N. FRIEDMAN.

COMBINATION LOCK.

No. 180,758. Patented Aug. 8, 1876.

Fig. 1.

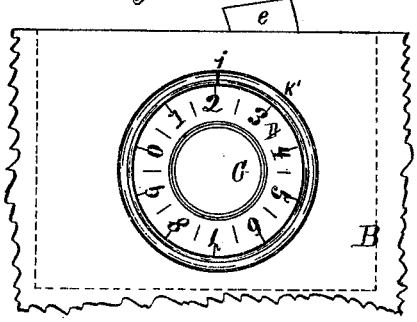


Fig. 2.

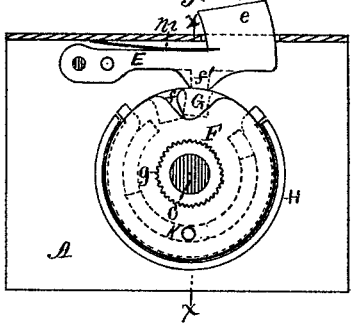
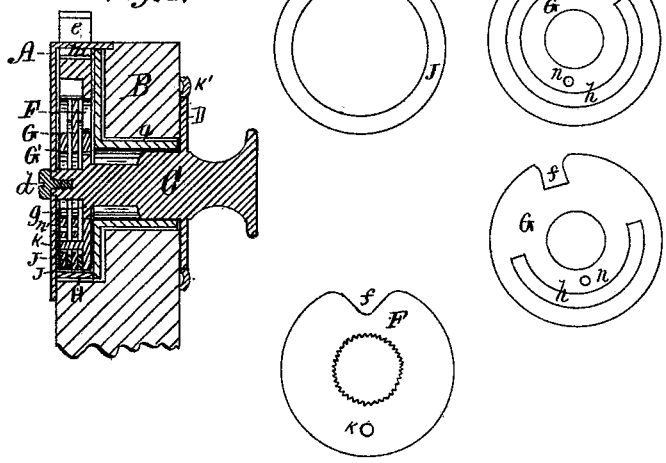


Fig. 3.



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UNITED STATES PATENT OFFICE.

NATHAN FRIEDMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO CAROLINE FRIEDMAN, OF SAME PLACE.

IMPROVEMENT IN COMBINATION-LOCKS.

Specification forming part of Letters Patent No. **180,758**, dated August 8, 1876; application filed May 24, 1876.

To all whom it may concern:

Be it known that I, NATHAN FRIEDMAN, of Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Combination-Locks; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable others skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 represents a front view of a combination-lock embodying my invention. Fig. 2 represents a front elevation of the same with front plate removed, and Fig. 3 represents a transverse sectional elevation of the same, taken on the line *x x* drawn through Fig. 2.

Like letters of reference indicate like parts.

My invention relates to that class of combination-locks employing notched tumblers, and a graduated index-plate for regulating and determining the position of the tumblers with relation to each other, so as to operate the latch; and my invention consists in the combination and arrangement of the several parts of the lock, as hereinafter described and claimed.

