

H. GROSS.

Permutation Locks.

No. 144,670.

Patented Nov. 18, 1873.

Fig. 1

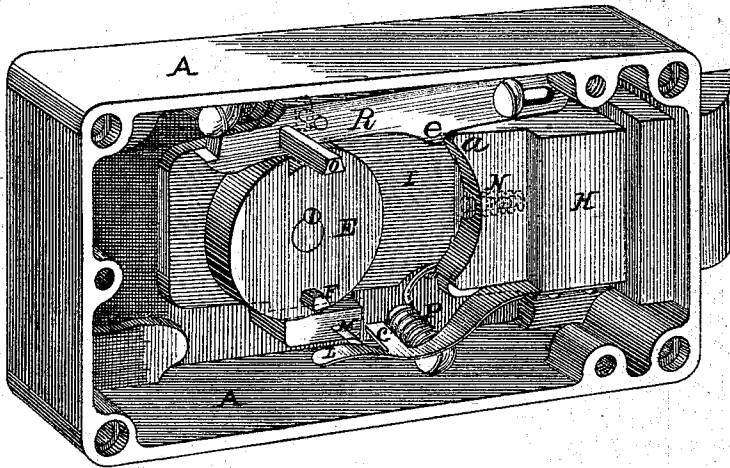


Fig. 2

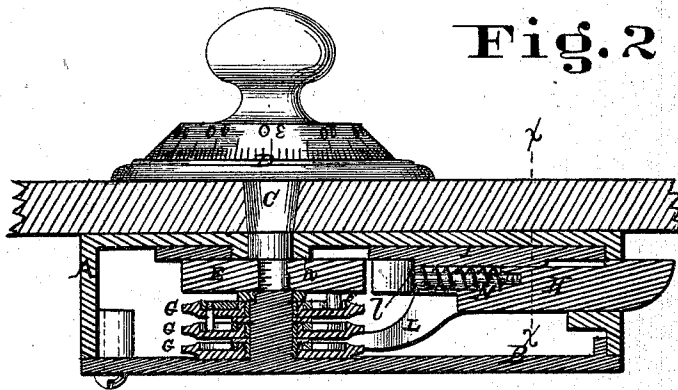


Fig. 3



Attest
Wm. G. Woodward
Richard D. Pullen.

Inventor
Henry Gross

UNITED STATES PATENT OFFICE.

HENRY GROSS, OF CINCINNATI, OHIO, ASSIGNOR TO HALL'S SAFE AND LOCK COMPANY, OF SAME PLACE.

IMPROVEMENT IN PERMUTATION-LOCKS.

Specification forming part of Letters Patent No. **144,670**, dated November 18, 1873; application filed August 11, 1873.

To all whom it may concern:

Be it known that I, HENRY GROSS, of Cincinnati, Hamilton county, Ohio, have invented certain Improvements in Permutation-Locks, of which the following is a specification:

My invention consists in a device so arranged in connection with the locking-bolt that the movement of said bolt in closing the door will throw the tumblers out of combination, and thus avoid the necessity of turning the dial for that purpose, as hereinafter more fully explained.

Figure 1 is a perspective view of a lock embodying my improvement, with the back of the case removed. Fig. 2 is a longitudinal transverse section, and Fig. 3 is a cross-section, of the compound locking-bolt taken on the line *x x* of Fig. 2.

In the drawings, A represents the case, having the nest of tumblers, drive-wheel, and dial arranged in the usual manner. The locking-bolt, instead of being composed of a single piece, as usual, is formed of two parts, H and I, Figs. 1 and 2, and they are connected by means of a dovetail groove, as shown in Fig. 3, which is formed lengthwise in the face of the part H, and in which the part I fits loosely, so that the one can slide upon the other, and each part thus have a movement independent of the other. A screw passing through a slot cut longitudinally in one of the parts, or any equivalent means, may be used to limit their independent movement, so that when one part has moved a certain distance it will then move the other also. The part I is slotted at the point where the spindle C passes through it, and in this slot fits a projection, *n*, formed on the wall of the case, and which serves as a guide for the part I, though it is obvious that any other form of guide may be used instead. A spring, N, is fitted in a recess in the part H, around a pin secured therein, and has its rear end bearing against a projection, *l*, formed on the part I, as shown in Fig. 2, this spring thus tending to force the part H forward and cause its end to protrude from the case, this protruding end being beveled or rounded off after the style of the ordinary latch-bolt, so as to be forced back by coming in contact with the jamb of the safe or vault when the door is

