# C. R. C. French,

## Permutation Lock.

No. 82,104. Patented Sep. 15, 1868.

Fig. 1.

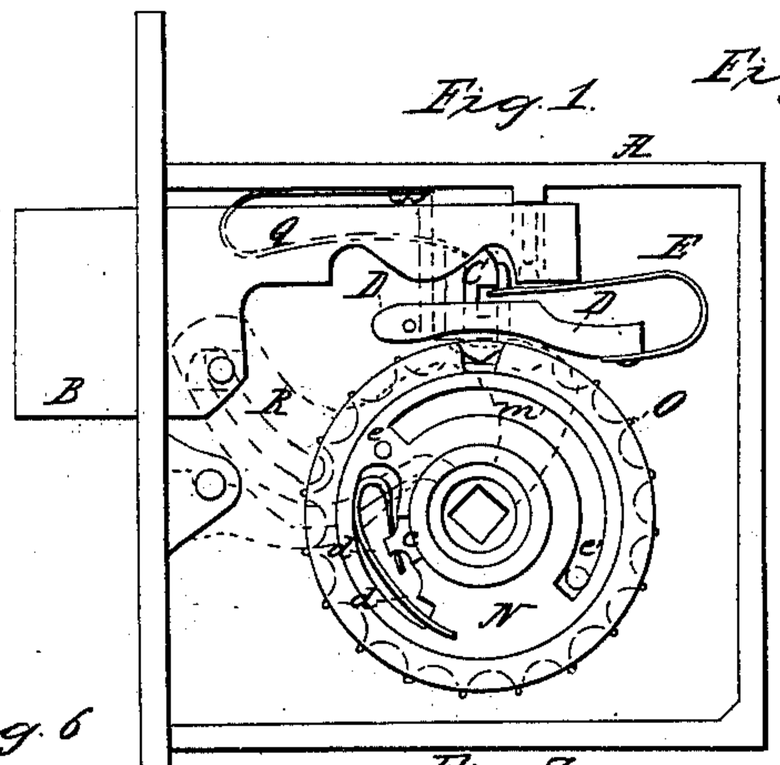



Fig. 3

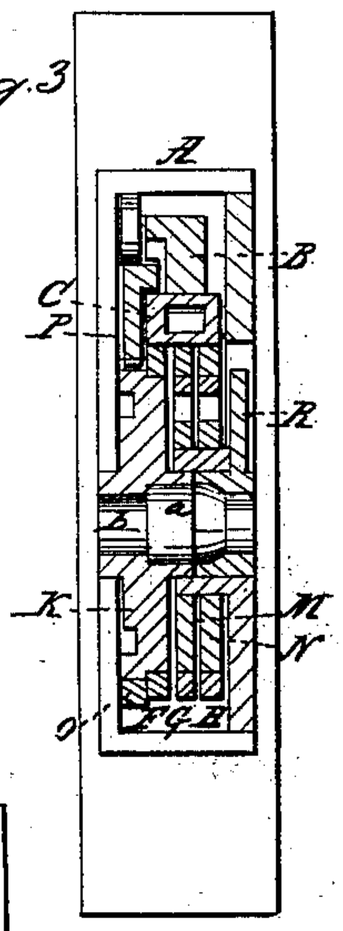



Fig. 6

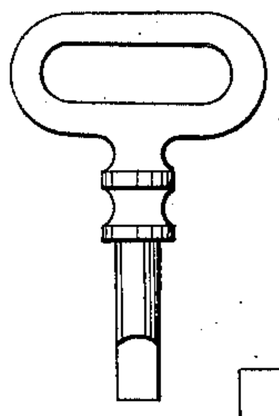


Fig. 7.

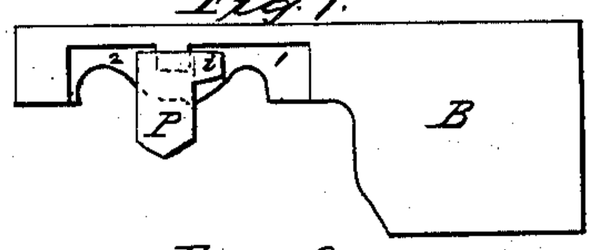



Fig. 2.

