

L. H. Miller,

Permutation Lock.

N^o 21,689.

Patented Oct. 5, 1858.

Fig. 2.

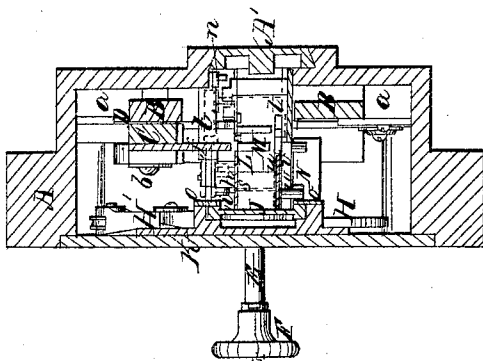


Fig. 4.

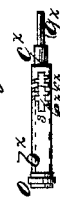


Fig. 5.

Fig. 1.

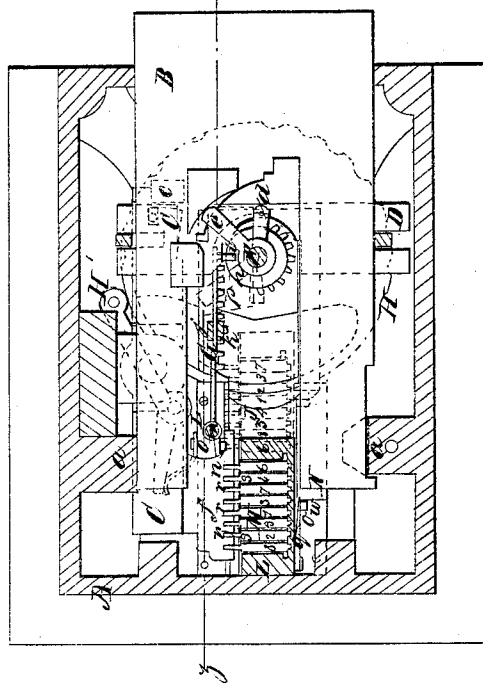
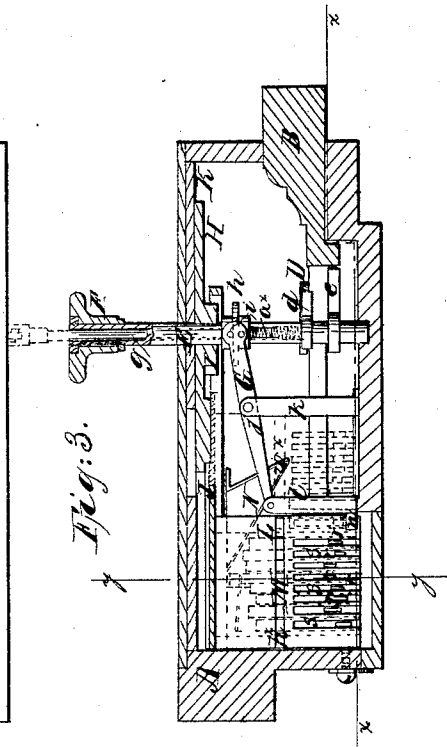


Fig. 3.



UNITED STATES PATENT OFFICE.

L. H. MILLER, OF PROVIDENCE, RHODE ISLAND.

BANK-LOCK.

Specification of Letters Patent No. 21,689, dated October 5, 1858.

To all whom it may concern:

Be it known that I, L. H. MILLER, of Providence, in the county of Providence and State of Rhode Island, have invented a new and Improved Burglar-Proof Lock; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a longitudinal vertical section of my invention taken in the line *x, x*, Fig. 3. Fig. 2, is a transverse section of the same taken in the line *y, y*, Fig. 3. Fig. 3, is a horizontal section of the same taken in the line 3, 3, Fig. 1. Figs. 4 and 5, are detached views of the key of the same.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in having a series of slotted tumblers placed within a sliding box which is connected with the bolt arbor and arranged in such relation with a bolt latch, that each tumbler requires to be adjusted separately in order to allow the bolt latch to release the bolt and enable the latter to be thrown back and the lock unlocked.