closed. A spring, P, has its end arranged to engage in a notch in the part I, and operates to force it forward also, this latter spring being enough stiffer than the spring N to prevent the part I from being moved when the spring N is compressed by shoving back the part H. It is obvious that any style of springs may be used instead of those shown. To the under side of the part H I secure a spring-arm, L, the rear end of which is slightly curved, and is arranged to come directly under the edge of the tumblers, as indicated in Fig. 2, and as represented in Fig. 1, in which the tumblers are not shown in position. This spring L has projecting laterally from one side an arm, *c*, which, as the part H is shoved backward, strikes upon the front and inclined face of a pin, M, which is secured rigidly to a projection on the lower side of the part I, the projection only being used for the purpose of bringing the pin M into the required position to be struck by the arm *c* when the latter is moved. As the arm *c* rides up the inclined face of the pin M, the rear end of the spring L is thrown up in contact with the lower edge of the tumblers above it, one or more, as the case may be, and as it moves it also moves the tumblers against which it bears, and thus throws them out of combination. But as it is obvious that the tumblers cannot be thus moved so long as the dog O is in their notches, I provide the lever R, to which the fence *o* is secured, with a shoulder or cam, *e*, as shown in Fig. 1, and so locate it that, as the part H is thrown back in closing the door, the upper corner *a* of the part H will strike the cam *e*, and thus raise the lever R, and lift the fence *o* out of the notches in the tumblers, when they are free to be turned. It will be understood that this movement of the fence must occur first, and therefore the parts are so arranged that the shoulder *a* will strike the cam *e* before the spring-arm L is in contact with the tumbler. In order to prevent the spring-arm L from bearing against the tumbler on its return movement, its arm *c* and the pin M are so beveled as to cause the arm *c* to pass down under the pin during its return movement, and thus prevent it from touching the tumbler, which would otherwise be turned

back to the position from which it had been moved.

From the above description it will be seen that the part H of the bolt is automatically thrown back by the closing of the door, and that by such movement of the bolt the tumblers are thrown out of combination, and that, therefore, it is not necessary to turn the dial after the door is closed in order to prevent it from being opened, as it is with permutation-locks of the ordinary construction.

It is obvious that the construction may be varied in its details materially, and still the lock be made to operate the same. For instance, instead of the spring-arm, a pawl may be used to move the tumbler, or friction or gear wheels may be used for that purpose, or any device which will operate on them in one direction and not in the other, the only requisite being that whatever device be used for that purpose shall be operated by the throwing in of the bolt, and thus throw the tumblers out of combination, and cease to operate upon the tumblers when the bolt is thrown out again, thus leaving the lock securely fastened; or, if desired, the parts may be arranged to operate on the tumbler, and break the combination when the bolt moves out, instead of when being shoved in, it only being necessary, in order to do that, to reverse the inclination of the pin M and the arm *c*, so that the spring L would be held away from the tumblers while moving backward, and thrown in contact with them while moving forward.

By this invention the lock is made more secure, and the possibility of leaving it so that

it can be opened in consequence of forgetting to turn the dial after closing the door, is absolutely prevented.

It is obvious that the device may be arranged to operate on one or any number of the tumblers, as desired, and that it may be arranged to operate upon all, or any number, of those next to each other, or on alternate ones, or in any other order desired.

Having thus described my invention, what I claim is—

1. A permutation-lock provided with the spring-bolt H, which is forced back by simply shutting the door, and arranged to operate upon the tumblers to throw them out of combination when the door is closed, the construction and combination being substantially such as is herein described.

2. The compound bolt H I with the springs N and P, and the spring-arm L provided with the arm *c*, and the guide or pin M, in combination with one or more rotating tumblers, the said parts being arranged to operate substantially as and for the purpose set forth.

3. The lever R, provided with the incline or cam *e*, in combination with the spring-bolt H, arranged to operate as set forth, whereby the fence is raised out of the notch in the tumblers by the movement of the part H, as described.

In testimony of which invention I hereunto set my hand.

HENRY GROSS.

Witnesses:

HENRY MILLWARD,
RICHARD T. PULLEN.