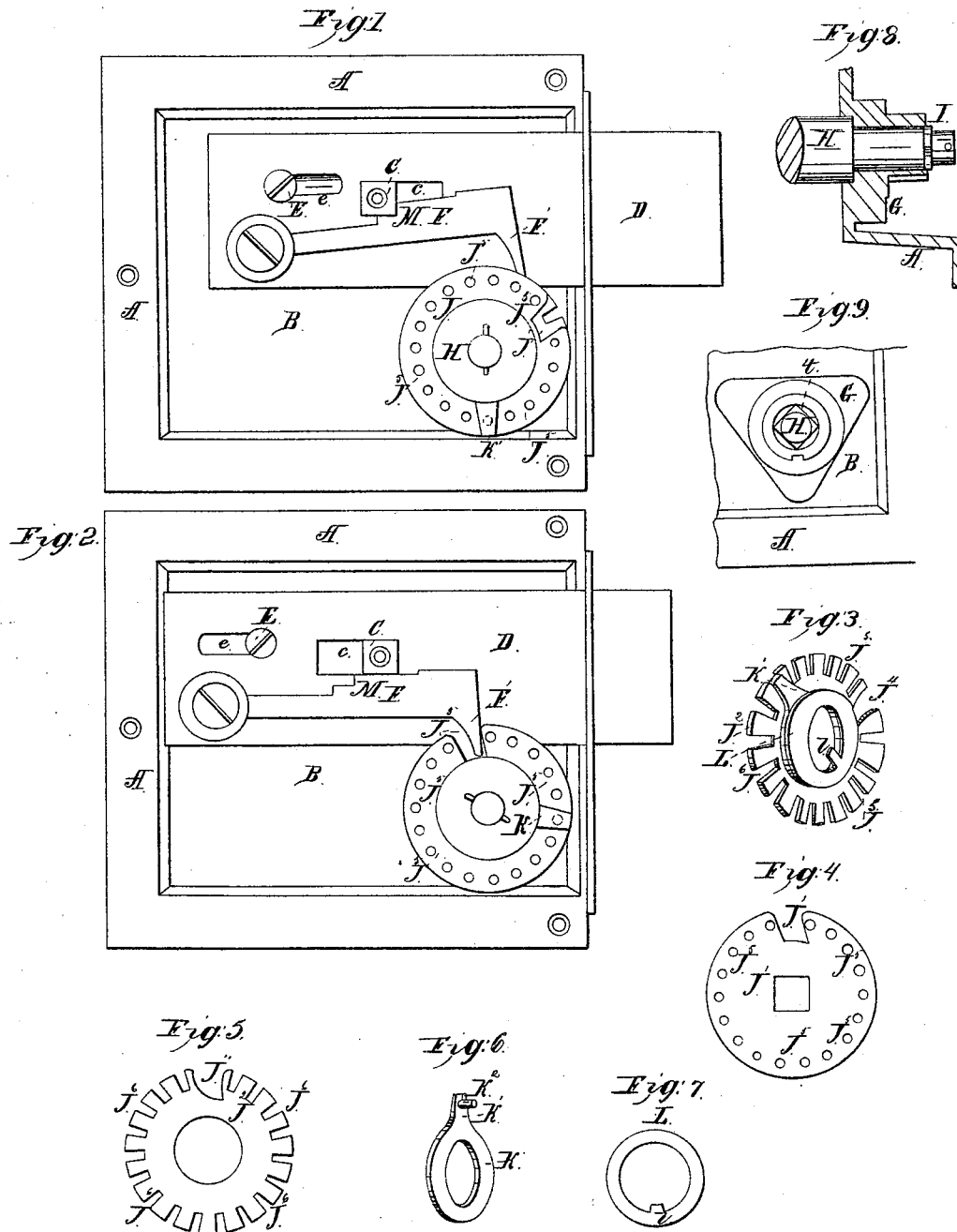


N. B. Dodds,

Permutation Lock.

N^o 46,858.

Patented Mar. 14, 1865.



UNITED STATES PATENT OFFICE.

