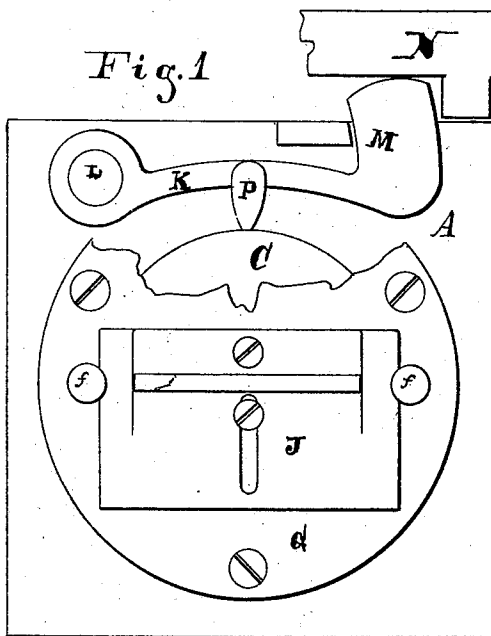
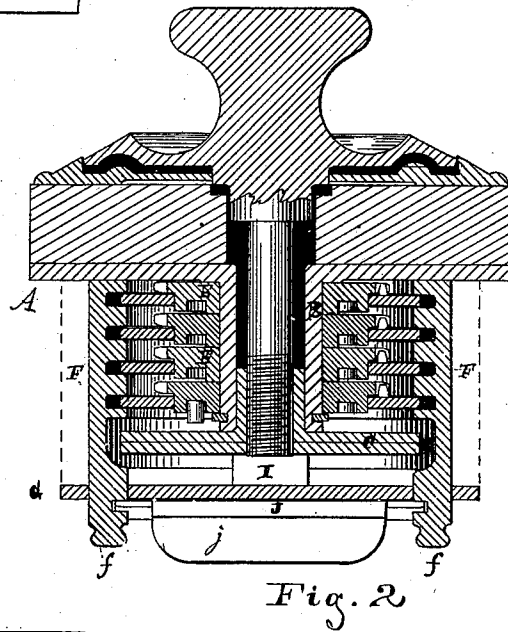
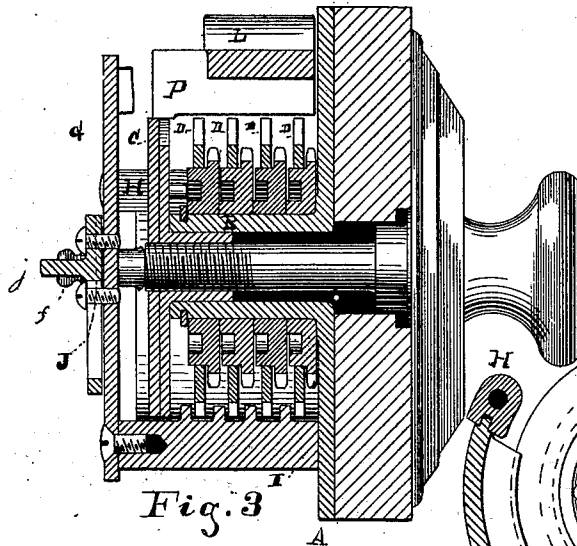
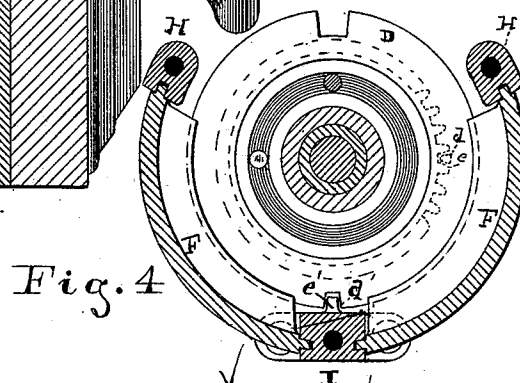


E. BERNHARDT.
Permutation Lock.

No. 237,950.

Patented Feb. 22, 1881.



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UNITED STATES PATENT OFFICE.

ERNST BERNHARDT, OF CINCINNATI, OHIO.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 237,950, dated February 22, 1881.

Application filed December 27, 1879.

To all whom it may concern:

Be it known that I, ERNST BERNHARDT, of Cincinnati, Hamilton county, State of Ohio, have invented a new and useful Improvement in Permutation-Locks, of which the following is a specification.

The invention consists in an improved means to disconnect the notched rims of the tumblers from their driving-hubs and prevent them from turning, so that the desired combination may be arranged by operating the dial-knob.

