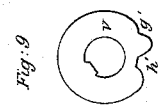
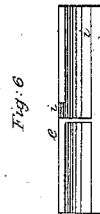
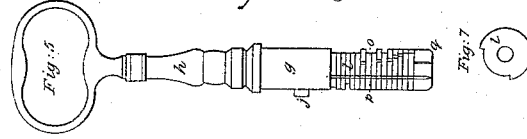
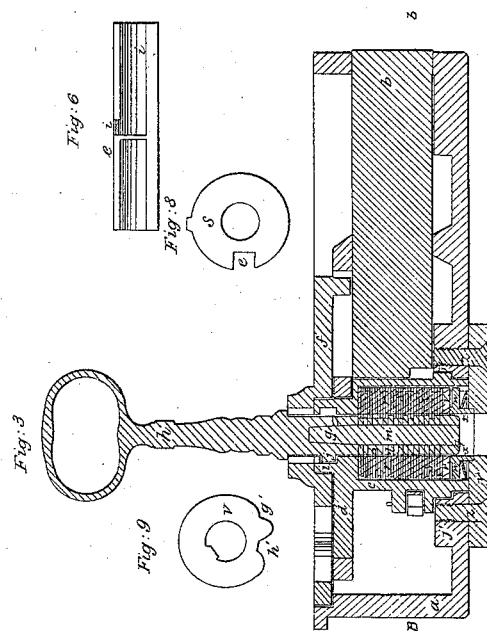
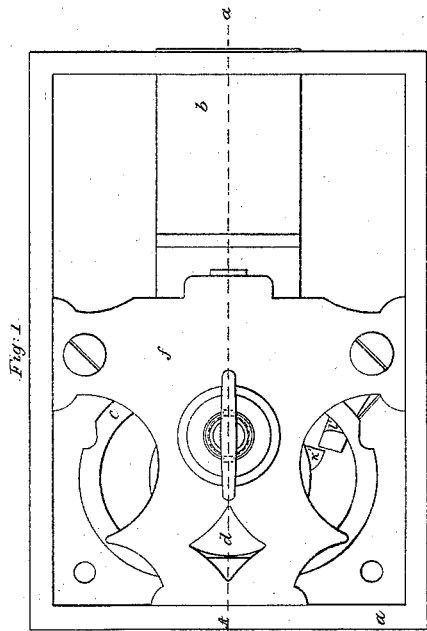
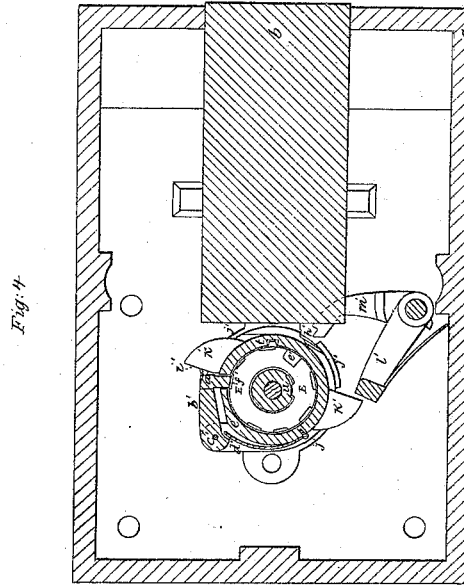
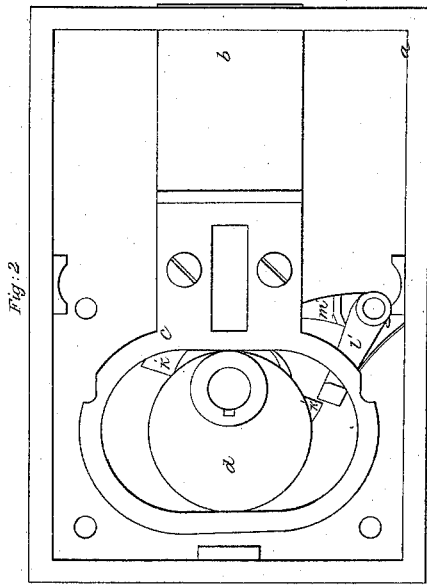


L. Jennings,

Lock.

N<sup>o</sup> 7,244.

Patented Apr. 2, 1850.