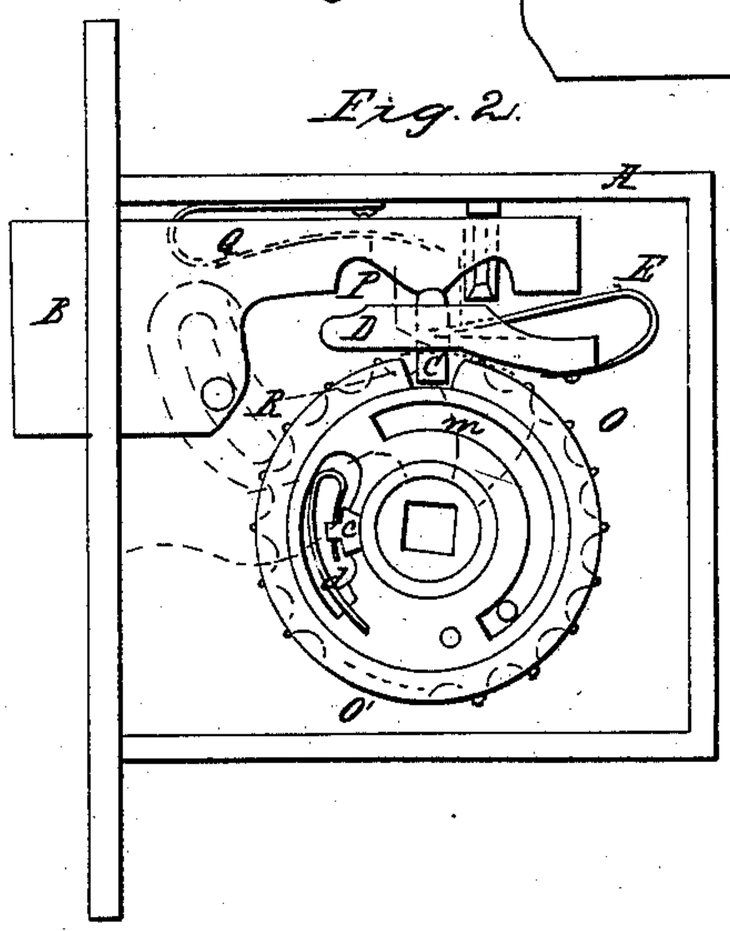



Fig. 4

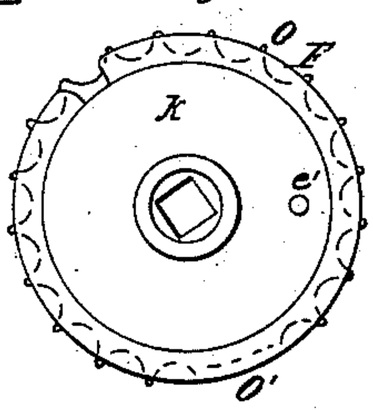
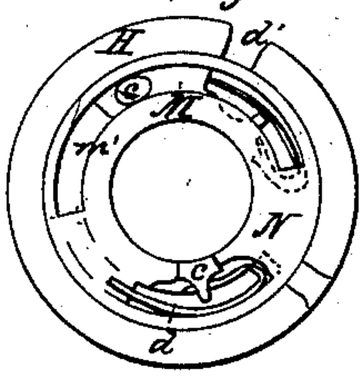



Fig. 5.




Witnesses:
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# United States Patent Office.

CICERO R. C. FRENCH, OF BERKLEY, MASSACHUSETTS.

*Letters Patent No.* 82,104, *dated September* 15, 1868.

## IMPROVEMENT IN PERMUTATION-LOCKS.

The Schedule referred to in these Letters Patent and making part of the same.

Be it known that I, CICERO R. C. FRENCH, of Berkley, in the county of Bristol, and State of Massachusetts, have invented a new and useful Improvement in Combination-Locks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a vertical longitudinal section of a lock embodying my improvements, with the bolt thrown out.

Figure 2 is a similar view, showing a different position of the bolt, and other portions.

Figure 3 is a vertical transverse section.

Figures 4, 5, 6, and 7 are views in detail of one of the tumblers and rings, toothed wheel, key, and bolt.

Similar letters indicate like parts in the several figures.

The object of my invention is to produce a combination-lock which will be simple in its operation, economical in its construction, and perfectly burglar-proof, and also one in which any indicating-marks or numbers, for setting the combinations in the lock, will be dispensed with.

Referring to the drawings, A represents the case of the lock, which may be made like the ordinary mortise-lock externally, to fit a common door.

B is the bolt, which is operated by means of a curved slotted lever, R, fitting on a stud or projection on the bolt.

C is a stop or sliding bar, passing through an aperture in a piece or projection, D, which latter is firmly attached to or forms a part of the side plate of the lock.