The object of the invention is to prevent the lock being picked by obtaining a knowledge of the position of the tumblers by the pressure of the bolt latch upon them, and also to prevent a person ignorant of the position of the tumblers from opening the lock even with the proper key.

To enable those skilled in the art to fully understand and construct my invention I will proceed to describe it.

A, represents the case of the lock, which may not differ essentially from these ordinarily made. B, is the bolt placed therein and allowed to slide freely between proper guides or stumps *a*.

C, is a latch which is simply a bar pivoted within the case as shown at *b*, and catching against a projection *c*, on the bolt when the latter is shoved forward and the lock in a locked state, see dotted lines Fig. 1.

D, is a slide which is connected to the front end of the latch C, and through the medium of which slide the latch is actuated from the arbor E, said slide having a recess or notch in which a dog *d*, on the arbor E, works. The arbor also has a dog *e*, on it which actuates the bolt B, the two dogs being placed on the arbor in such relation to each other as to act successively or, so that

the dog *e*, may shove back the bolt as soon as the dog *d*, lifts the slide D, and the latter raises the front end of the latch C. This will be clearly understood by referring to Fig. 1. The back end of the latch C, has a plate *f*, projecting down from it, the use of which will be presently explained.

The arbor E, of the lock has a hand knob E, on its outer end, and the arbor is hollow having a rod *g*, fitted within it and against which rod a disk *h*, bears, the disk has a spiral spring *a**, bearing against it and is allowed to slide freely on the arbor. The disk *h*, is connected by a fork *i*, with a lever G, the fulcrum *j*, of which is at the end of a rod *k*, within the case and the lever G, is pivoted to a tube *l*, which is fitted and allowed to slide freely on a rod or guide *m*, within the case. To the tube *l*, a bit or projection *n*, is attached, the use of which will be presently shown.

On the arbor E, a circular disk H, is placed and also a part pinion I, or a pinion having a portion of its periphery smooth.

J, is a plate which is fitted between guides *o, o*, on a plate K, within the case A. This plate has a box L, attached to it near one end, and the remaining part of the plate is cut out or slotted to receive the part pinion I, the toothed portion of which engages with a rack *p*, on the upper part of the slotted portion of the plate J, see Fig. 1.

In the box L, a series of slotted tumblers M, are placed. Eight tumblers are shown in the drawing Fig. 3, but more or less may be used. The tumblers are fitted in grooves *q*, in the bottom of the box L, and projections *r*, on the upper edges of the tumblers fit between the horizontal guide bars *s*, which form the front part of the top of the box L, the projections extending above the bars *s*, see Fig. 1. The lower edges of the tumblers have each a portion cut out to form shoulders *t*, which bear against plates *u, v*, placed in the bottom of box L. The plate *u*, serves as a stop only, but the plate *v*, is movable horizontally and has its ends fitted in grooves in the sides of the box. The plate *v*, has an arm or pin *w*, projecting down from its under side, said pin passing through a slot in the bottom of box L. N, is a spring constructed of a flat piece of steel,—this spring has an oblique position relatively with the arm or pin *w*, of the sliding plate *v*, as shown clearly in Fig. 3. The spring N, is attached to one of the

guides *o*, and the function it performs will be presently shown.

O, Figs. 4 and 5, is a key formed of a tube *b*^x, with a movable or adjustable tube *c*^x, within it, the tube *c*^x, having a projection *e*^x, on it which may be fitted in either of a series of notches *f*^x, made in the tube *b*^x, within the tube *c*^x, a rod *g*^x, is secured, and this rod may be virtually shortened or

lengthened by adjusting the tube *c*^x.

