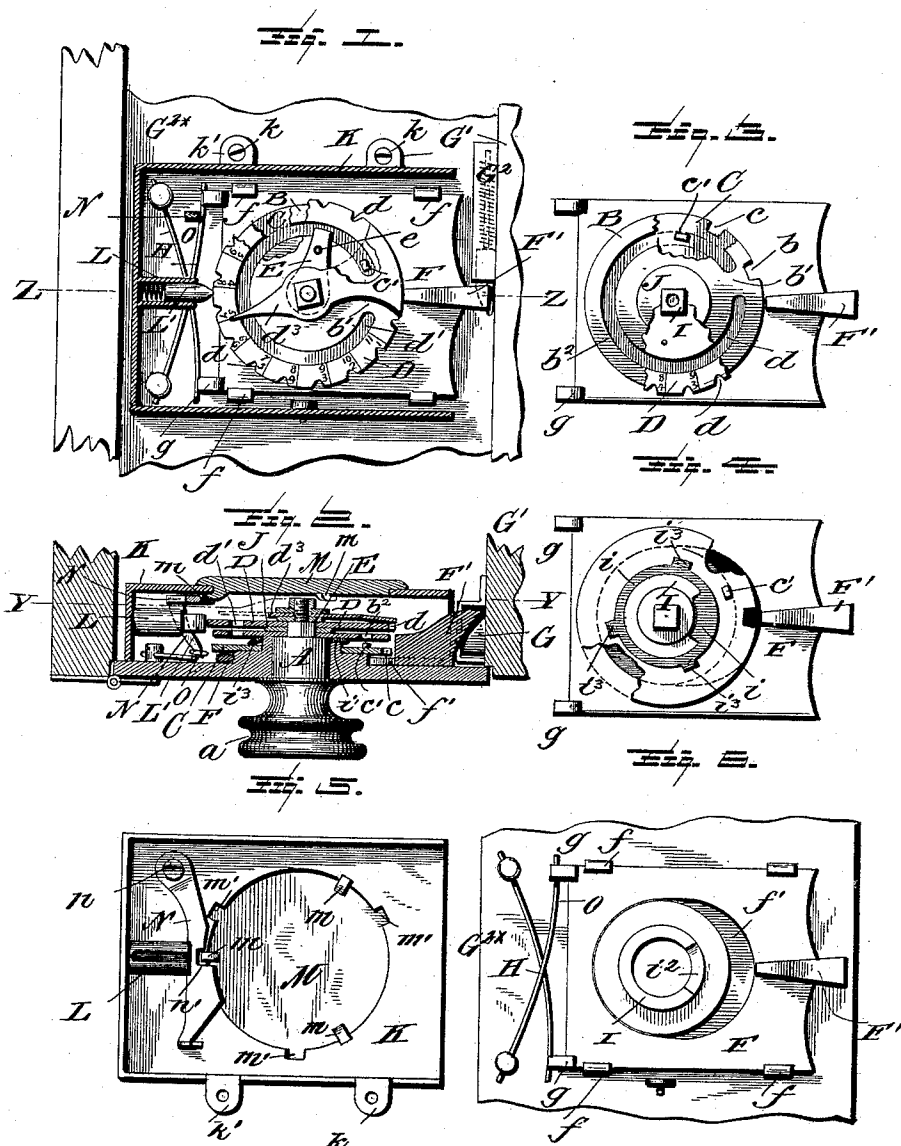


(Model.)

M. L. HALL & W. H. ELDRIDGE.
PERMUTATION LOCK.

No. 465,131.

Patented Dec. 15, 1891.



Witnesses:

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UNITED STATES PATENT OFFICE.

MARQUIS L. HALL AND WILLIAM H. ELDRIDGE, OF OMAHA, NEBRASKA.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 465,131, dated December 15, 1891.

Application filed July 11, 1891. Serial No. 399,146. (Model.)

To all whom it may concern:

Be it known that we, MARQUIS L. HALL and WILLIAM H. ELDRIDGE, citizens of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Permutation-Locks; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon.

This invention relates to certain new and useful improvements in permutation-locks, and is designed more particularly as an improvement upon the construction shown in the Patent No. 453,238, granted to us June 2, 1891.

The invention has for its objects, among others, to constitute it a lock that may be operated in the dark by the sense of touch or sound. To improve the catch so that when the knob is pulled the bolt strikes and is forced back, thus allowing the door to open by simply pulling on the knob.

