H. C. LOWRIE.

PERMUTATION LOCK.

APPLICATION FILED MAR. 19, 1909.

975,549. Patented Nov. 15, 1910.

Fig. 1.

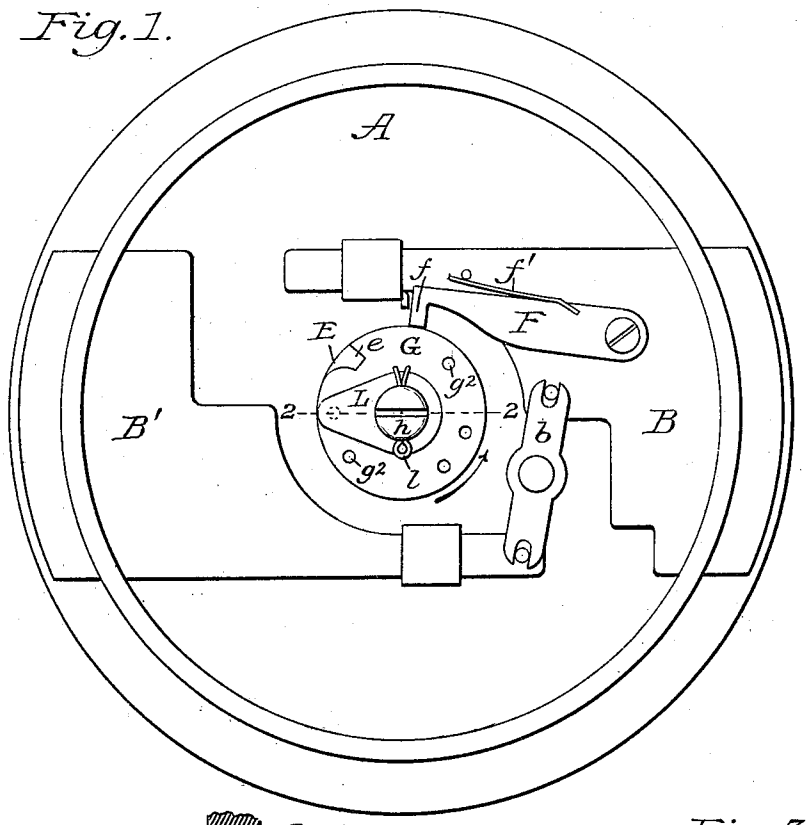


Fig. 2.

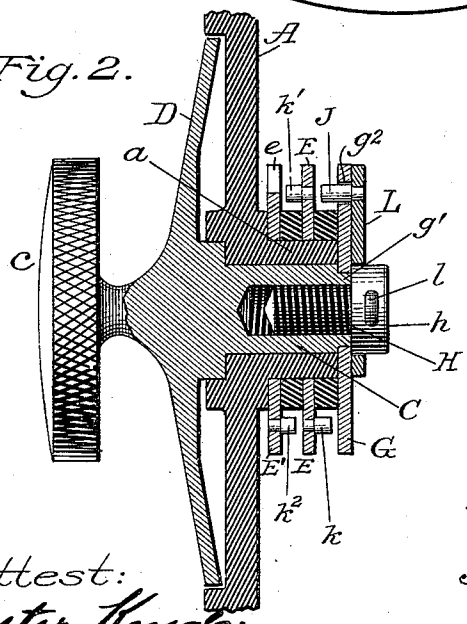


Fig. 3.

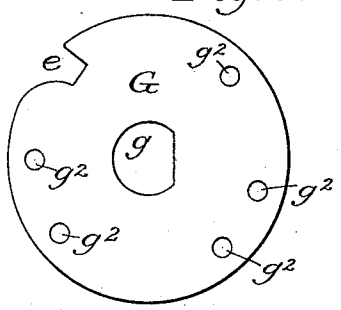
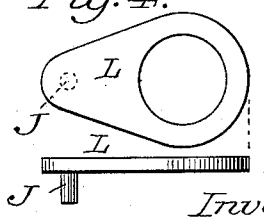


Fig. 4.



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HARVEY C. LOWRIE, OF NEW YORK, N. Y.

PERMUTATION-LOCK.

975,549. Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed March 19, 1909. Serial No. 484,486.

To all whom it may concern:

Be it known that I, HARVEY C. LOWRIE, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Permutation-Locks, of which the following is a specification.

My invention relates to permutation locks of the rotary tumbler type, and the main object of the invention is to provide a simple means for changing the combination of the lock without disconnecting or separating any of the disks or tumblers of the lock, or without disturbing the means whereby said disks or tumblers are supported and held in operative relations.

My invention consists of the features hereinafter described and particularly pointed out in the appended claim.

Referring to the drawings forming a part of this specification, Figure 1 is a rear view of a circular door showing a locking mechanism constructed in accordance with my invention. Fig. 2 is an enlarged sectional view taken on line 2—2 of Fig. 1. Fig. 3 is a detached plan view of the rear disk or tumbler of the lock, and Fig. 4, in plan and edge views, illustrates the driving pin and its supporting arm which is adjusted with reference to the rear disk to vary or change the combination.

