

(Model.)

2 Sheets—Sheet 1.

E. STOCKWELL. Permutation Lock.

No. 233,950.

Patented Nov. 2, 1880.

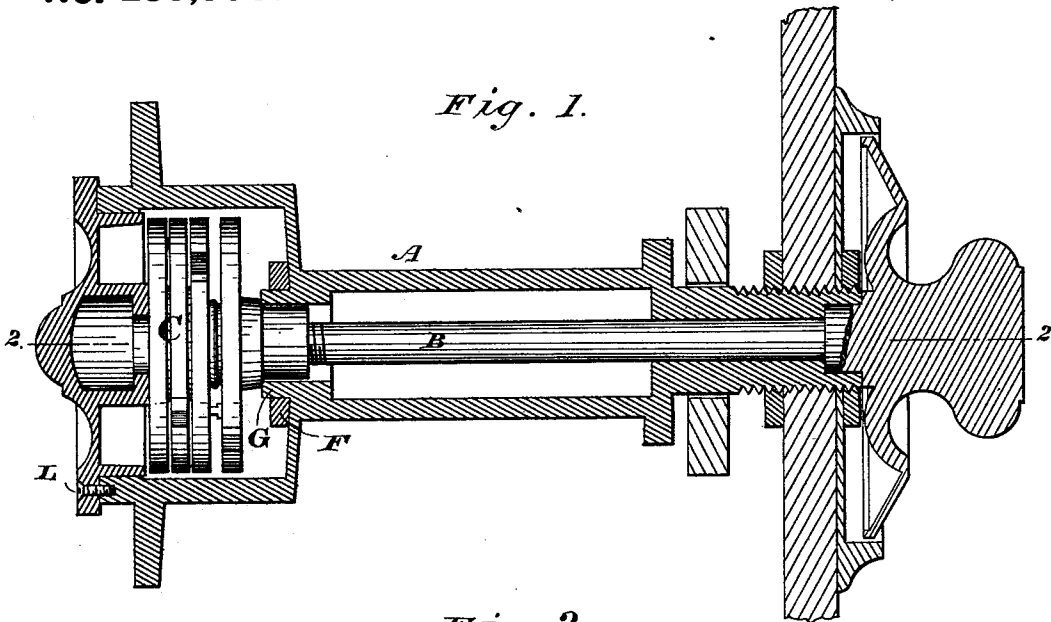


Fig. 1.

