(Model.)

C. SEYBOLD.

PERMUTATION LOCK.

No. 255,463. Patented Mar. 28, 1882.

Fig. 1.

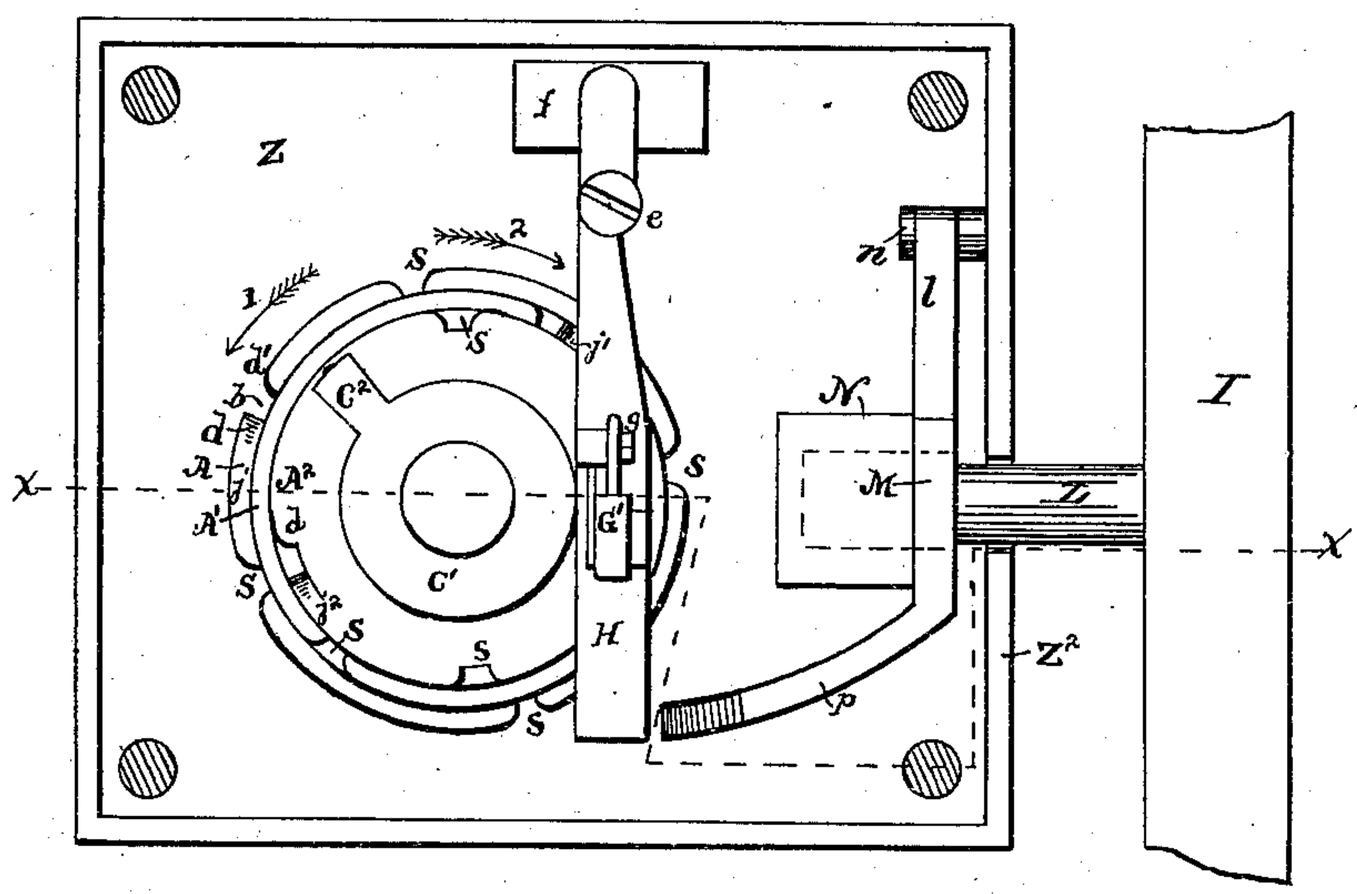


Fig. 2.

