tubular projection, *a*, upon which the permutation disks F, F¹, and F² are arranged to freely turn, the usual stationary washers *b* intervening between each of the said disks, so that any one of them may be turned independently of the other. The disks F are retained upon the projection *a* by a plate, D, which has a hollow stem, *c*, passing through the said projection; and the recessed plate H, which is attached to the outside of the drawer, has also a hollow-threaded stem, *c'*, which is screwed into the stem *c*, this method of connection serving to firmly secure both the plates D and H in their proper relative positions. The recess *d* of the plate H is for the reception of part of the knob G', which is screwed onto the outer end of the

lock-spindle G, the latter passing through and being arranged to slide longitudinally, to a limited extent, in the hollow stem *c'*, and being maintained in the position shown in Fig. 1 by a spring, *e*, attached to its inner end and bearing against the cover-plate C. The driving-disk E forms a part of, or is suitably secured to, the inner end of the spindle G, a portion of one edge of the said disk being cut away, as shown in Fig. 7, so as to form a shoulder, *p*, and projection *p'*, for a purpose described hereafter; and on the front face of the said disk is a projecting pin, *d'*, Fig. 6, similar pins *e* projecting from the permutation disks F, so that they may be turned by means of the said disks E, in the manner fully described in my former patent of May 26, 1868, and well understood by those familiar with locks of this class. A portion of the edge of each of the disks F is cut away so as to form a recess, *h*, and in the lock-case directly above these disks and above the driver E is an opening for the reception of a tumbler or bolt, J, which, in the present instance, is acted on by a spring, *j*, having a tendency to depress it. On that portion of the lower edge of the tumbler which is directly above the driver E, in Figs. 2 and 6, is formed a recess, *i*, and a tongue, *i'*, the latter being somewhat shorter than the edge *i''* of the tumbler, so that when this edge rests upon the disk F, as seen in Fig. 6, the said tongue shall be free from contact with the edge of the driver, the object of which arrangement will be fully described hereafter.

When the several parts of the above-described lock are in the position shown in Fig. 1 the edge *i''* of the tumbler rests upon the driver E, but does not touch the disks F, and the upper end of the said tumbler projects above the lock-case and edge of the drawer A. When, however, the several parts have been moved to the position shown in Fig. 2, the edge *i''* of the tumbler enters the recesses *h* of the permutation disks, and the projection *p'* of the device enters the recess *i* of the tumbler, so that the latter is permitted to fall until its upper end, which constitutes the bolt, is flush with the upper surface of the lock-case.

In order to bring the several parts to the position shown in Fig. 2, so that the driver may be unlocked, the knob G' is operated in the following manner: The spring E, Fig. 1, has a tend-

ency to force the knob outward from its recess d , as shown, and to bring the driver E into close proximity to the disk F , so that when the knob is turned the pin d' of the driver shall strike the pin e of the disk F and cause the latter to revolve, as fully described in my aforesaid patent of May 26, 1868; and the motion is continued until the remaining disks are turned, and until the recess h of the disk F^2 has been brought to a position directly beneath the tumbler J , which is indicated to the operator by a determined number on the knob coming opposite to a fixed point on the plate H . The motion of the handle is then reversed and the operation continued until the recesses of the disks F and F^1 have also been brought to their proper positions beneath the tumbler; after which the knob is pushed inward and then turned in either direction until the shoulder and projection p and p' of the driver are directly beneath the tumbler, when the portion i^2 of the latter will fall into the recesses h of the disks, the projection p' will enter the recesses i of the tumbler, and the tongue i^1 of the latter will pass to one side of the said projection p' , as clearly shown in Fig. 2.

It will be seen from the above that the method of operating my improved locks is the same as in the lock for which Letters Patent have been granted to me; but the objection to the latter, (which is shown in Fig. 8,) and indeed to most locks of this class, is that it is possible, by a skillful manipulation of the knob, to obtain such indications from the interior of the lock as to enable a person to ascertain the numbers which form a key to the positions of the disks.

In Fig. 8 the same letters indicate parts corresponding to those already described in my improved lock, and I will now proceed to describe from this figure the manner in which the lock can be picked by a person unacquainted with the proper numbers. All of the disks F , F^1 , and F^2 can be turned by means of the driver E ; and the first point to be determined is the number indicating that the recess h of the rear disk F is uppermost. This is ascertained by pushing in the driver E , as seen in Fig. 8, and turning it until its projection p is beneath the recess i of the tumbler, when, if the recess h of the disk is uppermost, the tumbler will fall or tilt slightly, as shown in Fig. 8, so that its corners i^1 shall be struck by one of the corners x of the cam-like shoulder p on the revolution of the driver. This striking of the tongue i^1 by the shoulder x will produce a sharp click, or offer sufficient resistance to the turning of the knob to indicate to the operator that the tumbler has fallen slightly, and that, consequently, the recess of the first disk is uppermost. From this the first number is determined, the remaining numbers being similarly ascertained until all have been found and the lock opened.

In my improved lock the driver E has a beveled edge, y , on the side adjacent to the disks F , and the tongue i^1 of the tumbler is considerably shortened, so that when the driver is pushed forward, as seen in Fig. 6, the said tongue shall be

free from contact with the same. It will also be observed that the driver E is somewhat larger in diameter than the disks; but this is not essential, as its diameter might be less than that of the disks, providing the form of the tumbler was modified accordingly, as in my former lock, Fig. 8. In Fig. 1 the tumbler rests upon the edge of the driver; but when the latter is pushed inward, as shown in Fig. 6, the tumbler falls until it rests upon the disks. When in this latter position, even if two of the recesses h were uppermost, as shown in Fig. 7, so as to permit the tumbler to fall slightly, the tongue i^1 , being shortened, could not touch the driver, and no indication would be given to the operator as to the positions of the disks. When the driver is drawn toward the disks its beveled edge y will elevate the tumbler to its position in Fig. 1, so that the disks may be freely turned without interference by the tumbler and without indicating the positions of their recesses h .

It will be seen that by this arrangement the tumbler is raised by two operations, one by the driving-cam and the other by the longitudinal movement of the spindle, the tumbler being thus raised out of contact with the cam, in which position it is maintained by the disks on which it rests, so that, should one or more of the disks be turned so as to permit the tumbler to tilt, it will not strike the driver and give any indication of its position. It is not essential, however, that the driver should be beveled at y , as the tumbler itself might be beveled at the point z , (Fig. 6;) or the beveling might be dispensed with and the said tumbler elevated by some other means dependent upon a longitudinal movement of the driver.

By slightly turning the knob upon its spindle and thus altering the position of the said knob with respect to the driver, I am enabled to quickly change the entire combination of numbers by which the lock is opened. The combination of numbers can also be altered by reversing or changing the positions of one or more of the disks.

Although I have described my invention as attached to a drawer, it is equally applicable to the doors of cupboards, &c., or may be used for burglar-proof safes, as fully described in my former application, upon which

I claim as improvements and desire to secure by Letters Patent—

The tumbler J , driving-disk E , its spindle and disks F , all constructed and operating together, substantially as described, so that the tumbler is partly elevated in notches in the disk F by the rotation of the disk E , and is further elevated above the said disks on the longitudinal movement of the spindle, 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:

WM. A. STEEL,
HARRY SMITH,