

(No Model.)

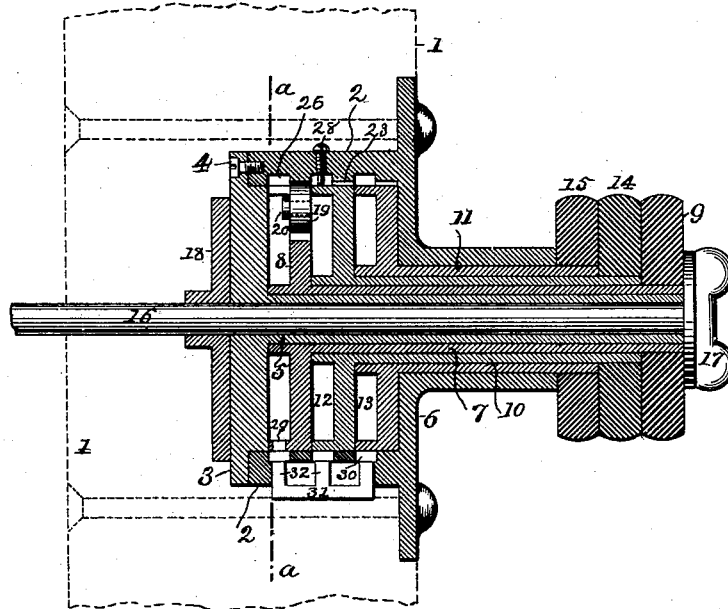
2 Sheets—Sheet 1.

T. P. COOK.  
PERMUTATION LOCK.

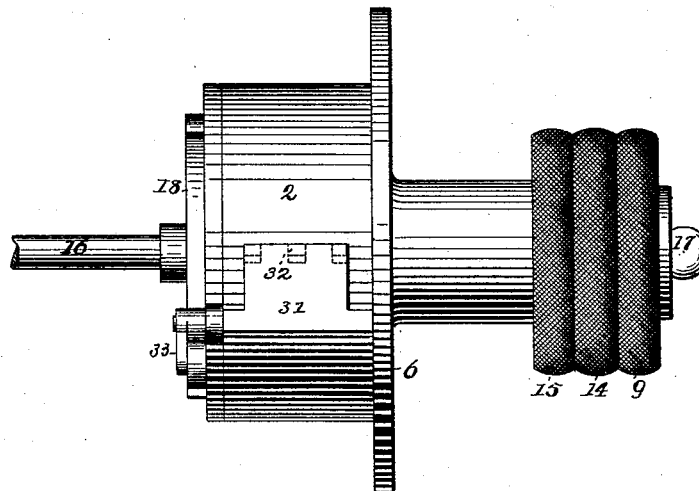
No. 489,411.

Patented Jan. 3, 1893.

*Fig. 1*



*Fig. 2*



Witnesses:  
Robt. F. Faylord  
James Catlow

Inventor  
Thomas P. Cook  
by Duaneau & Page  
Attorneys.

(No Model.)

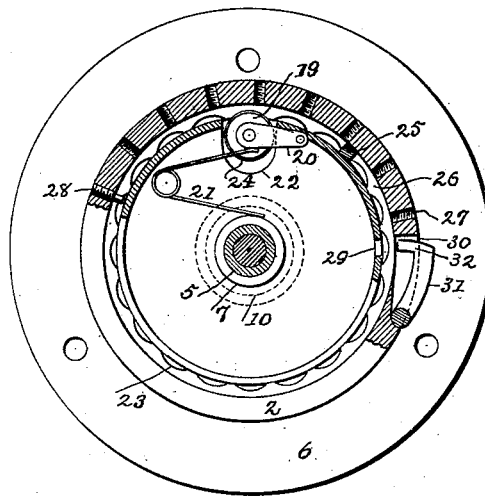
2 Sheets—Sheet 2.

T. P. COOK.  
PERMUTATION LOCK.

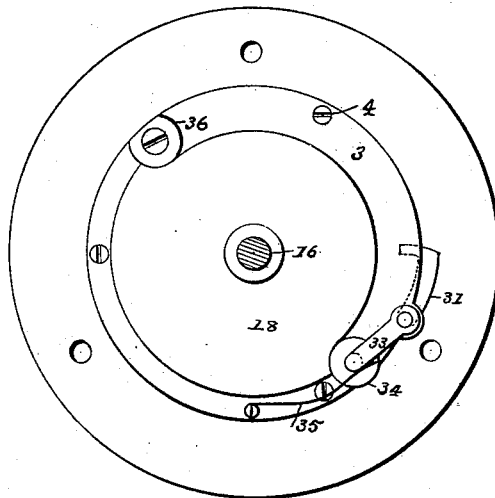
No. 489,411.

