

W. Hall.

Permutation Lock.

N^o 90,096.

Patented May 18, 1869.

Fig. 1.

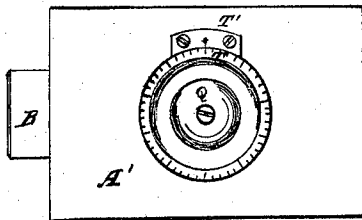


Fig. 2.

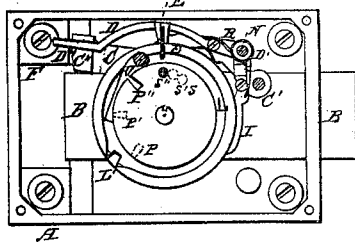


Fig. 3.

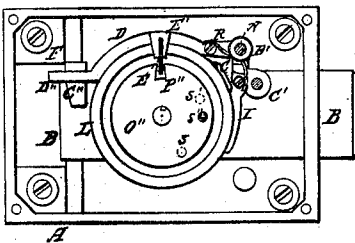


Fig. 4. Section

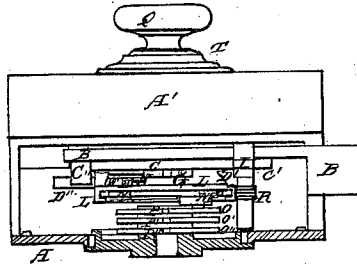


Fig. 5.

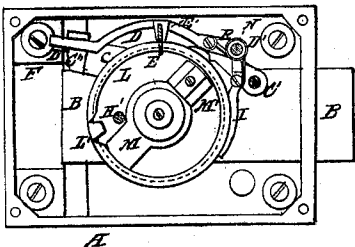
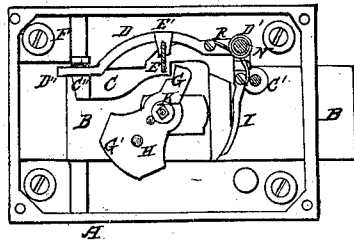


Fig. 6.



Witnesses:

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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, WILLIAM HALL, of Boston, in the county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in the Construction of Dial-Locks; and I do hereby declare the following to be so full and exact a description as to enable those skilled in the art to make and use my invention.

As the nature of my invention consists in the peculiar arrangement and construction of parts, it can only be understood by examination of the specification and drawings.

Drawings.

Figure 1 is an elevation of the front of the lock, showing the dial and knob.

Figure 2 is an elevation of the back of the lock, the plate removed, showing the lock as it appears when the bolt is thrown out, and the internal gear so thrown out of adjustment that the bolt cannot be drawn back until all the parts are readjusted, which readjustment can only be effected by a person who has the key-numbers.

Figure 3 shows in elevation, as before, the lock in adjustment.

Figure 4 is a horizontal section, showing the relative position of the parts.

Figure 5 is an elevation of the lock, showing the dog M, for operating the tumblers O O O', fig. 4.

Figure 6 shows, in elevation, the cam G' G, lever C, and latch D, the wheel L and dog M being removed.

In the drawings, A represents the casing of the lock attached to the door A', figs. 1 and 4.

Q, figs. 1 and 4, is the knob of the lock, to which is attached the spindle K, fig. 6, and the graduated disk T, fig. 1.

Permanently attached to the spindle K is the cam G' G, fig. 6, one end of which, G, operates as a tumbler, to send back and forth the bolt B.

As the cam G does not act directly upon the bolt itself, but upon the lever C, which is pivoted to the bolt, it follows that if the lever C, as seen in fig. 6, should be elevated, as shown in fig. 2, the cam G as it revolves would not come in contact with it, and therefore would not move the bolt.

If the end G', of the cam G' G, be swung around, so as to come in contact with the lever C, it will raise it up, as shown in fig. 5.

D D' is a latch, hung upon a pivot, N, affixed to the casing of the lock. The end D" of this latch passes through a slot or channel made in the end C" of the lever C, so that both latch and lever must necessarily move up and down together, yet the lever C is free to traverse longitudinally when the bolt B slides in or out.

F is a buttress, against which the end C', of the latch C, rests when elevated, as shown in fig. 2. As the lever C is attached to the bolt B, it will be seen that the

bolt can be pushed back only when the lever is down, as represented in fig. 3, for if the lever were up, the end C" would come in contact with the buttress F, figs. 2 and 5, and thus prevent the bolt from being sent back.

The wheel L, figs. 2, 3, 4, and 5, is attached loosely to the spindle K, but has a stud, H', figs. 4 and 5, extending toward the cam G, and so placed that it will come in contact with the stud H, in the cam G' G', so that the cam G cannot make a complete revolution without moving the wheel L.

