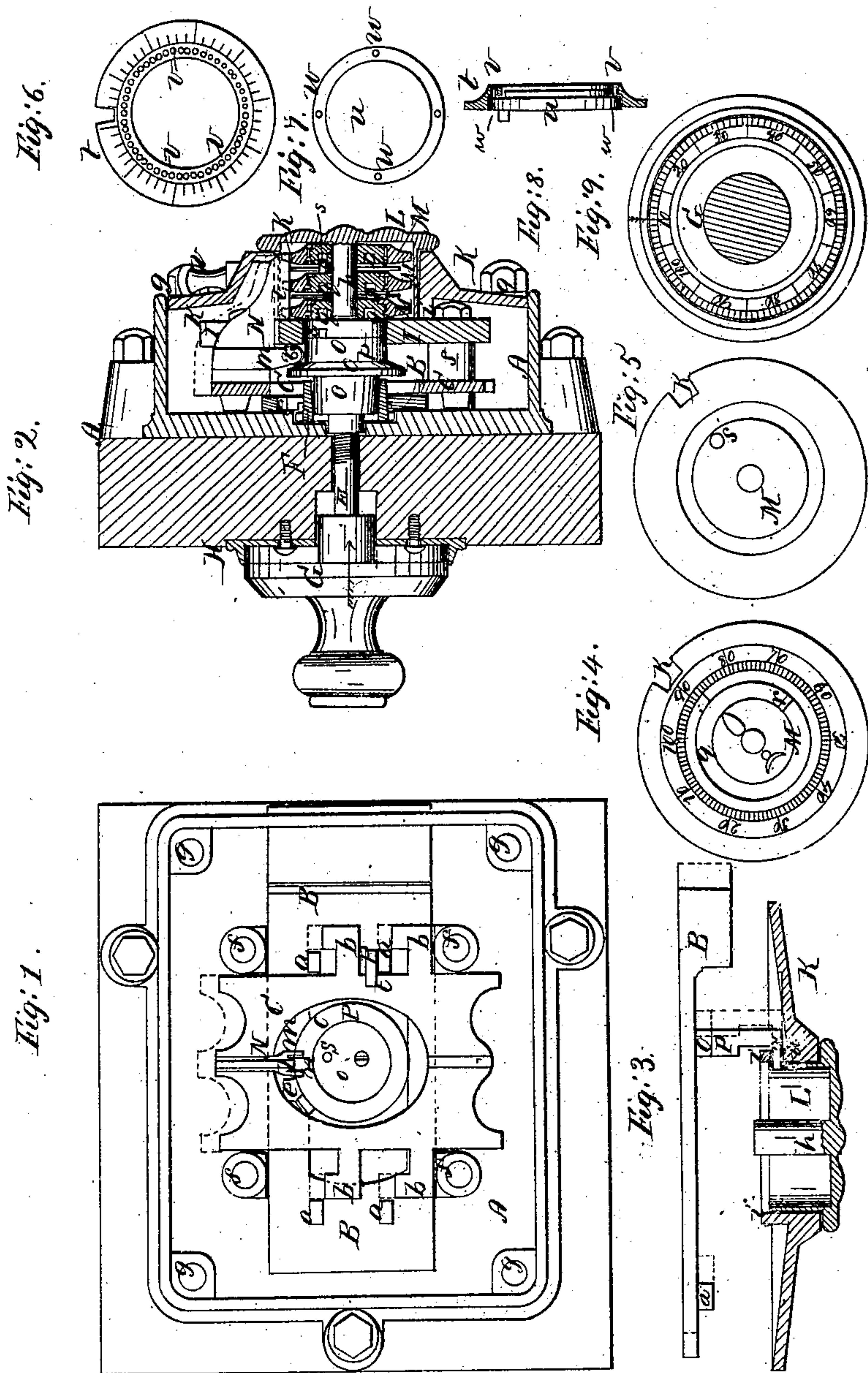


J. Connell,

Permutation Lock.

N^o 38,858.

Patented June 9, 1863.



Witnesses;
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UNITED STATES PATENT OFFICE.

JOHN CONNELL, OF ROCHESTER, NEW YORK, ASSIGNOR TO MARTIN BRIGGS, OF SAME PLACE.