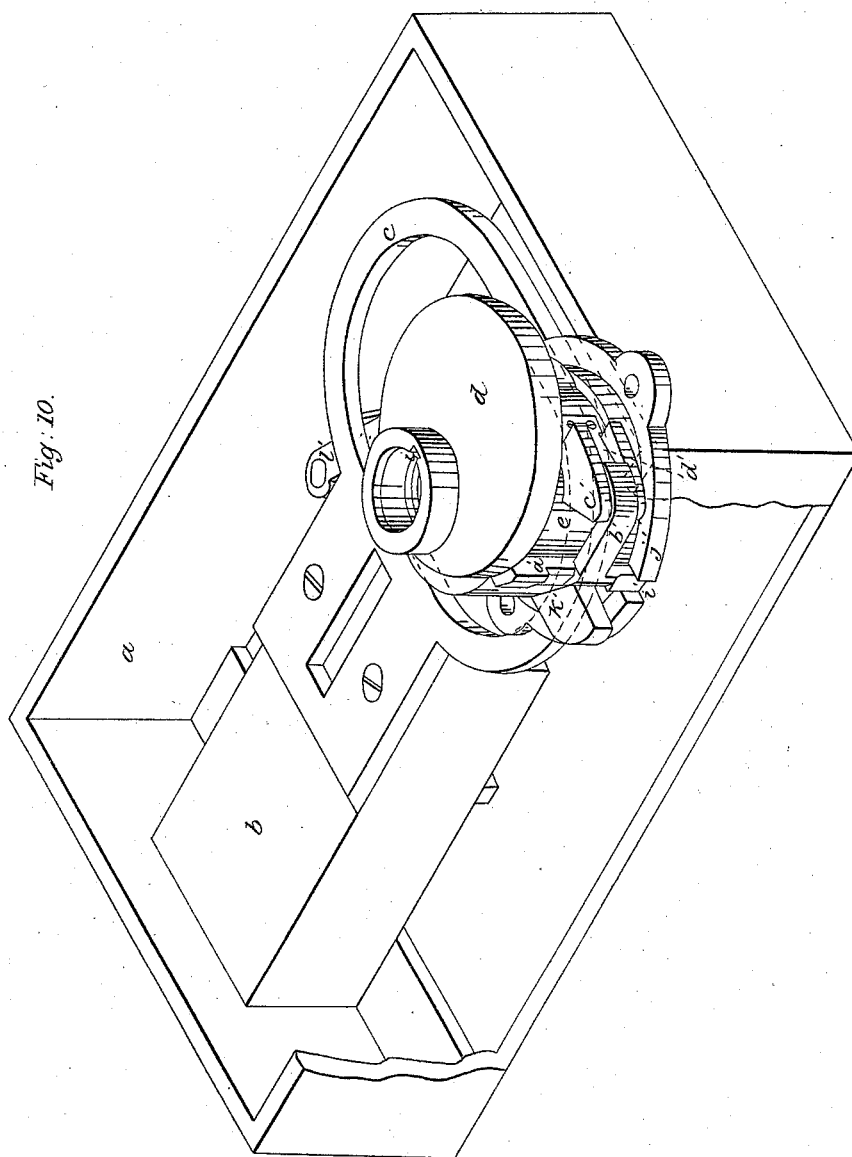


2 Sheets, Sheet 2.  
L. Jennings,

Lock.

N<sup>o</sup> 7,244.

Patented Apr. 2, 1850.



# UNITED STATES PATENT OFFICE.

LEWIS JENNINGS, OF NEW YORK, N. Y.

## • REVOLVING PLATE AND TUMBLER-LOCK.

Specification of Letters Patent No. 7,244, dated April 2, 1850.

*To all whom it may concern:*

Be it known that I, LEWIS JENNINGS, of the city, county, and State of New York, have invented certain new and useful Improvements in the Permutation or Combination Lock for Banks, Vaults, and other Doors; and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification in which—

Figure 1 is a view of the lock. Fig. 2, a like view with the plate which secures the parts removed. Fig. 3 a longitudinal section taken at the line (A, *a*,) of Fig. 1. Fig. 4, another section taken at the line (B, *b*,) of Fig. 3. Fig. 5, an elevation of the key, and Fig. 10 a perspective view of the lock with part of the case in red lines. The other sections will be referred to hereafter.

The same letters indicate like parts in all the figures.

The first part of my invention consists in arranging within a cylindrical cavity a series of permutation plates each pierced with a central hole to receive the entire body of the key and with a projection therein to receive the action of the key and with a recess or recesses in the outer periphery to receive a tumbler when all of them have been brought around to the proper point, the key being made of a series of plates corresponding in number with the permutation plates and each having a recess of different length to act in succession on the permutation plates to bring them to the proper position for the reception of the tumbler, one of the series of plates being cam-formed for the purpose of operating the tumbler.

The second part of my invention consists in arranging the permutation plates and tumbler within a rotating cylinder or other case surrounded by a permanent flanch or case properly recessed for the reception of the tumbler when held out by the permutation plates to prevent the said rotating cylinder or case from turning when locked.

The third part of my invention consists in arranging with the rotating cylinder or case which contains the permutation plates and tumbler, an eccentric fitted to a yoke on the bolt for the purpose of throwing the bolt, the eccentric being at the dead point

when the bolt is thrown out that any pressure applied directly to the bolt to force it in may have no tendency to turn the eccentric, and also with the view to render the whole lock compact. And the last part of my invention consists in making the recesses in the plates of the key of different lengths but all starting from the same line, to bring the permutation plates in the proper position for inserting and withdrawing the key.

