H. GROSS.

Permutation Locks.

No. 145,171. Patented Dec. 2, 1873.

Fig. 1

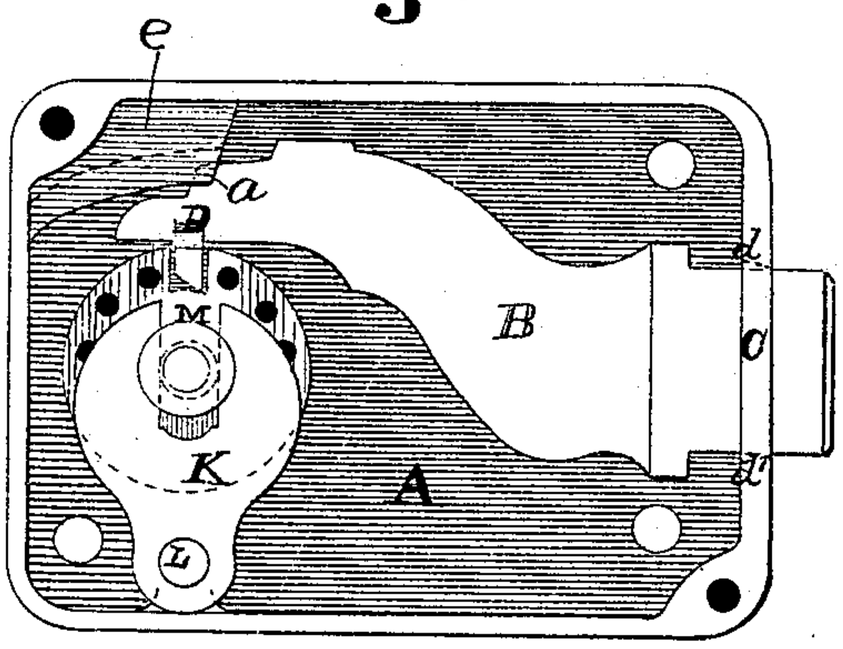


Fig. 2

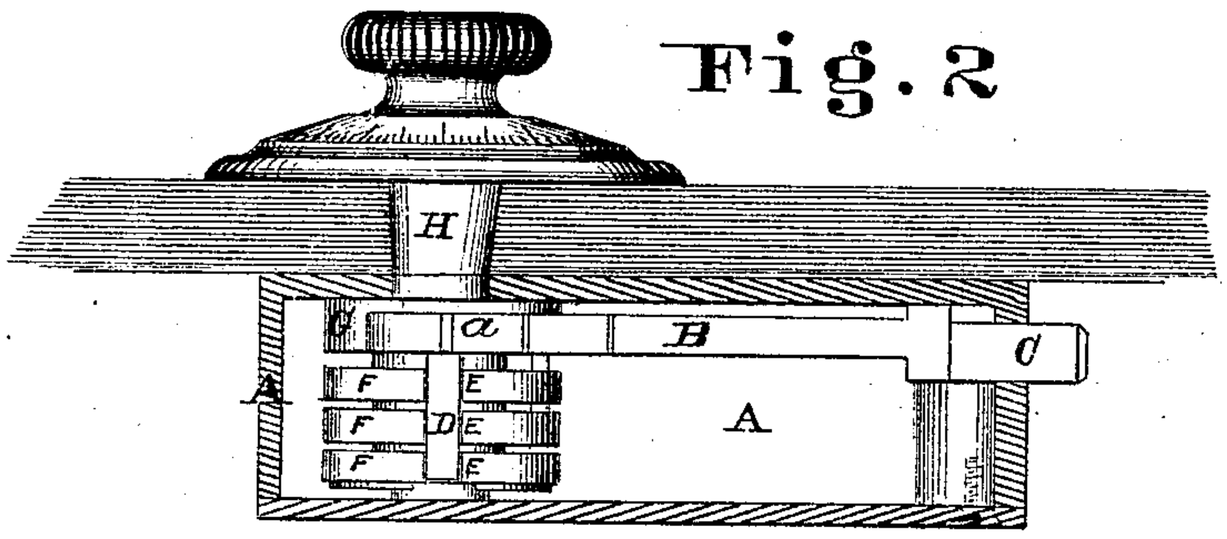


Fig. 3

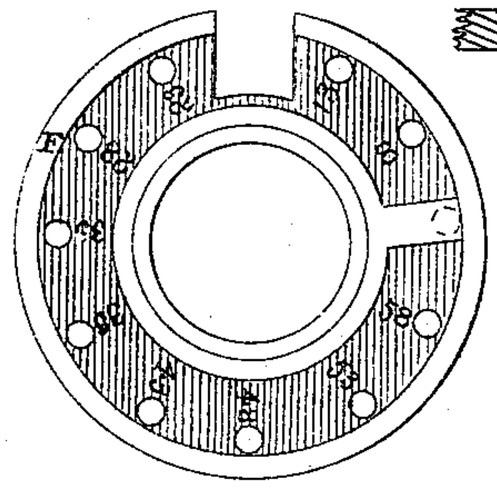
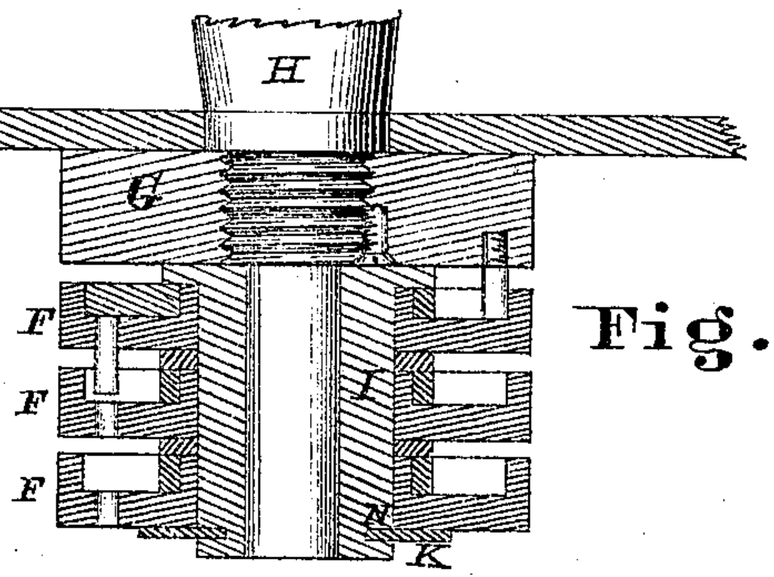


Fig. 4



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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. **145,171**, dated December 2, 1873; application filed August 11, 1873.

CASE D.

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 constructing the bolt and dog in a single piece, and arranging them, in combination with the tumblers and drive-wheel, in such a manner as to dispense with the separate dog and accompanying devices usually embodied in locks of this character, and also in an improved method of securing the tumblers upon the sleeve on which they revolve, as hereinafter more fully explained.

Figure 1 is a side elevation of my improved lock with the back plate or cover removed. Fig. 2 is a transverse horizontal section on a line along the upper face of the locking-bolt. Fig. 3 is a front or face view of one of the tumblers with its yoke attached. Fig. 4 is a transverse horizontal section through the center of the tumblers and the drive-wheel.