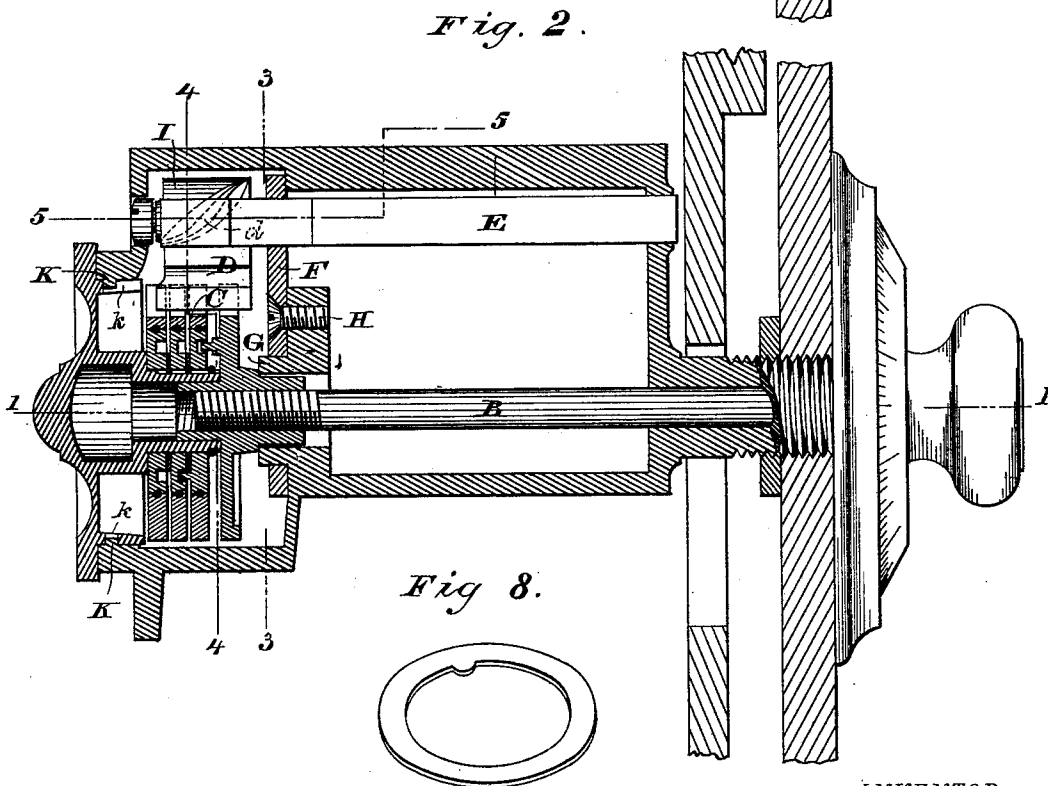


Fig. 2.

Fig. 8.

WITNESSES

Wm. A. Smith,
Robertson Buchanan.

INVENTOR

Emory Stockwell.

By his Attorneys

Baldwin, Hopkins, Peigton.

(Model.)

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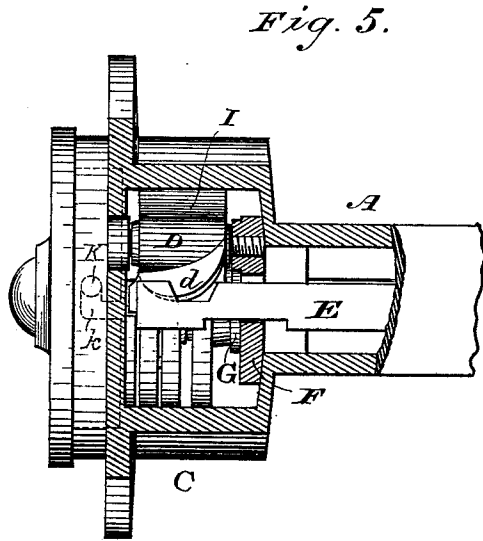
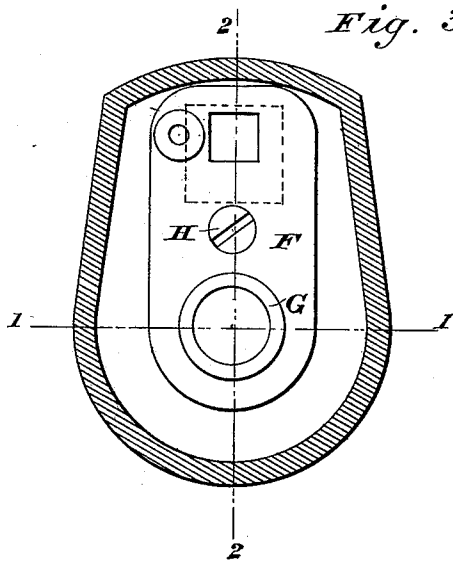
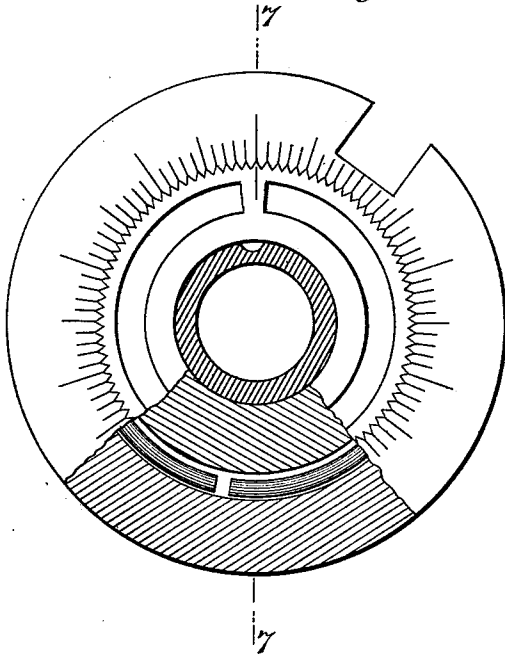
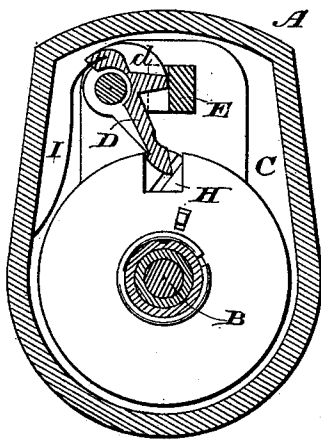