In the accompanying drawings, Figure 1 is plan view of the lock, looking from the back, part of the back plate being broken away to show the form of the dogging fence-bar. Fig. 2 is a longitudinal section taken in the plane of the axis of the lock-arbor. Fig. 3 is a longitudinal vertical section of the lock in a plane at right angles to the view shown in Fig. 2. Fig. 4 is a transverse section taken in front of the driving-tumbler, looking to the front of the lock. In Figs. 2 and 3 the spindle is represented as drawn forward in position to operate the tumblers.

Identical parts in the different figures are indicated by similar reference-letters.

A represents the front plate of the lock. Projecting back centrally from this plate is a hub, B, through which the lock-spindle passes to enter the hub of the driving-tumbler C, into which it is screwed and held from turning by a key in the usual manner. This driving-tumbler, as shown in Figs. 2 and 3, is composed of two disks secured together. The outer disk (or if it be made in one piece the outer half) is a plain wheel, and the inner disk (or half of the tumbler) is notched to receive the projection upon the fence or dog. The inner face of C carries the usual stud-pin to operate the lock-tumblers. The tumblers, of which there may be any desired number, are composed of outer notched rims, D, and inner flanged hubs, E. The flange of each hub E is provided with notches *e*, adapted to be engaged by a pin, *d*, in the adjacent rim D, so as to couple the parts together when the rim is pushed back against the flange of the hub. These tumblers are incased between two cylindrical segments, F F, which are grooved to receive the outer rims, D, of the tumblers, and are fitted to slide between plate A and back cap, G, in standards H H and I.

From the upper edges of F F guide-pins *ff* project through the cap G. These pins have transverse slots upon the inside and above the plate G to receive a cam or inclined slide, J. The slide is guided vertically by a screw passing through a slot into the cap G, and has a projecting thumb-plate, *j*, by which it is raised and lowered.

The lower standard, I, which is secured to the plate A by screws to permit the ready removal and replacement of the segments F F, has pins *e'* projecting up between the tumblers D.

The dogging device is a lever, K, journaled upon a stud, L. The outer end of the lever has an enlargement, M, which is, when the safe is locked, held up back of the projection upon the safe-bolt N. The fence-dog P, which projects down from the center of lever K, has, as shown, a projection at the inner end, which rests, when the arbor is drawn forward to operate the tumblers, upon the periphery of the outer disk of the driver, and holds the fence above the tumblers D. The same result will, it is obvious, be accomplished by making the driving-tumbler larger than the loose tumblers and making the lower edge of the fence straight. To lessen the friction a wheel may be fitted in the end of the fence-dog P, to ride upon the tumbler C.

The spindle and driving-tumbler C have a limited play between the front and back plates of the lock, so that when the spindle is drawn out to bring the stud-pin upon the driver C in a position when revolved to strike the pin upon the adjacent tumbler, the dog P will be held above and out of contact with the notched rims D, and as the driving-pin will not revolve the tumblers when the spindle is pushed back, it will be impossible to "feel" the tumblers or subject them to the action of a micrometer.

The mode of changing the combination to open the lock is as follows: The known combination is first set up and the dog allowed to drop into the notches in the tumblers. This brings the opposite and smaller notches *d'* of tumblers D in line with the pins projecting up from standard I. The slide J is now drawn up, bringing the grooved segments F against the back cap, G. The tumblers D are by this action slipped back upon the hubs E and disconnected from them, and the lower notches, *d'*, in rims D engaged by pins *e'*, projecting

up from standard I. The rims D are thus held from turning. Now, by drawing the arbor forward and going through the operation of setting up the proposed combination in precisely the same way as if it were intended to open the lock by such new combination, the upper notches of the tumblers are brought into proper relation with their engaging-pins in hubs E and the driving-stud pins. The slide J is now pushed down, carrying the tumblers D back and coupling them with the hubs E.

It is evident that the slide J may be in the form of a disk with cam-face, or that the segments F F may be carried back and forth by any well-known means without varying the principle of the invention, and that the shape of the dogging-lever K may be varied to suit the different kinds of bolt-work now in use.

I claim—

1. In combination with the tumblers of a permutation-lock, which tumblers are composed of an inner hub and outer rim, the sliding

grooved segments F F, for the purpose of holding the rim and hub united when the lock is in use and disconnecting said rims from their hubs to change the combination, substantially as specified.

2. The combination, substantially as hereinbefore set forth, of the tumblers D E, segments F F, grooved standards H H and I, said standard I having projecting pins to enter notches in rims D to prevent the rims from turning when disconnected from their hubs to change the combination.

3. The combination, substantially as specified, of the tumblers, composed of parts D E, the segments F F, cam-slide J, and cap-plate G, for the purpose set forth.

ERNST BERNHARDT.

Witnesses:

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