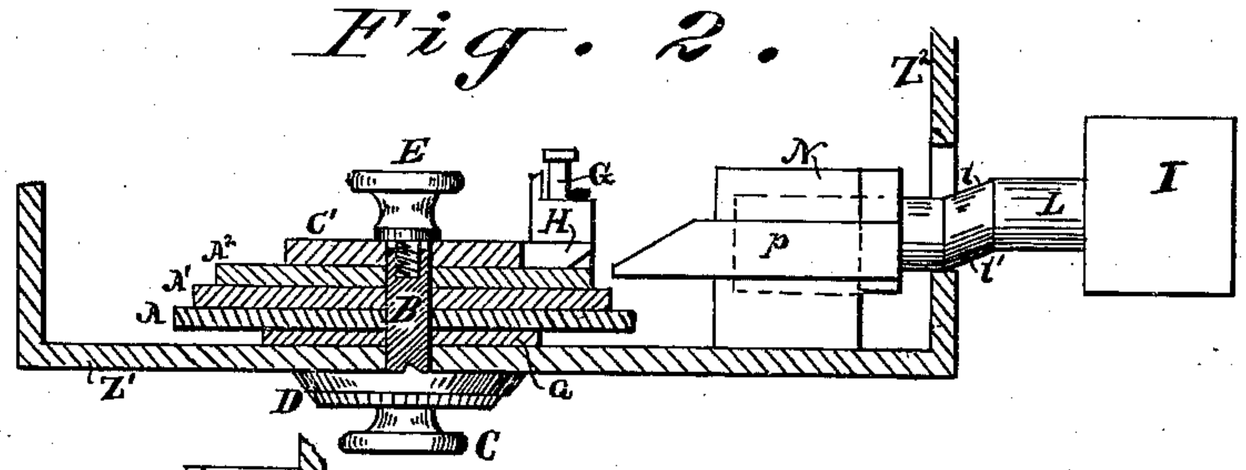


Fig. 3.

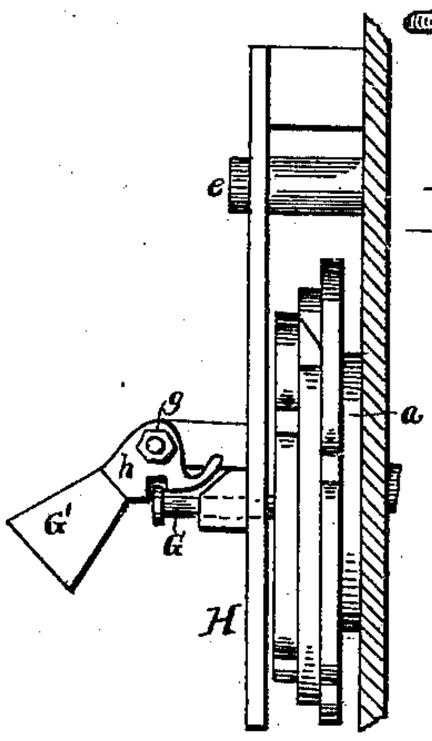
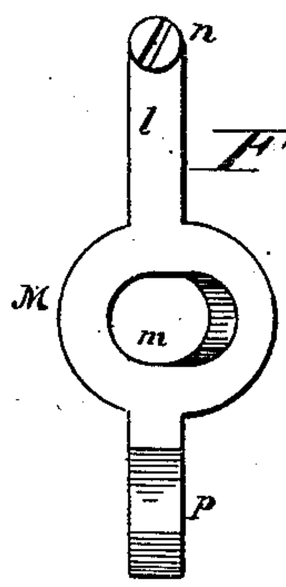


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES SEYBOLD, OF CINCINNATI, OHIO.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 255,463, dated March 28, 1882.

Application filed May 6, 1881. (Model.)

To all whom it may concern:

Be it known that I, CHARLES SEYBOLD, of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Combination-Locks, of which the following is a specification.

My invention relates particularly to locks for safes and vaults; and its object is to provide a lock the operation of which shall be perfect, and at the same time simpler than the operation of locks as heretofore constructed, and this object I accomplish by the simplicity of construction.

The various features of my invention and the manner in which its object is accomplished will be apparent from the drawings and the following description.

Referring to the drawings forming part of this specification, Figure 1 is an elevation representing the interior of the lock. Fig. 2 is a sectional view, looking up, taken through the line *x x*, Fig. 1. Fig. 3 is a view looking at the edge of the tumblers. Fig. 4 is a perspective view of a detached portion.

Z is the box, which is recessed into the door of the safe or vault, and in which the various parts of the lock are situated.

A A′ A² are the circular tumbers, by means of which, with the aid of intervening mechanism, the bolts are permitted to slide back or prevented from sliding back, at will. These circular tumblers are arranged upon an arbor, B, which passes through the side of the box and terminates in the usual hand-knob, C, employed to turn the arbor and tumblers.