Fig. 4.

Fig. 7.

Fig. 6.



WITNESSES

Wm. A. Smith,
Robert Dean Buchanan.

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Baldwin, Hopkins, & Peyton.

UNITED STATES PATENT OFFICE.

EMORY STOCKWELL, OF STAMFORD, CONNECTICUT, ASSIGNOR TO THE
YALE LOCK MANUFACTURING COMPANY, OF SAME PLACE.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 233,950, dated November 2, 1880.

Application filed June 7, 1880. (Model.)

To all whom it may concern:

Be it known that I, EMORY STOCKWELL, of Stamford, Connecticut, have invented certain new and useful Improvements in Combination-locks, of which the following is a specification.

My invention relates to improvements in the construction of locks for safes, and particularly to improvements upon the forms of locks shown in the patent of W. K. Marvin, dated July 28, 1874, No. 153,588, and in the patent of H. W. Covert of even date herewith, which latter patent shows and claims a sliding dogging-bolt moving in a direction parallel with the case and spindle of the lock, and also claims operating such dogging-bolt by means of a vibrating fence and cam, and I therefore make no claim to such construction.

My improvements consist in bettering the construction of the lock-case and the operating mechanism of the lock, including the changeable wheels or tumblers, as appears below.

In the accompanying drawings, Figure 1 is a longitudinal section of a complete lock embodying my improvements. Fig. 2 is a longitudinal section on the line 2 2 of Fig. 1. Fig. 3 is a cross-section on the line 3 3 of Fig. 2. Fig. 4 is a cross-section on the line 4 4 of Fig. 2. Fig. 5 is an elevation of the rear end of the lock, partly in section, on the line 5 5 of Fig. 2. Fig. 6 is an enlarged plan view of one of the tumblers, partly broken away. Fig. 7 is a cross-section on the line 7 7 of Fig. 6; and Fig. 8 is a perspective view of one of the tumbler-collars detached.

A indicates the lock-case; B, the spindle; C, the tumbler mechanism; D, the fence provided with an inclined cam, *d*, and E the lock-bolt.

The relations and operation of these parts of the lock are substantially the same as appears in the said patents.

To insure accuracy of location of the inner end of the locking-bolt E relatively to the cam *d* and to the fence D, I introduce a plate, F, which fits over the turned rim or hub G of the lock-case, and is held in place by a screw, H, as shown in Figs. 2 and 3. In the upper end of the plate I form an opening corresponding in shape to a section of the locking-bolt, so that the plate being in position the location of the bolt is accurately fixed and determined. By this mode of construction I insure the nec-

essary accuracy at comparatively slight expense. Without some device of this kind it would be difficult and expensive to form in the lock-case a proper guide and support for the inner end of the bolt.

To insure a quicker action of the fence, I provide it with a spring, I, as shown in Fig. 4. This spring presses the end of the fence gently upon the tumblers and insures the immediate engagement of it with them, after the tumblers have been set, even if they be rotated quite rapidly, whereas without it there is liability of the tumbler-gatings passing without engaging with the fence.