In constructing my lock, I provide a case, A, in the upper rear corner of which is a solid abutment, *e*, against which the bolt B engages when locked, this abutment being grooved on its under side, as indicated by dotted line, Fig. 1, and in which groove the rear end of the bolt B slides when moved, the groove thus serving as a guide for the rear end of the bolt, and serving to keep it in place, with reference to the drive-wheel and tumblers, though other means may be used for this purpose, if desired. The bolt B, with its dog D, which projects at right angles from its side near the rear end, as represented in Figs. 1 and 2, is made of a single piece of metal, or, if of more than one piece, they are rigidly connected, so as to form a single solid device with no yielding or moving joint; and it is provided on its upper edge, near its rear end, with a shoulder, *a*, as shown in Figs. 1 and 2, so located that when the rear end of the bolt is elevated by the drive-wheel G, to throw the dog out of the notch in the tumblers, as hereinafter described, this shoulder *a* will be raised and held in front of the abutment *e*, against which it will rest, and thus be securely locked.

The tumblers F are made, as represented in Fig. 3, with an adjustable yoke for facilitating changes in the combination, but which, forming no part of this invention, need not be further described, especially as any of the various styles of tumblers may be used in this lock. The tumblers F are all mounted loosely upon a sleeve, I, Fig. 4, which latter is mounted loosely upon the spindle H, to which latter the drive-wheel G is secured rigidly, as usual. The sleeve I is provided with a flange at its end next the drive-wheel, and its opposite end extends through beyond the face of the tumblers, where it has a groove, N, cut in its sides to receive the edges of a plate, K, which has a slot, M, of the proper width, and is slipped on, as shown in Figs. 1 and 4. This plate K also has an extension at its lower edge, in which is a hole fitting over a stud or pin, L, projecting from the case A, which holds the plate in position and prevents it from turning, and it in turn holds the sleeve from turning. In order to remove the sleeve with the tumblers all together, it is only necessary to take hold of the plate K and draw them off the spindle. To remove the tumblers separately to change the combinations, or for any other purpose, the plate K is drawn out of the grooves in the sleeve I, when the tumblers can be slipped off. This makes a very simple means of accomplishing the desired object, and avoids the use of screws, springs, and all similar devices, and thereby cheapens the construction.

From this construction and arrangement of parts, it will be seen that, to operate the lock, all that is required is to turn the dial until the tumblers are all adjusted in the usual manner, and then turn the drive-wheel G until its gate or notch comes under the dog, when the latter, dropping into the notches of the tumblers and drive-wheel, permits the rear end of the bolt B to drop down, thus removing the shoulder *a* from in front of the abutment *e*, when, by turning the dial or spindle backward, the bolt is withdrawn. To lock it, the dial is turned forward, which carries the bolt forward the proper distance, after which the further turning of the dial causes the dog, with the rear end of the bolt, to ride up out of the notch and rest

on the periphery of the drive-wheel, bringing the shoulder *a* into position in front of the abutment, from which position it cannot be moved until the tumblers and drive-wheel are again arranged with their notches all in line under the dog, and which can only be done by knowing the combination on which they are set. In order to permit the bolt to have imparted to its rear end the up-and-down motion without binding in the case, the opening through which the front end of the bolt moves is beveled inward, the outside being of a size to correspond with that of the bolt, so as not to leave any opening around the bolt; and to insure the bolt riding up on the drive-wheel at the proper time, the rear face of the dog, or of the notch in the drive-wheel, or both, are beveled accordingly.

By these means I am enabled to construct a permutation-lock, which, while as safe as any, is far less complicated, the bolt with its dog and the tumblers with their driving mechanism being all the devices employed.

Having thus described my invention, what I claim is—

1. The bolt B, with its dog D formed in a single rigid piece, in combination with one or more tumblers, F, a locking-shoulder, and the notched drive-wheel G, all constructed and arranged to operate substantially as shown and described, whereby the bolt is thrown, made to engage with its locking-shoulder, and all the operations performed without the aid of a key, pivoted dog, or other devices, as herein set forth.

2. The sleeve I, with the tumblers F mounted thereon, and held in place by the sliding key-plate K, substantially as set forth.

In testimony of which invention I hereunto set my hand.

HENRY GROSS.

Witnesses:
HENRY MILLWARD,
RICHARD T. PULLEN.