Upon the outside of the box, concentered upon and with a square portion of the arbor B, is the usual index-disk, D, secured between said knob and the side of the box.

Inside the box is the disk *a*, rigidly attached to the arbor, and the tumblers are fixed and prevented from turning by being clamped between this disk *a* and the disk or crank-piece C′ by means of the bolt E, (preferably a thumb-bolt,) screwed into the end of the arbor B. The tumblers are of different diameters, space being left at the side of each tumbler between the edge of the periphery of one and that of the next adjacent tumbler for the pin G of the swinging piece H to ride upon said side. The edge of each tumbler is provided with the operating-notches *b*, for the reception of the pin G. These operating-notches have one edge, *d*, inclined or beveled across the plane of the tumbler and the other edge, *d′*, rounded, as shown.

The swinging piece H swings upon pivot *e*, which latter is fixed to the box Z; and to enable the swinging piece H to swing steadily and with reduced strain and friction when called to operate upon the tail-piece *p* of swinging lever M, I preferably extend the swinging piece H above the pivot *e* and provide a smooth bearing, *f*, elevated from the box Z, and against which said extension shall bear and upon which it shall move. The swinging piece H carries the pin G, which slides in a hole in said piece, and is continually pressed toward the side Z′ of the box by a suitable device—as, for example, a spring—and in the present instance is pressed forward by the swinging weight G′, pivoted to the piece H at *g*, and operating upon the head of the pin G by means of the projection *h*. The pivot *e* of the swing-piece H is so located that when the said piece H hangs straight it assumes the position shown in Fig. 1.

The method in which this part of my invention operates is as follows: The tumblers are set with reference to each other and the index D, and then clamped in position by means of the said thumb-bolt E. The safe is locked by rotating the disk one revolution, which act causes the projection C² to throw the swinging piece H to the right and allow the pin G to shoot forward beyond and against the edge of tumbler A. The tumblers are now rotated by means of the knob C until the notch *b* in tumbler A comes opposite the pin G, when the tendency of the swinging piece to hang straight will bring the pin into said notch *b*. Now, if the index is rotated in the wrong direction—viz., in the direction of arrow No. 1—the pin will be thrown out and back upon the periphery of the tumbler A; but if the index be rotated in the other direction—viz., indicated by the arrow No. 2—the pin G will mount the bevel and ride upon the portion *j* of the side of the tumbler A. The index is now turned till the notch *b* in tumbler A′ comes opposite the pin G, when the tendency of the piece H to hang straight will cause the pin G to enter said

notch *b*, and the index being now turned in the direction not of arrow 2, which would cause the pin to pass out of the slot and remain on portion *j* of tumbler A, but in the direction of the arrow No. 1, the pin mounts the incline *d* of said notch and rides upon the portion *j'* of tumbler A'. The index being now turned in the direction of arrow No. 2, the notch *b* of tumbler A^2 is brought opposite the pin G, when the tendency of piece H to hang straight causes this pin to enter said notch, and the index being turned in the direction of the arrow No. 1, the pin G is caused to mount the part j^2 of tumbler A^2, and is now against the periphery of the disk or piece C'. The swinging piece H is now in the position shown in Fig. 1, and the parts are now in position that the bolts may be retracted and the safe unlocked.

Various forms of mechanism for permitting the bolts to be retracted and for preventing their retraction may be employed in connection with the above-described mechanism and operated in part or in whole by the swinging piece H. In the present instance I herewith, in the subjoined description, present one form of mechanism for thus governing the retraction of the bolts.

I is the usual bolt-piece, to which the bolts are attached, suitably supported and connected by suitable mechanism of any desired kind, with the usual handle by which the bolts are shot out and retracted. This bolt-piece I is provided at rear with a piece, L, which passes through the end Z^2 of the box Z. The sides of this piece are preferably beveled, as shown in Fig. 2. Immediately at the rear of piece L swings on pivot *n* a lever, M, composed of tail-piece *p* and piece *l*, having an orifice, *m*, so located that when the lever is left to itself said orifice will be opposite the end of piece L, and the latter can pass through it. The end of tail-piece *p* is beveled, as shown in Fig. 2. A box, N, of metal, is secured to the side of the box Z, and contains a recess of proper size for the reception of the piece L when the bolts are retracted.