WILLIAM B. DODDS, OF CINCINNATI, OHIO, ASSIGNOR TO HIMSELF AND
NEIL MACNEALE, OF SAME PLACE.

IMPROVEMENT IN LOCKS.

Specification forming part of Letters Patent No. 46,858, dated March 14, 1865.

To all whom it may concern:

Be it known that I, WILLIAM B. DODDS, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Locks for Safes or other Purposes; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is an elevation of the lock, viewed from the inside, the bolt being projected. Fig. 2 is an elevation of the lock, viewed from the inside, the bolt being retracted. Fig. 3 is a perspective view of one of the tumblers with its accompanying annular plate and washer. Fig. 4 is a view of one of the tumblers with a circular series of holes for the pin on the annular plate, which is represented detached in Fig. 6. Fig. 5 is a view of one of the disk-tumblers with notches in its periphery. Fig. 7 is a detached view of one of the stationary washers which are interposed between the tumblers. Fig. 8 is a sectional view of the shaft and side view of the socket, and Fig. 9 is an elevation of the same.

The nature of my said invention consists, first, in the employment of a gravitating dog pivoted to the lock-bolt and engaging with the notches of the tumblers, so as by their movement to operate the bolt; second, in the method of operating each of the series of permutation-tumblers after the first or prime moving tumbler by means of an annular plate with a tongue and pin, which latter is capable of engaging in any one of the circular series of holes in the tumbler to which it belongs, and which projects through so as to engage with the tongue of the annular plate appertaining to the next tumbler of the series.

The following description will enable any one skilled in the art to which my invention appertains to fully understand and use the same.

A represents the side plates, and B the back plate, of the lock-case. C is a permanent-stump attached to the latter. D is the lock-bolt, which passes through a slot in the side plate, and is otherwise sustained and limited in its motions by the stump C and screw E,

which pass through slots *c* and *e* in the bolt. F is a dog which is pivoted at one end to the bolt D, the other end being provided with a downwardly-projecting bit, F', which on suitable occasions engages with the notches in the permutation-tumblers, to be described hereinafter.

Rigidly secured to the case is a socket, G, through which passes the shaft H of the handle by which the tumblers are rotated, and on which the tumblers J' J², &c., and their interposed plates and washers are arranged. The shaft is provided near its end with a square, I, on which the outermost tumbler, J, is placed (relatively to the shaft) so that it must revolve with the shaft, the other tumblers receiving their motion through it, as will be explained. Each tumbler has a notch, J⁴, of a suitable size and shape for the reception of the bit F' of the dog F, and also has a circular series of holes or notches, J⁵ or J⁶, Figs. 4 and 5. Each tumbler is accompanied by an annular plate, K, which has an arm, K', provided with a pin, K². These plates are capable of rotation on the socket G or on the shaft H, so that the pins K² may be placed in either of the holes or notches J⁵ or J⁶, in the disk-tumblers. These pins project so far beyond the lengths of these said holes or notches that they engage the arms on the annular plates belonging to the tumbler next in series, so as to communicate motion thereto. The pin on the plate belonging to the last tumbler—that is, the one nearest to the handle, and which is the last to receive motion and the first one to be set—does not project beyond the tumbler to which it belongs, as there remains no work beyond this point in connection with the permutation arrangement. An annular washer, L, is interposed between the annular plate and the preceding tumbler, speaking relatively to their order of time in receiving motion from the shaft. Each of these washers has an inwardly projecting tooth, *l*, Fig. 7, which enters a longitudinal slot in the exterior of the socket G, so as to prevent rotation of these washers, which might be communicated to the next tumbler other than by the appropriate method provided were the washers allowed to rotate.