On the lower edge of the piece D, at one end, is secured a bent spring, E, the other end passing into a recess in the stop C, so as to keep the said stop from engaging with the rings when it is not operated or forced down by the bolt.

The stop C plays vertically in a slot in the piece D, so as to be guided to the recesses in the rings which surround the tumblers.

F G H represent three rings, fitted snugly upon tumblers K M N, but are allowed to turn upon them. These rings do not extend entirely around the tumblers, but their ends are separated sufficiently to allow the stop C to drop into the space between the ends, and thus prevent them from moving with the tumblers, when it is desirable to set the latter.

Attached to or forming a part of the ring F is a toothed wheel, O, fitting close to one side of the case. The teeth do not extend around the entire periphery of the wheel, but a short space is left, as shown at O′, fig. 4, for the purpose of determining the position of the wheel, and for setting the lock.

The central portion of the tumbler K projects on each side, as at *a* and *b*, one side, *b*, fitting within the side of the casing, and having a square opening, in which the key is fitted.

M and N are two tumblers, which fit snugly on a cylindrical projection or arbor of the side plate, and are provided each with a friction-block, *c*, actuated by a spring, *d*, to prevent them from moving too freely on such arbor, and acting as a brake.

In each of these tumblers is a semicircular concentric slot or opening, *m′*, which receives the pins or projections *e e′*, by which motion is communicated to the tumblers M and N from the tumbler K.

The piece D is provided with a slot, in which fits, so as to slide freely, a small bolt or click, P, of the form shown in fig. 7. The said bolt or click has a slight lateral play in this opening, so that, when struck by the teeth of the wheel O, it will produce a sound sufficient to clearly distinguish its passage over the said teeth. This bolt or click is pressed downward by means of a spring, Q, the free end of which should press directly upon the centre of the click P, to keep it in contact with the wheel O.

On the upper front portion of the click P is a projection, *i*, which engages in recesses 1 and 2, in the rear side of the bolt B, as shown in fig. 7, and plays in and out of the same when the bolt is being locked or unlocked.

The partition between the recess prevents the bolt from being forced back by any improper means, and the

position of the rings, and consequently the tumblers, is determined by causing the stop or plate C to drop into the openings *d'* of the rings surrounding the tumblers as the bolt is moved to half-lock.

The curved slotted lever R is provided with a cylindrical hub, fitting within the cylindrical projection or arbor of the side plate. This hub has a square opening, in which is fitted the end of the key, which latter has a square end, as shown in fig. 6, and by means of which both the bolt and tumblers are operated, only one key being required for the purpose, and the only change required, in the use of the key, is by moving the key into or out from the lock longitudinally, to actuate first the tumblers and then the bolt.

The operation is as follows:

The bolt is first brought to a position of half-lock, when the sliding stop or bar C will fit in each of the openings of the rings F G H. When thus arranged, the bolt may be easily thrown forward and back, and the tumblers are in the position to be set to desired combinations.

To set the lock, the key is pushed in, so as to operate the tumblers. The key is then made to turn the wheel O, which may be done in either direction, and is turned twice around, so as to bring all the tumblers in communication. Then continue to turn the key in the same direction until the click slips into the wide space O', between the teeth on the wheel O, which will be easily determined by the motion of the key. The key is still to be turned in the same direction as before, to designate the first number of the combination, which may be any number from 1 to 17, say, in the present instance, 5, the number being indicated by the sounds of the click as the toothed wheel is turned. For the second number in the combination, turn the key in opposite direction, so as to indicate a number between 10 and 18, say 12, then turn the key back again, to make the third number of the combination from 1 to 9, say 4, as indicated by the sounds. Here we have the combination of numbers 5, 12, 4, upon which the bolt is locked.

In unlocking the lock, the same operation is necessary, to bring back the proper combination of numbers.

It will be seen that a lock as above described is comparatively simple in its construction and operation. It may be applied to any ordinary door as a mortise-lock, if desired.

In safes, or for bank-locks, the number of tumblers may be increased, so that the combinations may be capable of five or six million changes.

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

1. The combination, with a series of tumblers and adjustable rings, of an indicating-wheel, O, a click, P, and sliding plate C, whereby, the bolt being set at half-lock, the required combination may be formed, by turning the tumblers alternately in opposite directions, substantially as set forth.

2. The curved recesses in the bolt B, in combination with the sliding plate C, when operating as and for the purpose specified.

3. The click or bolt P, provided with the projection *i*, in combination with the bolt B, as set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

CICERO R. C. FRENCH.

Witnesses:

J. H. ADAMS,

RODNEY FRENCH.