In securing the curb which carries the tumblers to the lock-case, it has been customary heretofore to rely upon screws inserted through its flange. This plan is objectionable, because by pounding or jarring the outer end of the spindle it is sometimes possible to break such screws and drive the curb and tumblers out of the lock, thereby enabling the latter to be immediately opened. Furthermore, the screws are liable to get loose and work back, thus disconnecting the tumblers with the mechanism outside for operating the lock, and this happening of course causes a lock-cut. To remedy this difficulty I provide one or more steel pins or studs, K, Figs. 2 and 5, and make one or more openings, *k*, commonly known as "bayonet-cuts" in the inner rim of the curb.

It will be seen that after pushing the curb into position in the lock-case it can be slightly rotated, and the projecting horn or hook of the opening thereby locked into engagement with the pin or stud. The disengagement of the curb from the stud is prevented by the insertion of a small screw, L, through the curb into the lock-case. Any attempt at driving out the curb will now be resisted by the steel pin or stud, which must be sheared off before the curb can be driven out. No strain is received by the screw L, excepting in the event of an attempt to rotate the curb from the inside of the door. Should it be desired to change the combination, it is only necessary to remove the one screw L, when by slightly rotating the curb it can be immediately withdrawn from the lock-case.

The tumblers which I prefer to use are of the kind known as "hand-changing tumblers"—that is, tumblers which, when it is desired to

change their combination, can be removed from the lock and their parts changed in the hand. They each consist of two disks of metal, one within the other.

5 For economy of manufacture I utilize the punching, which is removed from the center of the larger disk, M, to form the inner disk, N. As its diameter will be slightly too small for this purpose, I increase it after it has been
10 punched out by swaging or otherwise slightly expanding it. In this way I am able to produce my tumbler with the greatest possible economy of material.

The outer rim or disk of the tumbler is provided with the usual gating or notch, and has stamped or engraved upon one of its faces the desired graduations. A series of notches or teeth corresponding in number to the graduations on its face are formed in the interior
15 edges of the circular opening through the disk. The inner or smaller disk has on its exterior edges a corresponding series of notches or teeth, each of which when the two disks are put together engages with the corresponding
25 notches of the other, thus locking the two together in the most absolute and secure manner. To hold the two disks together I employ a split ring or spring, as shown in Fig. 6, which is placed in a groove formed within the
30 outer disk. A slight notch is formed on the exterior edge of the inner disk, as shown in Fig. 7, into which the spring-ring fits when the two disks are together. The aperture through the exterior or larger disk is of equal
35 diameter throughout, so that the inner disk can be inserted or pushed out from either side.

I am aware that a tumbler of somewhat similar construction has heretofore been patented by H. W. Covert; but the tumbler shown in

said patent is quite expensive to manufacture, and necessarily occupies much more space than the improved tumbler herein described.

In my improved tumbler the teeth of both disks are conical, and are always plainly in sight during the time that the tumbler is being set to the desired number, so that it is always
45 easy to rotate one disk without the other to the point at which their teeth or notches are in coincidence, and the two disks can thus be easily pushed together. The spring-ring employed within the outer disk gives just sufficient friction or resistance to prevent the disengagement of the two disks by accident, and yet enables the person using the lock to at
50 any time disengage the disks for the purpose of changing the combination.

Having thus described my improvements, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a lock-case, A, provided with the internal hub, G, the detachable plate F, fitting over the hub and provided with a bearing for the locking-bolt E, substantially
60 as and for the purposes described.

2. A tumbler for a combination-lock, composed of an outer disk with teeth on its inner periphery and an inner disk with teeth on its
65 outer periphery, the teeth of the two disks being coincident and extending from the front to the back of the tumbler, the two disks being
70 adjustably held in engagement by a spring or split ring, substantially as described.

In testimony whereof I have hereunto subscribed my name.

EMORY STOCKWELL.

Witnesses:

SCHUYLER MERRITT,
E. D. OGDEN, Jr.