Patented Jan. 3, 1893.

*Fig. 3*



*Fig. 4*



Witnesses:

Robt. F. Fay  
James C. Galloway

Inventor

Thomas P. Cook

by Duncan & Page  
Attorneys

# UNITED STATES PATENT OFFICE.

THOMAS P. COOK, OF NEW YORK, N. Y.

## PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 489,411, dated January 3, 1893.

Application filed August 13, 1892. Serial No. 442,945. (No model.)

### *To all whom it may concern:*

Be it known that I, THOMAS P. COOK, of the city, county, and State of New York, have invented certain new and useful Improvements in Locks, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The present invention relates to that class of locks in which an exterior knob is operably connected with an interiorly located disk, which disk is movable relatively to a locking latch which controls a bolt or other locking mechanism of the safe door, or other part to be secured by the lock.

The present improvement has for its object, to provide means whereby the movements of the unlocking parts of a combination lock can be indicated to the operator by the sense of touch, or by the sense of hearing if desired; thus obviating the necessity for a dial or other exposed part designed to indicate how the operating knob is to be worked, and also to prevent the discovery of the combination by seeing the knob worked, and, particularly, permitting the working of the lock without visual aid.

The invention consists, generally, in one or more wheels, tumblers or like movable part or parts, means for operating such wheel or wheels, a casing to such wheel or wheels or a part relative to which the wheel or wheels has predetermined movement provided with a series of indentations and a device located between the wheel or wheels and the casing and adapted to so act upon either or both as to effect an intermittently resisted movement of the wheel or wheels whereby to indicate to the operator a regular interval movement, or angular movement, of the wheel.

In the drawings, Figure 1 is a central vertical section through one form of lock embodying my improvements. Fig. 2 is an exterior plan view of the same parts, but at nearly right-angles to the same as seen in Fig. 1, or as the latter parts are viewed from below. Fig. 3 is an elevational view of the same from the left-hand of Fig. 1, parts of the same being sectioned away by plane *a a*. Fig. 4 is a

plan view of the same parts, or as the same are seen from the left-hand of Fig. 2.

Referring to the views in detail, 1 represents the walls of a safe or other door, or parts upon or in which the locks are mounted.

2 is what I will term the casing, this being a hollow cylindrical box or part that incloses the combination wheels and relative to which they are adjusted and revolve.

3 represents the back plate of the casing and to which it is fixed, as by screws 4. This plate carries the spindle-sleeve 5, which projects forward through the casing, and preferably to without the front walls 6 of the lock.

Upon the sleeve 5 is mounted a sleeve 7 which carries one of the tumblers or combination wheels 8. At the outer end of this sleeve is fixedly mounted thereon the knob 9. Similar sleeves, 10 and 11, and wheels 12 and 13, and knobs 14 and 15, are in like manner concentrically mounted in succession upon the spindle-sleeve 5.

16 is the spindle, and 17 its handle. The spindle is held in position by the latch cam 18, which is fixedly secured upon the spindle and bears upon the rear casing plate. The parts are securely held together between this cam and the spindle handle, as well as by the inclosing casing, which latter is to be fastened to the door by any suitable devices.

Each of the tumblers or combination wheels is annularly grooved or hollowed out, and within the space thus formed is mounted an indicating, resistance, or impulse-wheel 19, which is pivotally hung on a swinging arm 20 held to normal position by a spring 21. An opening 22 in the periphery of the tumbler permits the resistance-wheel to project so as to bear upon the inner face of the casing 2, and this face along the path of the resistance-wheel or adjacent the peripheral face of the tumbler is provided with regularly spaced shallow indentations, or scallop-like depressions 23, of shape, preferably, conforming to the circle of the resistance-wheel. The resistance-wheel as the tumbler is turned enters successively these depressions, and thereby opposes at regular intervals or angular space the turning of the tumbler. This action

creates a series of impulses that are transmitted, or indicated, to the hand of the operator, who is apprised of their number through the sense of touch, and so of the range or extent of revolution of the tumbler. The resistance device may be caused to report its movement to the hearing by successive clicks, but ordinarily this would not be desired. To prevent the resistance-wheel giving out such sounds, its periphery may be covered with a sound-deadening material 24, or the casing may be similarly made non-resonant, or both.