This wheel L has a notch, L', in its periphery, into which the boss E', of the latch D, may drop, as represented in fig. 3.

I is a spring-brake, bearing on the wheel L.

M, figs. 4 and 5, is a dog, moving freely around the spindle K, but being so connected with the wheel L that it always moves it, though, by loosening the set-screw in M', fig. 5, it may be adjusted so as to bring the projection M' at any desired distance from the notch L'.

This projection M', shown in section in fig. 4, comes in contact with a projection, or pin S, figs. 2 and 3, on the tumbler O, fig. 4, and causes it to revolve.

Each of the tumblers O O O' is provided with a projecting pin, which, coming in contact with each other, causes the tumblers to revolve.

P P' P'', figs. 2 and 4, are notches cut into the tumblers O O O'. When these notches are opposite to each other, as represented in fig. 4, and occupy the position represented by P'', fig. 3, the projecting plate E, attached to the latch D, may drop into these notches, as shown in fig. 3, and thus to allow the lever C and latch D to fall, unless they are also held by the projection E', resting on the rim of the wheel L, as shown in fig. 5.

If the notch L', of the wheel L, is in conjunction with the three notches P P' P'', and all of them in the position represented in fig. 3, the projection E', of the latch D, will drop into the notch L', and thus allow both latches to fall, provided the end G', fig. 6, of the cam G, uncovers the notch L'.

U, fig. 2, represents spring-brakes, bearing upon the tumblers O O O', fig. 4.

T, figs. 1 and 4, is a graduated disk, attached to and revolving with the knob Q, the marks forming the divisions being numbered.

T' is a vernier plate, having a single mark.

From the above description, it will be seen that the bolt in my lock can only be thrown back when the lever C and latch D are down, which can happen only when the notches P P' P'', of the tumblers O O O', and the notch L', in the wheel L, are all in conjunction, and in the position represented in fig. 3; and further, when the end G', of the cam G' G, is not in a vertical position.

The operation and adjustment of my lock are as follows:

To throw back the bolt, the dog M being in the position shown in fig. 5, the lever C and latch D raised, and the notches P P' P" and L' out of conjunction, the knob Q is turned to the right, until the pins S S' S", fig. 2, are in contact with each other, causing the tumblers O O' O" to move together. When a certain division of the graduated disk, say 8 $\frac{3}{4}$, comes under the mark on the vernier plate T', which indicates when the notch P", of the tumbler O"; is under the projecting plate E, the knob Q is revolved to the left, until the division stopped at 8 $\frac{3}{4}$ has passed the mark on the vernier three times, and another number, say 23 $\frac{1}{4}$, is under the mark; this puts the notch P' under the plate E. The knob is now revolved to the right, and this second number (23 $\frac{1}{4}$) is made to pass the vernier mark twice, and until a third division, say 3 $\frac{1}{4}$, is under the mark on the vernier. The notches P P' P" are now in the position shown in fig. 4.

The notch L', in the wheel L, fig. 5, is now brought under the projection E', which is accomplished by turning the knob once more to the left, and causing the last division stopped at (3 $\frac{1}{4}$) to pass the vernier once, and until another division, 22 $\frac{1}{4}$, comes under it. Now all the notches are in conjunction, and by turning the knob again to the right, the end G', of the cam G' G, is moved from under the projection E', thus allowing the lever C and latch D to fall, and take the position shown in fig. 3. A further revolution of the knob causes the end G of the cam to act on the lever C, and through it to move the bolt B.

The dog M' M may be set in any desired position.

but such a change necessitates an entire change of numbers. These numbers may be found by inserting a pin, or "key," into the small hole in the back of the lock, but not shown in the drawing, opposite the notch P", fig. 3, and turning the knob Q alternately right and left, as above described, until the pin passes into the notches P P' P", noting what division of the graduated disk is under the mark on the vernier when the pin enters each notch, and the number of times the knob is revolved before the pin enters either notch.

When the notches P P' P" are in conjunction, the tumblers O O' O" are removed, by removing the back plate of the lock, to see when the notch L' is under the projection E', noting at the same time the number of turns of the knob Q, and the division of the graduated disk under the vernier, as before.

What I claim as my invention, is—

1. The combination of the adjustable dog M with the wheel L, substantially as described, and for the purpose set forth.

2. The combination of the cam G G' with the wheel L, sliding lever C C', and latch D D', all operating as described, and for the purpose set forth.

3. The combination of the lever C C' with the latch D D', arranged and operating substantially as described, and for the purpose set forth.

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Witnesses:

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