The invention has for a further object to improve generally upon this class of locks to make them more perfect in their construction and operation and less liable to get out of order. In the present instance the pin that moves the loose disk is attached to an arm which is fastened to the shaft and held by the nut that holds the fixed disk, the pin passing through a slot or slots in the fixed disk as it acts upon the loose disk. We form the end of the catch with an incline, with which the bolt engages and permits the door to be opened by a simple pull on the knob. We place a third disk upon the knob-shaft, which disk has a notched or pointed periphery, a pointer being used which is attached to a spring, which spring presses the point into the notches as the disk turns by turning the knob, the point passing from notch to notch, making a clicking sound that may be readily heard and an impression easily felt. The face of the disk is provided with figures arranged in circular form with two figures in a place, running in opposite directions, one of which denotes the number of clicks the disk is to be turned forward and the other so many clicks in the opposite direction to bring the two slots

in the fixed and loose disks coincident. This third disk is provided with circular slots corresponding with those in the fixed disk, through which the pin passes to move the loose disk. A flat strip of metal is attached to the shaft and extends across the face of the disk. This we term the "bridge." It is formed at one end sufficiently wide to cover two or more notches, the other end being reduced to a point and designed to rest at two of the figures. When the disk is turned, the bridge passes under the spring-point, causing no sound or vibration until the point reaches the first notch of the disk not covered by the bridge.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be specifically defined by the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a rear elevation of our improved lock, with portions in section and parts broken away. Fig. 2 is a horizontal section on the line *z z* of Fig. 1, the line *y y* in this view showing the line on which the section of Fig. 1 is taken. Fig. 3 is an elevation of the catch removed and portions of the disks broken away. Fig. 4 is a like view with the notched disk removed and the other disks broken away. Fig. 5 is an inside view of the case removed. Fig. 6 is an inside view looking at the parts inside the case, the shaft being removed, the view being taken looking toward the front of the lock, the disks also being removed.

Like letters of reference indicate like parts throughout the several views.

The lock, as hereinafter described, is adapted for use in all places where locks of this character are desirable to be used, and we wish the scope of our present invention to be so understood.

Referring now to the details of the drawings by letter, A designates a shaft or spindle having at its outer end an operating knob or handle *a*, by which it may be revolved, and B is a disk which is secured to the shaft in such a manner as to at all times revolve therewith, and therefore, for convenience in distinguish-

ing the several disks, we will call this the "fixed" disk. This disk is provided with a short radial slot *b*, extending inward from its periphery, and with a circular slot extending nearly the entire circumference of the disk, leaving a portion *b'*, which serves as a stop, as will hereinafter appear. This circular slot *b*² is seen best in Figs. 1 and 3. Any suitable means may be employed for connecting these parts—such, for instance, as is described in our prior patent or any other preferred means.

C is a loose disk upon the shaft and provided with a radial slot *c* and with a projecting pin or lug *c'*, as seen in Figs. 1, 2, 3, and 4, which works in the circular slot of the fixed disk, as seen in said views. These two disks are of substantially the same diameter, as seen in Fig. 2, and their radial slots are designed at predetermined periods to be coincident with each other.

D is the third disk. It is fast upon the shaft, so as to revolve therewith at all times. It is provided around its periphery with a plurality of notches *d*, which are numbered with two sets of figures, which are reversely arranged—that is, one set running in one direction around the disk and the other set in the opposite direction, as seen clearly in Fig. 1. This disk is provided with a circular slot *d'*, which is coincident with the circular slot of the fixed disk, as seen best in Fig. 1. The slot in this third disk is interrupted by the bridge E, which is a piece of metal which is fast upon the shaft and extends flush with the periphery of the third disk and is of sufficient size to cover two or more of the notches in said disk. Its other end is reduced to form a pointer *d*³, as seen in Fig. 1.

Any suitable means may be employed for securing the disk upon the shaft.

E is an arm fast upon the shaft and secured also to the third disk, as seen at *e*, and provided with a portion at right angles to its length and working in the circular slots of the third and fixed disks and adapted to engage the lug *c'* of the loose disk and move said loose disk at predetermined times. A washer *i* separates the fixed and loose disks, as seen best in Fig. 2. It is formed with a segmental portion *i'*, which engages a similar recess *i*² in the boss I of the outer plate or face of the part to which the lock is applied and through which the shaft A passes, as seen best in Figs. 2 and 4. It has lugs or prongs *i*³, which are bent at an angle, so as to raise the washer slightly from contact with the disk. A washer J separates the fixed and third disks, as seen in Fig. 2.

