

A. PETERSEN.

LOCK.

(Application filed May 17, 1900.)

(No Model.)

Fig. 1.

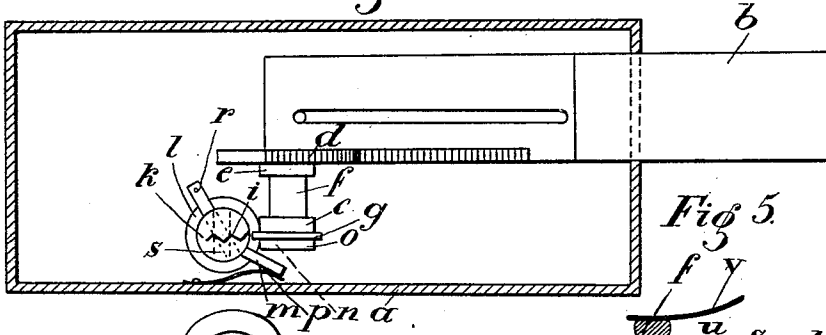


Fig. 2.

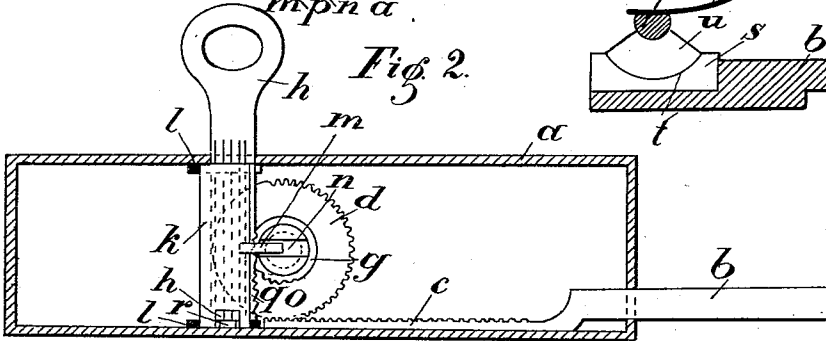


Fig. 3.

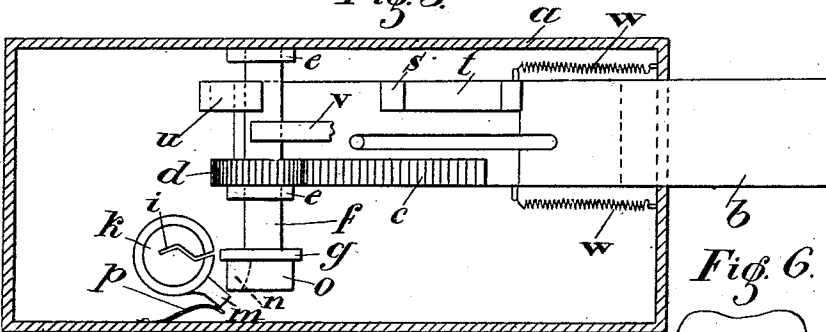


Fig. 4.

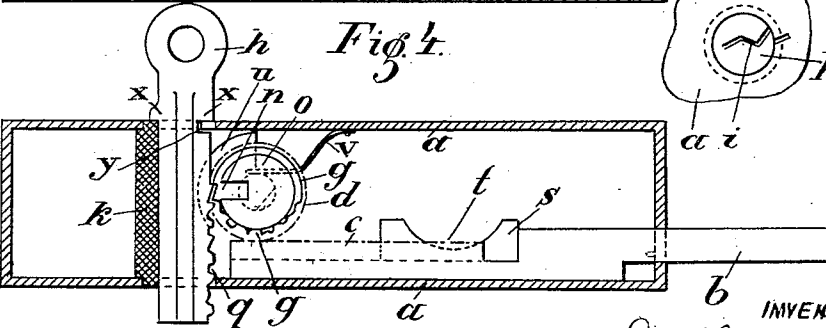


Fig. 5.

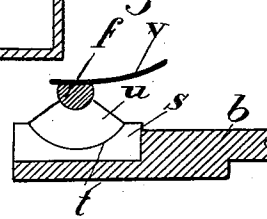
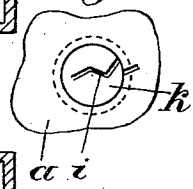


Fig. 6.



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LOCK.

SPECIFICATION forming part of Letters Patent No. 664,674, dated December 25, 1900.

Application filed May 17, 1900. Serial No. 17,062. (No model.)

To all whom it may concern:

Be it known that I, AXEL PETERSEN, commercial clerk, of Hellerup, in the Kingdom of Denmark, have invented certain new and useful Improvements in Locks, of which the following is a specification.

The present invention refers to improvements in locks of the kind in which the lock is opened and closed by simply inserting into or withdrawing the key from the keyhole.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 shows a front view of the lock from the side where the key is inserted; Fig. 2, a side elevation of the lock; Figs. 3 and 4, some special arrangement by the lock shown in Figs. 1 and 2; Figs. 5 and 6, some details.

a is the case, and *b* the bolt, that is provided with a rack *c*, gearing into a cog-wheel *d*. The cog-wheel *d* is fixed on a spindle *f*, moving in bearings *e* and carrying a toothed segment *g*, profiled in a certain way. When the segment *g* is turned, the cog-wheel *d* will also turn and by means of the rack *c* move the bolt *b* forward or backward, as the case may be. The movement of the toothed segment *g* may of course also be transmitted to the bolt in some other suitable manner.