The operation of the entire device is as follows: When the swinging piece H assumes the position shown in Fig. 2 the lever M swings to a perpendicular position—viz., that shown in Fig. 2—and the orifice *m* of said lever is in such a position as to allow the piece L to pass within it. The piece I and locking-bolts are now retracted by turning the usual handle, and the piece L passes into orifice *m*, the bevel *t* of the said piece carrying the lever M a little to the left, looking at the Fig. 2 from the end which is at the left hand in the drawings, and the piece L passing on and into the recess in box N. The square edge of the tail-piece *p* of the lever M is now opposite the square adjacent edge of the swinging piece H, and any attempt to throw the latter piece to one side and cause the pin G to slip off from the side j^2 of tumbler A^2 will be prevented by the square edge of piece H impinging against the square edge of the tail-piece *p*. Thus this swinging piece cannot be rendered inoperative, as might be the case were the end of tail-piece *p* permitted to remain in the position shown in Fig. 2, the swinging piece when thrown out by the piece C' being wedged upon the bevel of the tail-piece *p*.

When the safe is to be locked the piece I and the bolts are shot out and the piece L is moved forward, the bevel *t'* thereon causing lever M to return to its perpendicular position, as shown in Fig. 2. The index-disk is now rotated, and the stud C^2 of the piece C' throws the swinging lever to the right, and until the pin G passes beyond the outer edge of the tumbler A the swinging piece in its movement impinges against the bevel of the tail-piece *p* of the lever M, thereby moving the lever to one side and causing the orifice to pass from coincidence with the end of piece L and to place a part of the flat surface of the lever M immediately behind the piece L. Thus the piece L cannot now be retracted and the safe is securely locked. The safe is unlocked by turning the index in the manner first hereinbefore described.

In order to deceive any burglar desiring to enter the safe and attempting to find the combination of the tumblers by means of the click or noise caused by the entering of the pin G into the operating-notches, the tumblers are provided with false or blind notches, as S, not inclined across the plane of the tumblers, but rounded at both edges, as shown. Into these notches the pin G falls as the disk is rotated, and immediately passes out of same without mounting any of the sides—*i. e.*, portions *j j' j²*—of the tumblers A A' A^2. Thus these false notches, while not interfering with the operation of the pin G, do, in connection with the true or operative notches *b*, deceive the burglar and render futile his attempts to find the index combination of numbers.

I do not confine myself to any particular number of tumblers, but expect to vary the number in each application of the device as may prove most desirable, and the use of any number of said tumblers will fall within the scope of my invention.

My improved arrangement and construction of the arbor, tumblers, and the devices for holding the tumblers rigidly in position enable me to dispense with the usual sleeve for carrying the tumblers, and with all extra mechanism for connecting the arbor to the tumblers, and this part of my invention is applicable to tumblers provided with notches other than those I have herein shown.

Instead of the screw-bolt E, the arbor may be made to extend beyond piece C', and a screw-thread being formed on said extended end, a nut may be screwed thereon to clamp the piece C' and the tumbler to disk *a*.

My invention enables me to set each of the numbers so as to be included in less than an entire revolution of the index, so that the grasp of the fingers upon the thumb-knob need not be removed while finding the combination.

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

1. The combination of the index, rotating tumblers provided with notches *b*, each having a side, *d*, beveled obliquely to the plane of the tumbler, and a locking-pin, G, pressed forward by mechanism, substantially as and for the purposes specified.

2. The combination of the index, rotating tumblers provided with notches *b*, each notch having a side, *d*, inclined obliquely to the plane of the tumbler, and swinging piece H, having movable pin G, pressed forward by a suitable device, substantially as and for the purposes specified.

3. The combination of the index, rotating tumblers provided with notches *b*, each having a side, *d*, inclined obliquely to the plane of the tumbler, piece C′, and the swinging piece H, having movable pin G, pressed forward by a suitable device, substantially as and for the purposes specified.

4. The combination of the index, arbor B, thumb-knob C, disk *a*, tumblers provided with notches, each having a side, *d*, inclined obliquely to the plane of the tumbler, piece C′, swinging piece H, and pin G, actuated by weight G′, substantially as and for the purposes set forth.

5. The combination of piece L, swinging lever M, provided with tail-piece *p*, and the swinging piece H, and operating mechanism, substantially as and for the purposes specified.

6. The combination of the tumblers and driving-arbor, the said tumblers resting directly on said arbor and fixed rigidly thereon, substantially as and for the purposes set forth.

CHARLES SEYBOLD.

Attest:
E. H. FOSTER,
E. R. HILL.