IMPROVEMENT IN PERMUTATION-LOCKS.

Specification forming part of Letters Patent No. 38,858, dated June 9, 1863.

To all whom it may concern:

Be it known that I, JOHN CONNELL, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Permutation-Locks for Bank and other Uses; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is an elevation of my improved lock, the back plates being removed for the purpose of exhibiting the interior arrangement; Fig. 2, a central vertical transverse section thereof, with the back plates in place; Fig. 3, a diagram exhibiting an edge view of the bolt, and a central section of the back of the lock, and showing more particularly the manner of locking said back in place when the bolt is reversed; Figs. 4 and 5, obverse and reverse views, respectively, of one of the permutation-wheels, on an enlarged scale; Figs. 6, 7, and 8, views showing the construction of the permutation-wheels; Fig. 9, a view of the knob by which the lock is actuated.

Like letters of reference indicate corresponding parts in all the figures.

In ordinary permutation-locks the tumbler is actuated by means of an ordinary cam or eccentric on the shaft of the knob or key, and the dog, which fits into the notches of the permutation-wheels, to allow the bolt to move, is brought with considerable force against the edges of said wheels at every turn of the knob. This action produces a sound by the concussion, which, to the practiced ear of an accomplished burglar, enables him to ascertain with a greater degree of exactness the relative position of the permutation-wheels, and to more readily bring them into the proper combination to release the bolt.

My invention consists in operating the dog in such a manner that it shall not rest against the permutation-wheels at any time during their motion in producing the desired combination, nor be brought in contact therewith with any degree of force, so as to produce sound; also, in locking the back of the lock in place when the bolt is disengaged or thrown back, so that no one can open it to ascertain the position of the wheels for the next per-

mutation or combination, or to study its construction.

In the general construction of my lock I employ many of the parts patented to Henry W. Covert, and my invention is intended as an improvement on his devices. The case A of the lock is of ordinary construction. In this rests a bolt, B, and tumbler C, fitted face to face, the former provided with projecting lugs *a a*, Figs. 1 and 3, at suitable positions on each side of the tumbler, and the latter with hook-shaped detents or projections *b b*, which, as the tumbler is raised, slide up on one side or the other of the lugs (according as the bolt is thrown forward or back) to keep said bolt in position. The bolt is operated by the friction of a cam, *c*, on the sliding shaft E of the knob, fitting in a hollow sleeve or collar, F, Fig. 2; which has a cam, *d*, Fig. 1, resting in a notch, *e*, of suitable shape in the bolt, the device being the same as that patented to H. W. Covert, October 5, 1858. A knob is attached to the extremity of the sliding shaft, provided with a disk or circular head, G, which just fits in a socket, H, Fig. 2, of suitable shape, secured to the door, and which is of sufficient projection to allow the proper sliding motion to the shaft to accomplish the result desired. The bolt and tumbler are kept in place and guided in their motions by means of lugs *f f f* of the case, which also serve as the sockets for bolts to secure a plate, I, Fig. 2, by which the parts are retained in position. Outside this plate the back K of the lock is secured by means of bolts passing through holes *g g*. The back is provided with a central circular opening, in the rim of which fits a hollow cylinder, L, Figs. 2 and 3, of suitable size for containing the permutation-wheels M M, and having a central axis or bearing, *h*, for their support.

The permutation-wheels are similar in general construction to those patented to H. W. Covert, March 1, 1859, being composed of two parts—an outer ring, *t*, Fig. 6, and a center disk, *u*, Fig. 7, which fits in the ring. The two parts are shown united in the section, Fig. 8. The object of this arrangement is to set an index-hand on the face of the center disk, in conjunction with any number on the scale of the outer ring, so as to change the