Referring to Fig. 1, A indicates a circular door which may be employed in connection with a wall safe, said door being provided with two bolts B and B′ which are retracted and projected by means of a central spindle C, said bolts being adapted to engage with the inner edge of a door casing for locking the door, as will be readily understood. The spindle C passes through a central opening in the door A, and on the outside of the door the spindle is provided with a knob *c* by means of which it may be readily turned or revolved, and is also provided with a dial D having the usual numbered graduations for guiding the operator in revolving the spindle to effect an opening of the lock. At the rear of the door there is a hub *a* surrounding the spindle C, and on this hub are mounted two circular tumblers or disks E and E′, each of which is notched as at *e* for receiving the end of a dog F when the notches of all of the disks are brought into proper alinement. On the inner end of the spindle C is a disk or tumbler G which is also provided with a notch *e*, this disk being non-rotatively mounted on the spindle by forming a non-circular opening *g* in the center of the disk to fit over a similarly formed projection *g′* formed on the end of the spindle. The disk G is secured on the spindle by means of a screw H which has a cylindrical head *h*, the latter operating to clamp the disk against a shoulder formed on the spindle, as clearly shown in Fig. 2.

The dog F is pivotally secured to the bolt B with its free end *f* normally resting on the peripheries of the several disks E, E′ and G, a spring *f′* operating to hold the dog against the disks and to force its free end *f* into the notches of the disks, when said notches are brought into proper alinement. When the free end of the dog enters the notches of the disks, rotation of the spindle C in the direction of the arrow, Fig. 1, will cause the bolts to be retracted, and rotation of the spindle in the opposite direction will project the bolts and thereafter lift the dog free of the notches, as in prior locks of this general character. Motion is communicated from the bolt B to the bolt B′ by means of a connecting lever *b*.

The notches of the tumblers are moved into or out of alinement with the dog F by rotative movements of the spindle C. The disk G, which is carried by the spindle, is provided with a disk driving pin J which projects in the path of a pin *k* on the disk E, the latter being provided with a similar pin *k′* on its other side for engaging a pin k^2 on the disk E′. By turning the spindle until a pin on each of the disks is in engagement with a pin on the next adjacent disk, the disk E′ may be placed in its proper position with respect to the dog F, and then by reversing the rotation of the spindle, the disk E may be properly adjusted. A second reversal of the rotation of the spindle is necessary for properly positioning the disk G. These movements of the spindle are guided by certain numbers on the dial D which are supposed to be known only to those authorized to open the lock, and it is a very desirable feature of this class of locks to provide means for readily changing the numbers as occasion or desire may dictate. This has usually been provided for by so mounting the disk G that it may be turned on the spindle C in order that the position of the pin J may be changed with reference to the dial D, and the disk has also been provided with a series

of screw-threaded holes for receiving a screw-threaded pin so that position of the pin could be changed by removing it from one hole and inserting it in another. The pin J being the driving pin for the other disks, its position with reference to the dial D determines the numbers of the lock opening combination. When the disk itself is revolved for varying the position of the pin, it is necessary to unscrew the disk securing means, and this involves a possible separation of parts of the lock which is liable to cause trouble to one not familiar with the lock mechanism, and when a screw-threaded pin is provided so that it may be placed in any one of a number of holes, the pin is liable to become loose and drop out because of the fact that it is used as a driving pin which is subjected to strains first on one side and then on another, and should the pin drop out the lock would be inoperative. In either of these prior methods of changing the combination, it is necessary to have at hand a screw-driver of proper size, and it is the object of this invention to provide means for changing the position of the pin which does not require the use of a tool of any kind, and which does not involve a loosening up of the means which secure the rear disk to the operating spindle. To accomplish these results it has been proposed to provide the rear tumbler with a series of holes for receiving a pin carried by a spring arm rotatively mounted at the rear of the disk, said arm permitting the withdrawal of the pin from one hole and its insertion in another, but as the spring is liable to vary in its resiliency and also to become permanently bent and thus render the lock inoperative by reason of the fact that the pin will fail to engage the pin of the next adjacent disk, this arrangement is considered undesirable.

In accordance with my invention, the disk G is provided with a series of holes g^2 arranged on a line concentric to its axis, these holes being each adapted to receive the driving pin J, the latter being carried by a rigid arm L to which said pin is securely attached, either by riveting or by making it an integral part of the arm or otherwise securing it thereto. The arm L is provided with a circular opening to enable it to be loosely mounted on the head h of the screw H, a cotter pin l serving to hold the arm in place on the screw head, as clearly shown. The screw-head is transversely bored to receive the cotter-pin which may be readily removed and replaced by hand as occasion may require. The pin J projects through one of the holes g^2 in the disk G in proper position to engage the pin on the next adjacent disk E, and when it is desired to change the combination, it is only necessary to remove the cotter pin l, lift the arm L away from the disk to release the pin, and then insert the latter in another hole, the parts being resecured in place by the cotter-pin as will be readily understood. The disk G may be provided with a large number of holes g^2, but I have found it desirable in some locks to limit the number of possible combinations by providing only a limited number of holes so that a record may be kept of the possible changes for use in case the combination is lost or forgotten.

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

In a permutation lock, the combination with an operating spindle, of a dial carried thereby, a notched circular disk provided with a plurality of holes arranged on a line concentric with the axis of the disk, a screw securing said disk to said spindle, said screw having a cylindrical head, a rigid arm loosely mounted on the head of said screw, a pin carried by said arm and adapted to project through one of said holes and engage a second disk, detachable means for holding said arm on the screw-head, and a second disk adapted to be moved by said pin.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HARVEY C. LOWRIE.

Witnesses:
HOWELL BARTLE,
C. W. FOWLER.