The operation is as follows: Suppose the lock to be in a locked state as shown in Fig. 1, the first thing to be done of course is to raise the first end of the latch C, in order to allow the bolt B, to be moved back. This however cannot be immediately accomplished for the lower edge of plate *f*, on the back part of latch C, bears on the edge of the box L. This box therefore must be moved so that the plate *f*, may descend into the box through a slot *h*^x, in its top and the tumblers M, must also be moved so that their slots will be in line in order that the plate *f*, may pass into said slots and thereby allowed to descend. In order to effect this the box L, is moved along so as to bring the several tumblers M, successively in line with the projection *n*, on the tube *l*, and the tube *c*^x, of the key is adjusted on the rod *g*^x, a distance corresponding to that each tumbler requires to be moved in order to bring its slot in line with the slot *h*^x, in the top of the box L. The tube *c*^x, of the key is adjusted of course for each tumbler, the several notches *F*^x, being numbered corresponding with the several tumblers. The box L, is moved by turning the knob F, the part pinion I, gearing into the rack *p*, actuates the plate J, which is moved from left to right, and the exact distance the plate J, and tumbler box L, are to be moved each time in order to bring a tumbler in line with the projection *u*, the latter actuating the tumblers through the medium of the lever G, and rod *g*, the latter being actuated by shoving the rod *g*, the distance of its exposed length into the arbor E. It will be seen that some guide is necessary in order that the plate J, and box L, be moved the requisite distance each time a tumbler is to be actuated. This is effected by the disk H, in connection with a click H', the latter falling into notches in the edge of the disk and thereby indicating each time a tumbler is brought in line with the projection *n*. When the tumblers are all successively adjusted, the arbor E, by being turned around farther, in the same direction as when the tumblers were being adjusted, will cause the dog *d*, to throw up the slide D, and latch C, the plate *f*, at the back end of the latch passing into the slots of the tumblers, and the dog *e*, throwing back the bolt B. Thus it will be seen that the tumblers require to be operated separately. They cannot be tampered with as they are inaccessible. A

pressure of the bolt or its latch upon them cannot be obtained as the plate *f*, rests on the outer edge of the box L, until the last tumbler is properly adjusted, and as the key requires to be adjusted in order to actuate each tumbler it follows as a matter of course, that if a person loses the key the lock could not be opened by the finder or one ignorant of the position of the tumblers or the way in which the tube *c*^x, should be adjusted in order that the slots of the tumblers may be brought successively in line to receive the plate *f*. By referring to Fig. 1, it will be seen that the tumblers are so placed in their box L, that the projection *e*^x, of tube *c*^x, must be placed consecutively in the notches 8, 2, 5, 1, 3, 7, 4, 6, such being the position of the tumblers M, in the box L.

I would remark that a slide A', is placed in the back of the case A, by withdrawing which the tumblers may be changed when desired. All that is required is to make a minute of the position of the tumblers, so that they may be properly adjusted. In case a false movement is made during the process of unlocking the arbor E, is turned from right to left a corresponding movement will be given the tumbler box L, and the projection on arm *u*, will be actuated by the spring N, the latter in consequence of its oblique position throwing the plate *v*, backward so that the tumblers will all be returned to their original position. The box L, is then moved in the reverse direction to the extent of its movement and the tumblers again operated. The projection or arm *u* passes through an opening *w*^x, near the outer end of the spring at the termination of the forward movement of the tumbler box and is pushed out under the lower end of the spring during the return movement of the tumbler box.

I am aware that slotted sliding tumblers have been used in various forms of locks and arranged relatively with bolts and bolt latches in various ways, and I therefore do not claim broadly the slotted tumblers; but, having thus described my invention,

I claim as new and desire to secure by Letters Patent,

1. Placing a series of slotted sliding tumblers M, within a sliding box L, arranged in such relation with the bolt or a bolt latch C, that each tumbler will require to be adjusted separately in order to allow the bolt to be shoved back and the lock unlocked.

2. The arrangement of the hollow arbor E, rod *g*, lever G, and tube *l*, with projection *n*, attached, in connection with the notched disk H, and click H', and a key *o*, constructed as shown or in an equivalent way whereby the tumbler box L, is moved the correct distance for the several tumblers to be brought in line with the projection *n*, and the several tumblers adjusted at each move-

ment of the box as described, and for the purpose set forth.

3. Operating the sliding tumbler box L, from the arbor E, by means of the part pin-
5 ion I, and the rack *p*, of the plate J, arranged in such relation with the dogs *d*, *e*, slide D, and bolt B, that by the time the

tumblers M, are all properly adjusted the dogs *d*, *e*, will respectively raise the latch C, and throw back the bolt B.

L. H. MILLER.

Witnesses:

HENRY MARTIN,

ALBERT M. HEWITT.