

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN PERMUTATION LOCKS.

Specification forming part of Letters Patent No. 120,129, dated October 17, 1871.

To all whom it may concern:

Be it known that I, DANIEL L. TOWER, of the city, county, and State of New York, have invented a new and useful Improvement in Permutation Locks; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

My invention consists in the improvement of permutation locks, as hereinafter described and subsequently pointed out in the claim.

In the drawing, Figure 1, Sheet 1, represents a face view of the lock with the bolt thrown forward. Fig. 2 is a view of the same, showing the bolt ready to be thrown back; also showing in dotted lines the position of the bolt when thrown back. Fig. 3 is a section looking down from the line *x x* of Fig. 2. Fig. 4, Sheet 2, is a cross-section of Fig. 2 taken on the line *y y*. Fig. 5 is a view of one of the disk-wheels, with a portion broken away to show the manner of changing the combination. Fig. 6 is a section of Fig. 5, taken on the line *z z*.

Similar letters of reference indicate corresponding parts.

A represents the door. B is the case or shell of the lock. C is the knob of the lock by which the disk-wheels are turned. D is the knob by which the bolt is thrown. E is the bolt. This bolt is made in two parts, E being the bolt proper and F an end piece jointed thereto by a pivot, which allows it to be turned up at a right angle with E, as seen in Fig. 2, preparatory to being thrown back. The two parts of the bolt are halved together, and on the side of the piece F is the pinion G, (see Fig. 3;) also seen in dotted lines in Figs. 1 and 2. H is a rack, which engages with the pinion connected at one end with the gear-wheel L. (See Figs. 1 and 2.) J represents the disk-wheels, two only being shown in the drawing, but any desired number may be used. K is the shaft upon which they are rotated. L is a gear-wheel on the shaft connected with the first disk J by screws *m m*. This first wheel J is a little larger in diameter than the other wheels, so that the drop-bar will be held up by it clear of the other wheels when placing the wheels for unlocking. N is the spindle of the knob C, on which is a gear-wheel, O, which

engages with the wheel L. P is a bar, upon one end of which the gear-wheel I is pivoted. The other end of the bar is pivoted to the plate *q* of the shell, as seen in the drawing. R is an arm reaching out from the bar P, upon the lower end of which is a finger, S, (the end of which is seen in dots in Fig. 2.) This finger enters the groove T in the side of the first disk-wheel through the opening Z, and as the disk is revolved by turning the knob C back the groove allows wheel I to drop into gear and operate the rack and pinion for throwing up the end F of the bolt. This is done when the disk-wheels have all been properly placed according to the combination for unlocking. U is a dial-plate on the door, under the knob C, a finger, *v*, being attached to the shank of the knob to guide the operator in moving the disk-wheels. The bolt E is thrown by turning the knob D. D' is a disk on the shank of this knob, in which is a pin, seen in dotted lines in Fig. 3, which enters a slot in the bolt and throws the bolt backward or forward by a crank motion. In the sides of the disk-wheels are pins *e*, which come in contact with each other in placing the disks to form the combination. The disk-wheels are made in two parts or with central movable disks *d*, to which the pins *e* are attached. These inner disks are held in any desired position. The combination is changed by moving them, and thus changing the position of the pins *e*; and they are held by means of cam-grooves in the small key-wheels *f* and the plates *g*, which plates are thrown by the cam in contact with the edges of the inner disks *d*, and thus firmly holding the disks and pins *e* stationary in the disks J until another change in the combination is desired. The construction of these inner movable disks *d*, and the manner in which they are confined in and make a portion of the disk J, is plainly seen in Fig. 6. The cam-fastening above described is seen in Fig. 5. In the periphery of each outer disk (be they more or less in number) is a slot or notch, into which the arm R drops when the disks have all been placed according to the combination. The arm R extends out over all the disks and drops by its own gravity when the notches allow it; and, as before stated, when it drops the gear-wheel I drops into gear with the wheel L; the finger S enters the groove T and is held down by the groove, when a slight back movement of the knob throws up the end F of the bolt and