The bolt F consists of a plate designed to slide between the lugs *f* on the inner face of the part to which the lock is applied and provided with an elongated opening *f'*, embracing the boss of the said part, as seen in Figs. 2 and 6, and at one end it is provided with the tapered or inclined latch or tongue F', which is designed to engage the catch G upon

the frame or other part G', the said catch being beveled or inclined upon its acting face and urged outward by a spring G², arranged in a suitable casing, as seen in Fig. 1. The bolt is urged forward by suitable means, as the springs II, which are crosses, as shown in Figs. 1 and 6, one end of each being secured to or arranged to act against a lug *g* on the end of the bolt-plate, as seen in Fig. 6, and the other ends being secured to some fixed part on the part G², as seen in Fig. 6.

K is a casing designed to cover the parts above described. It may be secured detachably in place in any suitable manner, as by screws or other means *k*, passed through the the apertured lugs or ears *k'* of the said casing, the casing being open upon the end through which the bolt-plate works, as seen in Figs. 1 and 2. Within this casing, in line with the movement of the bolt, is a barrel or chamber L, within which is arranged to work a spring-actuated pin L', which is normally forced outward and engaged with a notch of the third disk. The disks are accessible through an opening in the back of the lock and protected by a cap M with lugs *m* upon it, and the back of the lock provided with notches or slots *m'* around the said opening therein, as seen in Fig. 5. When the cap is placed on, the lugs should be coincident with the said notches or slots, and then by turning the cap the lugs clasp the back of the lock, as seen in Fig. 5, and the cap is thus held fast and cannot be removed until the lock is open.

N is a lever pivoted at *n* to the inner face of the back of the lock and provided with a notch *n'* to engage one of the lugs of the cap. The movement of the bolt in closing the lock presses the lever down, so that its notch engages one of the lugs of the cap and prevents it from turning until the lock is opened. The lever is then raised by a spring O, which allows the cap to be turned until its lugs are coincident with the notches in the back of the lock, when the cap may be taken off. To remove the cap when the lock is opened press on the bolt and turn the cap to the left and lift it off.

Various modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

With the parts constructed and arranged as above described, the operation will be readily understood. As the knob is turned, the fixed and third disks are turned with it and the point of the pin L' rides from notch to notch of the third disk, making a clicking sound. When the disk is turned, the bridge passes under the spring pin or point, causing no sound or vibration until the point reaches the first notch beyond the bridge, when the first click is heard, and then the count commences. After counting the predetermined number of clicks the knob is then turned backward until after the bridge is passed and then the count

commences. The number of counts backward and forward are determined by the figures at the pointer. These counts may be changed as occasion may require by moving the bridge and bringing the pointer to another set of figures. The loose disk is moved to bring its radial slot coincident with the slot of the fixed disk by the bent end of the arm E engaging the lug of the loose disk.

10 What we claim as new is—

1. In a permutation-lock, the combination, with a series of tumblers or disks and means for rotating them, of a notched disk, a spring-actuated pin engaging the same, and a bridge covering one or more of the notches, as set forth.

2. In a permutation-lock, the combination, with a fixed disk, a loose disk, and a notched disk, and means for rotating them, of a spring-actuated pin engaging the periphery of the notched disk, and a bridge covering one or more of the notches and provided with a pointer, as set forth.

3. In a permutation-lock, the combination, with a fixed disk, a loose disk, a notched disk, and means for rotating them, of a spring-actuated bolt, a spring-actuated pin, and a bridge and pointer, as and for the purposes specified.

30 4. In a permutation-lock, the combination, with the fixed disk having radial and curved slot, of the loose disk having radial slot, the notched disk having curved slot, the lug on the loose disk, and the arm on the shaft of the disks, having bent portion extending through

the said curved slots and adapted to engage the said lug, substantially as specified.

5. In a permutation-lock, the combination, with the fixed, loose, and notched disks and their shaft, of the bridge and pointer, the spring-actuated pin, the spring-actuated bolt, and the arm on the shaft having bent portion to operate the loose disk, as set forth.

6. In a permutation-lock, the combination, with the lock-case and its inclosed parts, of a cap to an opening in said case having lugs, and a lever actuated by the bolt of the lock to engage one of said lugs to hold the cap in place, as set forth.

7. In a permutation-lock, the combination, with the lock-case and its inclosed parts, said case being provided with an opening having notches, of a cap fitted to said opening and provided with lugs, a spring-actuated lever having a notch to engage one of the said lugs, and the spring-actuated bolt, all as and for the purpose specified.

8. In a permutation-lock, a notched disk provided with two sets of figures reversely arranged, and a bridge having a portion extending over one or more of said notches and adapted to serve, substantially as specified.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

MARQUIS L. HALL.

WILLIAM H. ELDRIDGE.

Witnesses:

BUT ROBERTS,

I. N. PATRICK.