In the accompanying drawings (*a*) represents the lock case, the form of which may be varied at pleasure, and (*b*) the main bolt the rear end of which is formed into a yoke (*c*) to embrace an eccentric (*d*) by the rotation of which the bolt is forced in and out. The eccentric is attached to and made a part of a hollow cylinder (*e*) which has its bearings in the lock case, and in a securing plate (*f*) and its upper end is bored out to receive the shank (*g*) of the key (*h*) and grooved at (*i*) to receive a short feather or bitt (*j*) on the key stem by which the cylinder is rotated; but this groove only runs parallel with the axis for a short distance and then it runs in the direction of the periphery for nearly the entire circumference, so that when the key is inserted it has to be turned nearly one entire revolution before the cylinder and eccentric are acted on to be turned. The form of this groove is shown in Fig. 6, which exhibits the inner periphery developed. In this way it will be observed that when the bolt is thrown out or locked the eccentric is at its dead point and therefore any pressure applied directly to the bolt to throw it back will be effectually resisted and will not be felt by the permutation tumblers and plates to be hereafter described. On the shank of the key there are arranged a series of key plates (*l*) which are pierced with a central hole and fitted by a feather onto a stem (*m*) let into a central hole in the shank of the key and there secured by a screw (*n*). A portion (*o*) of the periphery of these plates is cut out in the direction of the periphery all starting from a line (*p*) parallel with the axis (see the plan of one of them in Fig. 7,) but no two of the plates should be cut out to the same distance. The head (*q*) of the stem is of the same diameter as the plates but of greater thickness, and this is in like manner cut or recessed out.

The varying length of the portion cut out of each may be governed by the following rule: In the present lock there are 16 per-

mutation plates, therefore 16 key plates with the head ( $q$ ) which makes 17. The head ( $q$ ) is to be cut out to the shortest distance from the line ( $p$ ) and then the remaining  
 5 portion of the circle is to be divided into 18 or more parts, that is, a greater number than the number of plates, and each succeeding plate is to have the portion cut out one division longer than the preceding one, so that  
 10 there shall be a space left between the end of the longest recess and the line ( $p$ ). The purpose of this structure of the key will be presently described.

In the bore of the cylinder ( $e$ ) is fitted a  
 15 series of permutation plates ( $r$ ) equal in number to the number of key plates with a washer ( $s$ ) (see Fig. 8) interposed between every two throughout the series, that the motion of one permutation plate may not be  
 20 communicated to the other and to prevent the washers from turning by the independent motions of the permutation plates. They are all formed with a tongue feather that fits in a groove ( $t$ ) of the cylinder.  
 25 All the permutation plates as well as the interposed washers are pierced with a central hole to receive that part of the key formed by the plates ( $z$ ) and the head ( $q$ ) of the stem, and from the inner periphery of each  
 30 permutation plate projects a small tongue ( $u$ ) equal to the depth of the part cut out of the key plates, but all of the same length in the direction of the periphery, and no longer than the part cut out of the periphery of the  
 35 head ( $q$ ) of the stem, so that when all these tongues are ranged in the same line the key can be put in and taken out.

At the further end of the series of permutation plates there is another plate ( $v$ )  
 40 which I denominate the tumbler plate, (shown separately in Fig. 9,) the hole in which is adapted to receive the head ( $q$ ) of the key stem. The tongue of this plate being made to fit the groove or recess in the  
 45 periphery of the head ( $q$ ) of the key stem. When all the plates are inserted in the cylinder another plate ( $w$ ) is put in with a spring ( $x$ ) interposed between it and a cap  
 50 plate ( $y$ ) attached to the lock case by screws ( $z, z$ ) by which the whole is secured, the spring being interposed to prevent the permutation plates from binding and yet to keep them close together.

There is a tumbler ( $a'$ ) which turns on a  
 55 fulcrum pin ( $c'$ ) that passes through ears on the cylinder, so that the said tumbler is carried around with the cylinder. The body of the tumbler plays in a radial groove in the cylinder and can pass in within the inner  
 60 periphery thereof when thrown in, and when thrown out it enters a recess ( $e'$ ) made in a permanent flanch of the lock case and surrounding one end of the cylinder.