Various other forms of resistance devices may be employed, and I do not confine myself to the means here shown and described. I believe the wheel device shown to be one of the best forms, but I have devised many others that embody the same principle of action.

Upon the periphery of each tumbler-wheel is a lug 25 set to one side of the resistance device. This lug enters a circular groove 26 in the inner face of the casing 2. The casing along such groove is provided with a series of holes 27 designed to receive a screw-stop 28, which is set so that it is in the path of the lug and will arrest the tumbler when the latter is brought to contact therewith. This stop serves as a starting or zero point from which to begin to turn the tumbler. Thus, in setting the tumbler to unlock, it will be first turned in one direction until stopped, and then it will be turned in the reversed direction until the proper number of impulses representing its combination number has been indicated to the operator, whereupon the tumbler is in position to permit the withdrawing of the bolt mechanism. The other tumblers will, of course, be similarly operated, if other tumblers be present, before the bolt is withdrawn.

The tumbler-wheels are each provided with peripheral slots 29, and in the path of these slots the casing is pierced, as seen at 30.

31 is the tumbler-latch, and it is pivotally mounted on the outside of the casing 2, and is provided with latch fingers 32 that enter, through the opening 30, the slots 29 in the tumblers when the latter are each set in their proper combination position. This latch carries on its axis the cam-arm 33, which by friction-roll 34 bears upon the edge of the cam 18. A spring 35 acts to hold the latch to contact with the cam. A stop 36 in the path of the cam engages its highest part and prevents the cam and the spindle being revolved only a portion of a turn.

When the tumblers have been set in combination, the latch may be raised by the cam, and the spindle thus permitted a partial revolution. It will be understood that the spindle is to be connected to the bolt work, or in any suitable way related thereto so that the latter can be withdrawn when the spindle is turned after the proper positioning of the tumblers.

The stop-screws may be variously adjusted

to change the combination. Also, the depressions for the resistance devices may vary in size as to different tumblers; and in many other ways, that will appear to those skilled in this art, can the combinations be changed.

I have shown three tumbler-wheels in the drawings, but it is to be understood that there may be more or less in number. In other respects also, the form and construction of the lock may be modified without departing from the principle of action of the same.

By these means, a combination lock may be operated without reference to a dial or other like indicating device; the combination cannot be learned by observing the operation of unlocking; the lock can be manipulated in the dark and without the aid of eyesight; and the parts and their operations are both simple and certain in action, as well as cheap in cost of construction.

What is claimed as new is:

1. In combination in a lock, substantially as and for the purposes set forth, one or more tumbler-wheels, a casing surrounding the tumbler and provided with a series of indentations relative to which the tumbler has movement, and mechanism arranged between the tumbler and the casing and adapted to act to resist the rotation of the tumbler by recurring impulses.

2. In combination in a lock substantially as and for the purposes set forth, a tumbler wheel, a casing to the wheel, a series of depressions arranged in the casing, and a spring-actuated piece on the tumbler acting to engage said depressions and frictionally resist the rotation of the tumbler-wheel by successive impulses.

3. In combination in a lock, substantially as and for the purposes set forth, a tumbler-wheel, a casing to the wheel surrounding the same and provided with a series of depressions, and a spring actuated friction wheel carried on the tumbler and adapted to frictionally engage said depressions and thereby resist the rotation of the wheel by successive impulses.

4. In combination in a lock, substantially as and for the purposes set forth, two or more tumbler wheels adapted to rotate by intermittent or successive impulse steps and each fixed to a knob or like means for operating the same, a latch adapted to engage said wheels when the same are set to unlocking position, and a bolt-operating mechanism controlled by said latch.

5. In combination in a lock, substantially as and for the purposes set forth, two or more tumbler wheels each fixed to a knob or like means for operating the same, intermittently acting resistance mechanism operating upon the wheels, and an adjustable zero stop to each of the wheels adapted to insure the rotation of each wheel from a predetermined position.

6. In combination in a lock, substantially

as and for the purposes set forth, two or more  
tumbler wheels, a casing surrounding the  
wheels adjacent to their peripheries, mechanism  
arranged between the casing and each  
5 of said wheels and acting to resist the wheel  
intermittently, and adjustable zero stops positioned  
in the casing opposite the wheels

and adapted to insure the beginning of the  
rotation of the wheels from predetermined  
positions.

THOS. P. COOK.

Witnesses:

ROBT. F. GAYLORD,  
EWELL A. DICK.