

W. Hall,

2 Sheets-Sheet 4.

Permutation Lock.

N<sup>o</sup> 47,817.

Patented May 23, 1865.

Fig. 5.

Fig. 6.

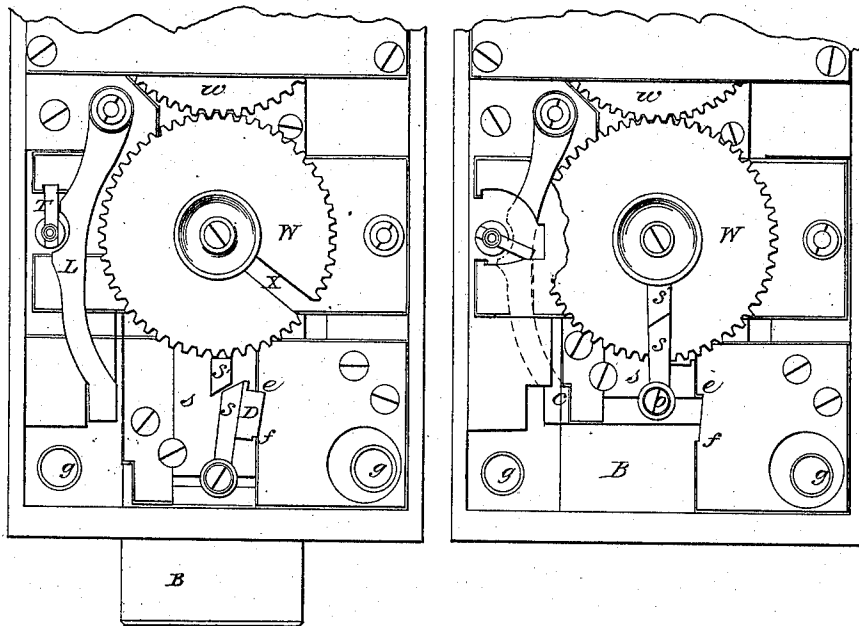
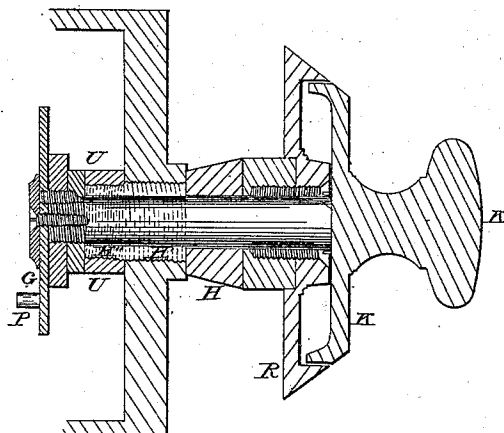
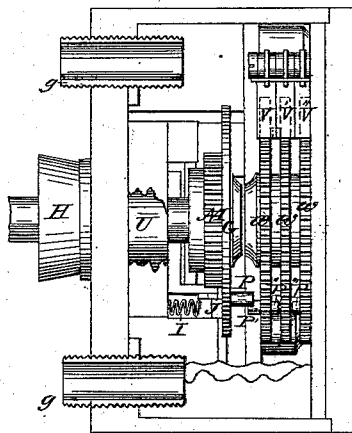


Fig. 3.

Fig. 4.



Witnesses:

Mathias Edison  
Chas. A. Gardiner

Inventor

W. Hall

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Permutation Lock.