A spring ( $d'$ ) is placed under the projecting arm of the tumbler, the tension of which

spring always tends to force the tumbler inward. The permutation plates as well as the washers have all of them a recess ( $e'$ ) in their outer periphery of sufficient breadth  
 70 and depth to receive the tumbler when forced in; and all the permutation plates have a similar recess ( $f'$ ) of much less depth than the recess ( $e'$ ) and made in that part of the periphery opposite to the tongue, so that  
 75 when these permutation plates are ranged with the tongues all in the same line, which is effected by the line ( $p$ ) of the recesses in the key plates. When the key is in a position to be withdrawn the tumbler will fall  
 80 into the recess ( $f'$ ) of all the permutation plates, and prevent them from being shifted while the key is out. Other recesses similar to ( $f'$ ) are made promiscuously in the periphery of all these plates to act as deceptions in case of any attempt to pick the lock.  
 85

The periphery of the plate ( $v$ ) (see section Fig. 9) is cylindrical to fit the inside periphery of the cylinder, and at two points ( $g'$ ) and ( $h'$ ) it has two cam formed depressions being for the purpose of permitting the tumbler at the proper time, to enter the recesses of the permutation plates. the faces of these cam formed recesses being  
 90 such by its rotation as to force the tumbler out of the recesses that the permutation plates may be turned by the key. When the tumbler is forced out of the recesses ( $e'$ ) of the permutation plates, its outer face enters  
 95 a recess ( $i'$ ) made in a flange ( $j'$ ) of the lock case which surrounds the cylinder and therefore locks the cylinder to prevent it from being turned. In this way the bolt is effectually locked. The operation is as follows, to wit:

The permutation plates and the tumbler  
 100 plate are in the position in which the tumbler lies in the recesses ( $f'$ ) so that the tongues of the whole of them are in the same line and in such a position to receive the key plates while the bitt or pin ( $j$ ) on  
 110 the key shank coincides with and may enter the groove in the head of the cylinder. The parts being thus situated the key is inserted and as the pin or bitt ( $j$ ) is free to turn in the horizontal part of the groove nearly  
 115 one entire revolution. The tumbler plate which has the shortest recess is turned first, which forces the tumbler out of the recesses ( $f'$ ) of the permutation plates, thus liberating them that each may be turned in succession by its corresponding key-plate until  
 120 the recesses ( $e'$ ) of each plate are brought in a line. At the same time the cam groove ( $g'$ ) of the tumbler plate comes into line which permits the tumbler to enter, that its  
 125 outer face may become flush with the outer periphery of the cylinder.

The cylinder is then free to turn that the eccentric attached thereto may move the bolt. When this has been done the key is  
 130

turned in the reverse direction. The tumbler plate first forces out the tumbler beyond the periphery of the permutation plates, and then the rotation of the key is continued until the cam groove ( $h'$ ) of the tumbler plate permits the tumbler to enter the recesses ( $f'$ ) of the permutation plates. In this position the key can be withdrawn, not only the bolt but the tumbler being locked.

To give time to the tumbler to enter the recesses of the permutation plates when brought into the proper position, there are two cam like projections ( $k'$   $k'$ ) on opposite sides of the cylinder, which, when the cylinder is turned, force out a spring dog ( $l'$ ) connected with another dog ( $m'$ ) which, by the outward motion of the first, is made to enter a recess ( $n'$ ) in the periphery of the cylinder and there to hold it until the cam-formed projection has passed the dog ( $l'$ ) which is immediately forced in by its spring, at the same time drawing the other dog ( $m'$ ) out of its recess and thereby liberating the cylinder.

As a matter of convenience the permutation plates and the key-plates are stamped with corresponding numbers or letters, that the combination may be varied at pleasure. It will be obvious that the key instead of being made of separate plates may be cut out of a solid piece of metal, but this will not present the advantage of changing the combination.

The advantages derived from my arrangement of the permutation plates and tumbler and the structure of the key may be obtained without employing the means herein described for throwing the bolt, as this may be done in any other desired manner, although I prefer the use of the eccentric as herein described for this purpose. But as

in some instances, as in the case of padlocks, I do not use the eccentric for throwing the bolt. Nor is it necessary in all instances to have the cylinders revolve, as the arrangement of key and permutation plates may be employed simply to place the tumbler in a position to lock the bolt.

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

1. The arrangement of a series of permutation plates in a line and on the same axis of motion, each having a central hole for the reception of the entire key and a projecting tongue for the key to act upon, and a recess or recesses on the periphery for the reception of the tumbler; but this, I only claim in combination with a tumbler attached to and rotating with the cylinder, substantially as herein described.

2. I also claim making the recesses in the key plates (or the equivalent thereof) of different lengths but all starting from the same line, substantially as herein described, to facilitate the insertion and removal of the key as described.

3. I also claim the cylinder which contains the permutation plates and which carries the tumbler as above described, in combination with the permanent flanch, inclosing the same, and having a recess to receive and hold the tumbler when thrown out substantially as described.

4. And finally I claim the arrangement of the eccentric for throwing the bolt with the rotating cylinder carrying the tumbler and containing the permutation plates as described.

L. JENNINGS.

Witnesses:

CHAS. M. KELLER,  
JOHN C. BROWNE.