The tumblers, having been arranged on the

shaft, as has been described, are operated by the turning of the handle to the right and to the left, so as to bring the notches *J'* in line parallel with the shaft *H*, and in accordance with the prearranged formula. This being common in such cases does not require extended description here. This point being reached and the bolt being supposed to be projected, the bit of the dog *F* falls into the notches of the tumblers, and by rotation of the handle the side of the notch in the outer tumbler, which has a positive motion from the shaft, pressing against the dog, operates and retracts the bolt. In the act of projecting the bolt the other side of the notch in the outer tumbler engages the slanting side of the bit *F'* as the shaft is revolved, shooting the dog and bolt, the back of the dog rubbing against the stump, which prevents its being raised out of the notch until the point is reached when the shoulder *M* passes the stump. The limit of the throw being attained, the further rotation of the positive tumbler, acting on the inclined side of the bit, elevates the dog, throwing it out of the notch, so that the shoulder *M* locks against the stump and the end of the bit rides upon the periphery of the disk-tumbler. The tumblers may then be rotated so as to throw them out of their order of combinations, and the lock is securely fastened. The return motion has been described.

The motion of the bolt is prevented at all times except when the bit of the dog has fallen into the tumbler-notches, the tumbler being the only means by which it can be operated.

The special merit of the arrangement described under the first head in the preamble, and consisting of the gravitating dog pivoted to the bolt and engaging in the notches of the tumblers, is that both the motions of the bolt are accomplished by means of the simple rotation of the handle and shaft communicated to it through the tumblers. In all other locks the tumblers operate merely to prevent the motion of the bolt until the proper adjustments are attained, when the bolt is rendered capable of being moved by special appliances adapted to that end. In this lock the tumblers are the means of placing the requisite impediment in the way of the motions of the bolt until the conditions are complied with, and, further, the prime motor tumbler is the direct, positive, and only means of moving the bolt. This dispenses with any special appliances for throwing the bolt independently of the mechanism for operating the tumblers, and prevents the tentative tampering with the latter by a strain being kept upon the bolt-throwing device, whereby the location of the notches might be discovered.

By this device all the known modes by which lock-pickers operate, such as tentative pressure or measurements, &c., are precluded because when the bit of the dog is thrown

out of the tumblers, it simply rides upon their periphery by its own weight and no pressure can be brought to bear upon the bolt or the dog, nor any motion obtained except the simple rotation of the shaft and its tumblers, accomplishing nothing which can indicate the location of the notches, for this reason, that the dog enters the notches of the tumblers when they are brought into line without the pressure of a spring or any other means except its own gravitation and independently of any direct motion under the control of or subject to the touch of the operator, and cannot be acted upon by any application from the exterior of the door. There is no spring used in any part of the lock.

The permutation arrangement which has been described in detail by letter in a former part of specification affords the means within a limited space of a great number of changes by the location of the pins attached to the annular plates in one or other of the series of holes in the disk-tumblers to which they belong.

A dial is placed upon the outside of the door and rotates with the shank. The number of diversions upon it corresponds with the number of holes for changes in the disk tumblers.

The pins on each of the annular plates having been located in any one of the circular series of holes in the tumblers to which they respectively belong, it becomes necessary to ascertain the combination on which it has been set up, which is done by bringing the tumbler nearest to the handle or the last in series, speaking in the order of time in moving so that the notch of the said tumbler is opposite to the bit of the dog, by looking on the outer side the number on the dial opposite to the index mark is then noted, and the second tumbler manipulated to bring its notch also opposite to the bit, when the dial is again referred to, and the number noted. So, also, of the other two tumblers as in the case represented in the drawing where four tumblers are shown.

It may be mentioned that in setting the consecutive tumblers they are operated by an alternate right and left hand motion, but this, being the ordinary method, need not be enlarged upon.

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

1. The method of operating and detaining the bolt by means of the dog pivoted thereto, the bit of the dog engaging the notches in the tumblers, and the notch on the top of the dog engaging the notches the detent-stump when the bolt is thrown, substantially as de- and represented.

2. The method of operating and adjusting the disk-tumblers by the application to each of a disk or annular armed plate provided

with a pin, which latter projects through the hole in its appropriate tumbler and engages with the arm of the annular plate appertaining to the tumbler next in series, substantially as described.

3. The washer interposed between the tumblers in the series and prevented from rotat-

ing by the tooth which engages in the slot in the socket, substantially as and for the purpose described.

W. B. DODDS.

Witnesses:

EDWARD H. KNIGHT,
C. D. SMITH.