combination. Heretofore, in the use of this arrangement, the center disk has been held in place by means of corrugations on the edges of the parts fitting together. It is difficult to cut these corrugations with great accuracy, on account of their position, especially in small locks, and great accuracy is required, not only to adjust the index-hand to the scale exactly, but also to fit all the corrugations around the whole circumference into those of the opposite piece. Instead of this arrangement, I make a circle of holes, *v v*, Figs. 6 and 8, through the inner rim of the ring *t*, corresponding to the divisions of the scale, and into any of these fit corresponding pins, *w w*, Figs. 7 and 8, projecting from the face of the center disk, *u*. The parts are thus capable of being adjusted to any position, and are at the same time held firmly together. By this arrangement I am obliged to make the holes in but one part, and these are bored with great facility and exactness, whereas, if corrugations are used, they have to be made in both parts of the device, and have to be accurately fitted to enter each other. I am thus enabled to secure a more perfect arrangement at less labor and cost. The wheels are provided with the usual notch, *k*, in the periphery, in which catches the dog for releasing the bolt, and also a stop, *r*, in a groove, *q*, or equivalent, on one side, in which groove fits the pin *s*, by which the wheels are operated. The dog *N* forms a part of the tumbler *C*, projecting from it, and being substantially of the shape represented in Figs. 1 and 2, its lower edge, *l*, being of such form and position as to rest in the notches of the permutation-wheels as the tumbler falls to its lowest situation. At the proper point the dog is provided with a bearing, *m*, extending downward, and having secured in its lower end a friction-roller, *n*, Figs. 1 and 2, which, when in its lowest position, rests near the cylindrical end *o* of the knob-shaft. In the rear of the friction-wheel the knob-shaft is provided with a circular cam, *O*, whose diameter is just such as to raise the tumbler to a sufficient height to release the dog from the notches of the permutation-wheels, as indicated by red lines. The face of this cam next the friction-roller is made beveling, as represented at *p*. Thus arranged, when the sliding shaft *E* is drawn out endwise to its farthest extent and the notches of the permutation-wheels are all in coincidence, as indicated in the drawings, the dog *N* will rest in said notches, the wheels being disengaged from the shaft, and the tumbler will be lowered so that the bolt *B* can be moved to either lock or unlock the device; but if the sliding shaft be pushed inward, in the direction indicated by the arrow in Fig. 2, the bevel *p* of the cam will strike the friction-roller *n*, and raise the tumbler, (thereby holding the bolt in place,) and consequently lift the dog from the notches of the permutation-wheels, at the same time bringing them in gear by means of the grooves *q q* and pins *s s*. Thus, when the wheels are

in gear to produce their movement, the dog is always raised away from their edges, and in reversing the knob-shaft they are always disengaged before the dog falls, so that no sound can be produced from friction. The dog falls only from the weight of the tumbler itself, and but a very small distance, and the velocity of its fall is only in proportion to that of reversing the shaft of the knob. Therefore no loud sound can be produced by the gradual falling of the dog and its contact with the edges of the permutation-wheels. If the reversing of the shaft is sudden, to allow the dog to fall quickly, the concussion of the latter will be drowned by the noise of the shaft itself. In ordinary devices, the dog can be caused to strike the edges of the wheels repeatedly by actuating the knob, so that the burglar can, as it were, "feel" the position of said wheels by the touch or the sound produced. In this device the dog is not thus under his control, as it only falls from its own weight, there being no positive power exerted to bring it in contact with the wheels. This device accomplishes the purpose perfectly, while at the same time it is a very convenient means for operating the tumbler, irrespective of its advantage in governing the dog. When the bolt is reversed, and the door unlocked, it would be very easy for clerks or others to remove the cylinder *L* and back *K* of the lock, for examining the interior, were the same not secured in place otherwise than by the proper bolts. I remedy this difficulty by securing to the bolt *B*, in the proper position, a projection, *P*, Figs. 1 and 3, having a right-angled catch, *x*, which, when the bolt is reversed or thrown back for opening the door, catches into a hole, *u*, made through the side of the rim or flange *i* of the back, and through the side of the cylinder. Thus, when the door is unlocked, so that the lock is exposed, no one can remove either the back or cylinder. The cylinder is further held by a screw, *v*, passing through the back.

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

1. The arrangement and combination of the cam *O* on the operating-shaft, the bearing *m* and dog *N* of the tumbler *C*, and the permutation-wheels *M M*, whereby the dog is prevented from producing noise or pressure on the edges of the wheels, substantially as herein set forth.

2. Locking the back *K* and cylinder *L* in place, when the bolt is reversed or thrown back, by means of the catch *P*, passing through the hole *u*, arranged and operating substantially as herein set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN CONNELL.

Witnesses:

MARTIN BRIGGS,
R. F. OSGOOD.