One side of the key *h* forms a rack *q*, with a profile exactly corresponding to that of the toothed segment *g*. The keyhole *i*, which has the zigzag cross-section shown on the drawings and to which the key *h* corresponds, is placed in a cylinder *k*, arranged to turn in bearings *l* on the case *a*. This cylinder carries an arm *m*, which when the bolt is pushed out may catch into a notch *n* of a disk *o*, rigidly fixed to the segment *g* or to the spindle *f*. A spring *p* actuates the arm *m* in the direction of the notch *n*.

In order to move the lock mechanism, the key *h* must first be inserted into the keyhole *i* and the cylinder *k* turned by means of the key until the one side of the keyhole through which the rack *q* of the key is projecting is just opposite the segment *g*. By now pushing the key fully into the keyhole the bolt *b* will be carried out and the door locked. When the key has reached the bottom of the keyhole, the cylinder *k*, actuated by the spring *p*, is again turned until the arm *m* falls into

the notch *n*. The spindle *f*, the gear-wheel *d*, the rack *c*, and the bolt *b* are now held in place, and the key being no longer in gear with the segment *g* may be withdrawn from the keyhole. If the lock is to be opened, the key *h* is inserted to the bottom of the keyhole, and the cylinder *k* is turned until the arm *m* is removed from the notch *n* and the rack *q* of the key gears with the segment *g*. The key being then drawn straight out, the segment *g* is turned and the bolt *b* drawn back.

When the cylinder *k* after the bolt *b* has been pushed out is turned in order to withdraw the key, the cylinder is maintained in this position by means of a spring *r*, situated below the end of the cylinder and which catches into a notch *s* in the cylinder. When the lock is to be opened and the cylinder *k* consequently is to be turned back, the spring *r* is forced out of the notch *s* as the key *h* is pushed home into the keyhole.

The key *h* and the keyhole *i* have zigzag cross-section, as shown in Fig. 1, which renders the introduction of instruments into the keyhole for criminal purposes extremely difficult.

The opening of the lock taking place as the key is withdrawn from the keyhole, a picking of the lock is rendered impossible.

By varying the profile of the teeth upon the toothed segment *g* and the rack *q* of the key an almost unlimited number of locks may be made.

In the arrangement shown above the spindle *f* is situated between the cylinder and the free end of the bolt *b*. The arrangement of placing the cylinder between the spindle *f* and the free end of the bolt, so that the bolt is pushed out when the key is pushed in and drawn back when the key is withdrawn from the cylinder, comes, however, also within the limits of this invention.

In Figs. 3 to 6 are shown some devices that may be applied to the lock described above for the purpose of making it still more difficult to pick the same.

In the construction already shown it might perhaps be possible to turn the segment *g* by inserting a crooked instrument into the keyhole, and thus draw back the bolt *b* without using the key. In order to prevent this, one

or more spiral springs *w* are inserted between the bolt *b* and the case, which springs have a tendency of maintaining the bolt in the pushed-out position and will consequently counteract a turning of the segment *g*. If now by introducing a crooked instrument into the keyhole the segment might be turned a little and it was believed to turn the segment still more by pushing in the instrument farther, the springs *w* would as soon as the instrument releases a tooth again draw out the bolt.

In order to prevent the spring *w* from pushing the bolt *b* forward after the gate or the like upon which the lock be placed has been opened, the lock is supplied with an arrangement for holding the bolt securely in the drawn-in position. This arrangement consists of a lug *s'* upon the bolt *b*, having a curved recess *t*, into which a disk *u* upon the spindle *f* may be turned when the bolt is drawn back, Fig. 3, whereby any action of the springs *w* to pull out the bolt becomes impossible. The spindle *f* is flattened upon the side showing upward when the bolt is drawn back, and a spring *v*, fixed upon the case and resting against the said flattening, will counteract an accidental movement of the spindle *f*. Another arrangement for securing against the cylinder *k* being turned before the key *h* has been pushed quite home into the keyhole is illustrated in Fig. 4. The key *h* is here provided with a shoulder *x*, that limits its insertion into the cylinder, the shoulder bearing against the casing when the key is fully pushed in. Immediately inside of this shoulder the key has a notch *y*, into which the rim of the casing, that protrudes somewhat over the ends of the cylinder, may glide when the key *h* is turned, Fig. 6. This turning can consequently not be effected before the said notch *y* is on line with the rim of the main

plate—i. e., when the key is pushed fully home.

Having now particularly described and ascertained the nature of this said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In combination with the bolt having a rack, a lock-cylinder adapted to receive a key, a gear-and-spindle connection between the cylinder and the rack, the said cylinder having a slit in its side and having also an arm, and the said spindle having a notch to receive the said arm and a key having teeth to operate the gear connection, the parts being arranged so that when the key is in engagement with the gear connection the arm will be out of the notch, substantially as described.

2. In combination, the cylinder to receive the key and having a slit, a bolt having a rack, a gear connection to be operated by the key when inserted into the cylinder, said cylinder having a notch in its lower end and a spring *r* for engaging the said notch when the cylinder takes up a position in which the slit is not in line with the gear connection, substantially as described.

3. In combination with the bolt of a lock, a spring tending to force the same outwardly, a lug on the bolt having a notch therein, a disk *u* to engage said notch, the spindle *f* carrying the said disk, the gear connection between the bolt and spindle and means for operating and controlling the spindle, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

AXEL PETERSEN.

Witnesses:

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J. C. JACOBSEN.