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Fig 2

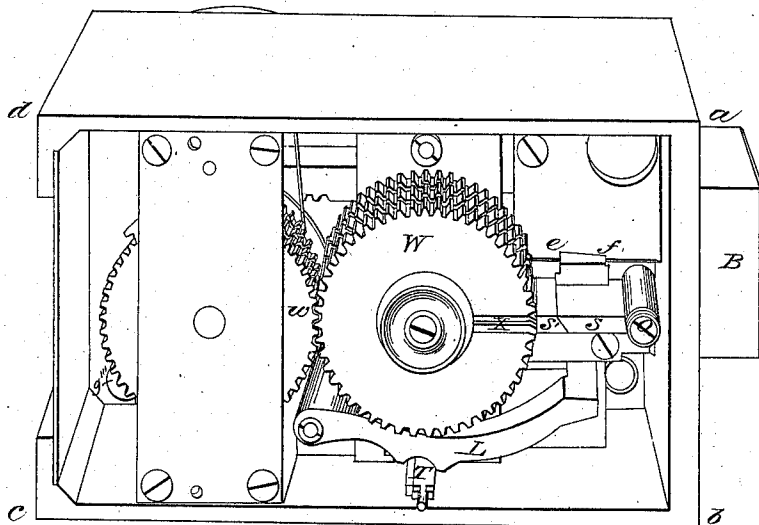
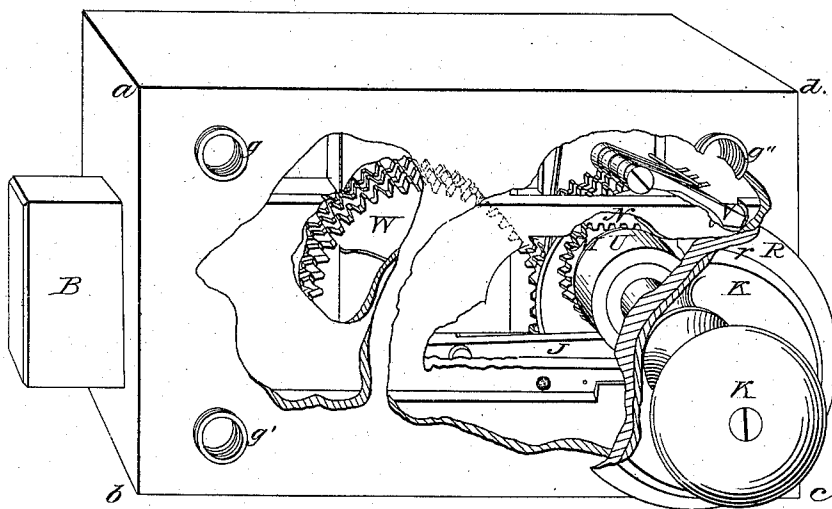


Fig 1



Witnesses:

William Eason  
Chas A. Gardner

Inventor:

W<sup>m</sup> Hall.

# UNITED STATES PATENT OFFICE.

WILLIAM HALL, OF BROOKLINE, MASSACHUSETTS.

## IMPROVEMENT IN LOCKS.

Specification forming part of Letters Patent No. 47,817, dated May 23, 1865.

*To all whom it may concern:*

Be it known that I, WM. HALL, of Brookline, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Locks, of which the following is a specification.

The nature of my invention consists in certain improvements in register-locks, to this effect, first, by securing the hub to the case of the lock by means of a right and left hand screw; second, guarding against pressing the stump against the cog wheels; third, holding the bolt in position while the cog-wheels are being set; fourth, adjusting the lock to the door by means of the hollow adjusting-screws.

To enable others skilled in the art to make and use my invention, I will proceed to describe it, reference being had to the accompanying drawings and to the letters of reference marked thereon.

Similar letters refer to similar parts.

*a b c d* in Drawings Nos. 1 and 2 represent case of lock; *B*, bolt; *S* and *S'*, stump divided into two parts. The part *S* is attached to the bolt *B* by the screw *O* and swings freely on the screw. That part of the stump designated *S'* is attached to the plate *s*. (Shown on drawings 5 and 6.) Plate *s* is confined by means of the screw within the groove made for that purpose in the bolt in such a manner as to admit of a slight sliding motion in the direction of the length of the bolt *B*. By this device it will be seen that the bolt *B* may be pushed back a short distance, while the part *S'* of the stump may remain stationary, thus causing the part *S* of the stump to swing up, carrying with it the dog *D* into the notch *e f*. The object of this arrangement is to prevent the operator upon the lock from feeling the openings *X* in the wheels *W W W*, Drawings 2 and 5—an operation which is performed by getting a slight pressure on the bolt to push it back. Then turning the knob *K* slowly, any motion of the bolt *B* indicates that the opening *X* of some one of the wheels *W W W* has probably come into position. By this arrangement any such pressure upon the bolt *B* will have the tendency to slide the part *S* against the part *S'*, thus raising it up and bringing the dog *D* (permanently attached to *S*) into the notch *e f*, Drawings 2, 5, and 6, thus effectually preventing any further motion of the bolt *B*.

*W W W* in all the drawings, except 3 and

4, are cog-wheels with openings *X*, into which the stump *S S'* may slide when the wheels are all brought into position.

*w w w* in all the drawings, except 4, are cog-wheels, which may be revolved by means of the knob *K*.

*G* in Drawings 3 and 4 is a disk permanently attached to the spindle of the knob *K*.

*P* in Drawings 3 and 4 is a pin in the disk *G*.