In the drawing, A represents the case of the lock, and B a section of the door, to which the case is attached in the usual manner. C is the operating spindle, loosely fitted within an annular sleeve, *a*, attached to, or made a part of, the inner wall of the lock-case, and extending through the door, as shown in Fig. 3, and from the door a distance sufficient to form a knob, by which the same may be rotated. The spindle C passes through the door and lock-case, and is provided with an annular index-plate, D, which bears against the outer face of the door, and is secured within the door and lock-case by a set-screw, *d*, passing into the end of the spindle, and adjusted to bear against the inner wall of the case. E is the latch, which is pivoted to the inner side of the inner wall of the case, and so adjusted as to admit of a free and easy tilting movement. The latch is provided on its upper surface with a lug, *e*, which extends through a mortise in the edge of the case, and is so adjusted as to pass into the lock-catch attached to the jamb-casing of the door when the latch is at the limit of its upward movement. F and G G′ are the tumblers, each of which consists of an annular disk of thin metal. The said tumblers are loosely fitted within an annular rim, H, which is permanently secured to the inner wall of the case, as shown in Fig. 2. Each of the tumblers is provided with a notch, *f*, formed in its periphery, and so adjusted as to receive a depending catch, *f′*, on the latch, when the respective tumblers are turned to the proper position to bring the notches in line with each other, and immediately under the catch. J J are sheet-metal washers, which are loosely fitted within the rim H, between the respective tumblers, by which means the tumblers are prevented from coming in contact with each other. The spindle C is provided with a collar or flange, *g*, rigidly secured thereon, and so as to be in the same plane with the tumbler F, as shown in Fig. 3. The diameter of the said collar is such as to allow it to pass loosely through the sleeve when the spindle is being adjusted within the case, and the periphery of the collar is serrated transversely across its face, as shown in Fig. 2, and adapted to fit a corresponding serrated aperture formed centrally through tumbler F, by which means the tumbler F and spindle are connected, and so as to revolve together. The object of connecting the spindle to the operating tumbler F by means of the serrated collar is to prevent the spindle from moving independently of the tumbler, thereby insuring a positive movement of the tumbler when the spindle is rotated, and at the same time allow the spindle to be readily removed and readjusted without changing the position of the tumbler. The operating tumbler F is provided with an adjusting-pin, *k*, which passes loosely through an annular mortise, *h*, formed in the respective tumblers G and G′, as shown in Fig. 3. The mortise in tumbler G′ exceeds in length the mortise in tumbler G, as shown, and the arrangement of said mortises, relative to the adjusting-pin *k*, is such as to allow the tumbler F to make part of a revolution in either direction, when the notches in the tum-

blers are in line, before the pin is brought in contact with tumbler G at the end of the mortise, and to allow said tumbler F and the tumbler G to make a further revolution before the pin is brought in contact with tumbler G′ at the end of the mortise, by which means the respective tumblers are moved to bring the notches into or out of line with each other, and under the catch *f′*, by the rotation of the spindle.

The face of the index-plate is provided with a series of figures arranged at graduated distances each from the other, as shown in Fig. 1. K′ is an annular ring permanently secured to the door around the index-plate, and is provided with an index-line, *i*, arranged in the same vertical plane with the center of the spindle.

The tumblers G and G′ have each a hole, *n*, formed through them between the spindle and mortise, and in a line with the center of notch *f* and the spindle, and arranged in the same plane with a corresponding hole, *n′*, formed through the inner wall of the case when the respective tumblers are turned to the proper position to bring the notches *f* immediately under catch *f′*. The washers J J are cut away at the upper side, and their ends bent outward against the ends of rim H, so as to prevent them from turning with the tumblers, and from coming in contact with the latch when the notches *f* are in line with each other. Permanently attached to the latch is a spring, *m*, which is adapted to bear against the edge of the lock-case, and forces the latch downward, so as to cause the catch to enter the notches in the tumblers when they are in line. To arrange the notches in the tumblers in line with each other, a suitable metal pin is inserted into the opening *n′* in the lock-case, and pressed against the tumbler G′. The spindle is then turned in either direction until the pin enters the opening *n* in tumbler G. The spindle is then turned in the opposite direction until the pin enters the hole or opening *n* in tumbler G, when the movement of the spindle is reversed until the catch drops into the notches in the tumblers.

The combination on which the lock is set is ascertained by noting the figure on the index-plate which is immediately under the index-line in the ring K′ at the time the pin enters each hole in the tumblers during the operation as above described. In order to change the combination, the spindle is withdrawn from case sufficiently to relieve collar *g* from tumbler F, by removing the set-screw in the end of the spindle, when the spindle is turned partly around and readjusted to the tumbler, the operator noting the figure which is immediately under the index-line in the ring.

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

The combination, with the tumblers F, G, and G′, the tumbler F having the pin *k* adjusted to pass through the annular mortises *h* in the tumblers G and G′, and the open washers J J arranged between the tumblers, as described, of the spindle C journaled within sleeve *a*, and provided with the collar *g*, serrated externally, and adjusted within the serrated aperture formed centrally through tumbler F, substantially as and for the purpose specified.

NATHAN FRIEDMAN.

Witnesses:
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