*P' P'' P'''* are pins in the cog-wheels *w w w*. The four pins—viz., *P P' P'' P'''*—are so placed that no one of the wheels *w w w* or the disk *G* can make a complete revolution without bringing the pin of some wheel in contact with the pin of another. Thus, if we revolve the knob *K* (which turns the disk *G*) the pin *P* of the disk *G* will come in contact with the pin *P'* and will cause the first wheel to revolve. The pin *P'*, coming in contact with the pin *P''* of the second wheel, will cause that to revolve. The same operation continued will cause the third wheel to revolve.

The set of cog-wheels *W W W* may be thrown out of gear from the wheels *w w w* by means of the key *T*.

The key *T* serves a double purpose—viz., that of throwing the cog-wheels out of gear by acting upon the vibrating plate *V*, Drawings No. 5 and 6, which hinges upon the screw *Z*, Drawings No. 5 and 6, and upon which the cog-wheels are hung, and at the same time raising the lever *L* up into the notch *e*, Drawings 5 and 6, of the bolt *B*, for the purpose of holding the bolt immovable while the wheels *w w w* are out of gear and are being set by the register.

*K'* in Drawings 1 and 4 is a disk fixed to the knob *K*, with edge graduated by means of small black lines into fifty equal parts. These divisional lines are numbered.

*R* in Drawings 1 and 4 is a disk fixed permanently to the lock. This disk has but one mark, *r*, upon it.

To illustrate the use of this part of the lock, I will proceed to describe the method of adjusting the cog-wheels *w w w* and of using the lock in actual practice. To adjust the wheels *w w w* (first premising it to be unlocked) by means of a key, I turn the key *T*, throwing up latch *L*, fastening the bolt *B* in position, and throwing the cog-wheels *W W W* out of gear, thus leaving the cog-wheels *w w w* and the knob *K*, which is indirectly attached to them, free to revolve. I then turn the knob

K to the right until all the wheels *w w w* are revolving together; then set the disk K' so that any number on it—5, for instance—coincides with the mark *r* on the disk R; then revolve the knob K and disk K' in an opposite direction more than twice, but less than three times, and set any division—say 45—to coincide with the mark *r*; reverse the motion again, revolve the knob and disk until the cog-wheels begin to move, (which will be indicated by the feeling,) but always less than twice, and set any division—say 50—to coincide with the mark *r*. The lock is now set on 5, 45, and 50; throw the bolt out by pulling the knob K toward you and turning it to the left; let the knob spring back, and revolve it each way two or three times. To unlock it, I turn the knob to the right till all three wheels are revolving together; then bring division 5 of the disk K' to coincide with the mark *r*; then turn to the left more than twice, but less than three times, and bring division 45 of disk K' to coincide with mark *r*; reverse the motion again and turn the knob K till the wheels begin to revolve, but always less than twice; bring division 50 to coincide with mark *r*; pull the knob K toward you, (which will bring the teeth of the cog-wheel M into the ratchet N, Drawings,) and then turn to the right, drawing the bolt in.

J is a bar, hinged at one end to the bolt, the surface of which back toward its free end is held in contact with the disk G by a spiral spring, I, interposed between the tail of the bolt and the bar, the purpose of all which is to force the disk K back into its socket R so soon as the hand releases its hold upon the knob.

M in Drawings 1 and 3 is a small cog-wheel attached to disk G and revolving with it. It acts against ratchet N, which is a part of the bolt B. (Shown in Drawing 1 out of gear.)

*g g' g'' g'''* in Drawings 1, 3, 5, and 6 are hollow screws for the purpose of adjusting the lock to the iron door. They have slots cut across the end within the lock to take a screw-driver.

H in Drawings 3 and 4 is the hub; H', right-hand screw cut on the shank of the hub H; H'', left-hand screw, upon which the check-nut U is screwed. The advantage of this arrangement is that the hub H having been screwed into the case of the lock, and the check-nut U screwed upon it, the hub cannot be started from the outside.

V V V in Drawings 1 and 3 three brakes, acting upon the cog-wheels *w w w*, for the purpose of holding them steadily in position.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Fastening the hub by means of the right-hand screw H' through the case of the lock, and the left-hand screw H'', or vice versa, combined with the check-nut U.
2. Making the stump in two parts, S and S'.
3. The peculiar arrangement of the lever L and the key T, so that at the time the cog-wheels are thrown out of gear the bolt shall be immovable.
4. The hollow adjusting-screws *g g' g'' g'''*, all of which operate substantially as described, and for the purpose set forth.

WM. HALL.

Witnesses:

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CHAS. A. GARDINER.