2 Sheets--Sheet 1.

H. WINN.

Lock for Doors, &c.

No. 160,859. Patented March 16, 1875.

Fig. 1.

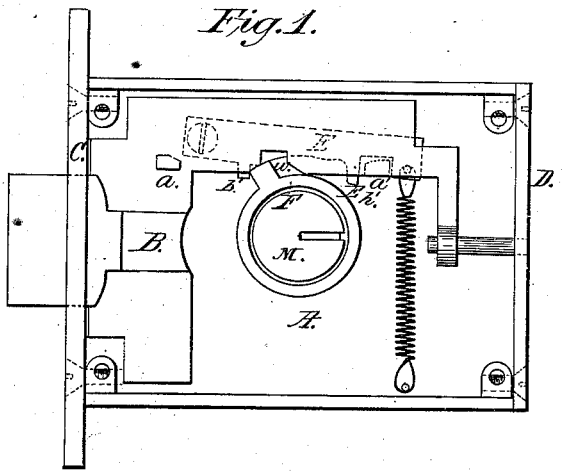


Fig. 2.

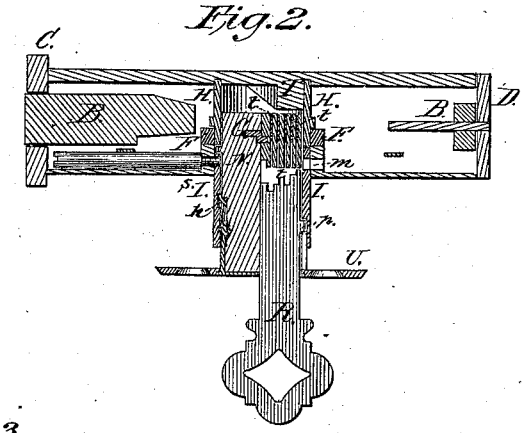


Fig. 3.

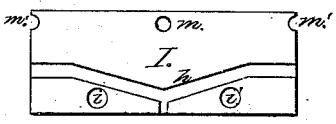


Fig. 4.

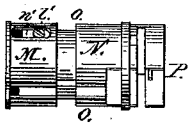
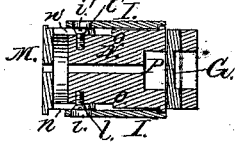


Fig. 5.



Attest:

Alfred Bonen

Daniel Powers

Inventor:

Henry Winn

2 Sheets--Sheet 2.

H. WINN.

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No. 160,859. Patented March 16, 1875

Fig. 6.

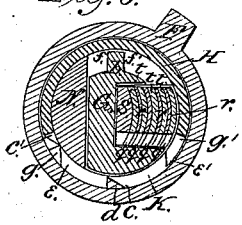

Fig. 7.

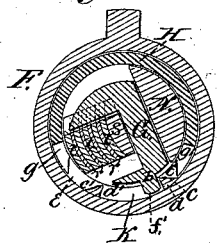

Fig. 8.

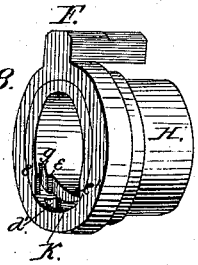

Fig. 9.

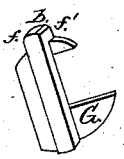

Fig. 10.

Fig. 11.

Fig. 12.

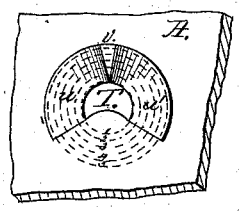

Fig. 13.

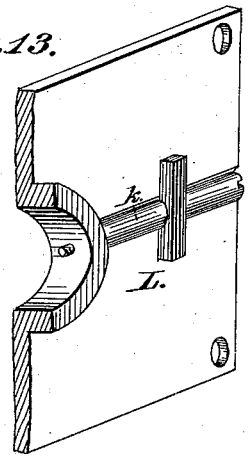

Fig. 14.

Attest:

Alfred Bonen
Daniel Powers

Inventor:

Henry Winn

UNITED STATES PATENT OFFICE.

HENRY WINN, OF SHELBURNE, MASSACHUSETTS.

IMPROVEMENT IN LOCKS FOR DOORS, &c.

Specification forming part of Letters Patent No. **160,859**, dated March 16, 1875; application filed June 26, 1872.

CASE C.

To all whom it may concern:

Be it known that I, HENRY WINN, of Shelburne, in the county of Franklin and State of Massachusetts, have made certain new and useful Improvements in Locks, whereof the following is a specification, reference being had to the drawings, in which—

Figure 1 is a front view of the lock in its locked position, with the cover removed. Fig. 2 is a horizontal section of the lock in its unlocked position, taken through the line *x x* of Fig. 1. Fig. 3 shows the non-rotating shell projected into a plane, with the key-groove therein. Fig. 4 is a side view of the rotating shell with the extension-cap thereto attached. Fig. 5 is a vertical section of the rotating and non-rotating shells, cap, and fence, taken through the line *y y* of Fig. 2. Fig. 6 is a vertical section of the ring bearing the wing and the parts inclosed thereby, taken at rest in the unlocked position through the line *z z* of Fig. 2. Fig. 7 is the same section as Fig. 6, showing said parts when the key has set the tumbler-notches, and the fence has fallen therein, and the key has made a partial rotation of the parts partaking of its rotary motion. Fig. 8 shows the wing-bearing ring, the fixed continuation of the non-rotating shell, and the inner front end portion thereof. Fig. 9 shows the fence. Fig. 10 shows a tumbler. Fig. 11 shows a furring. Fig. 12 shows the helical inclined surfaces on the lock-case at the bottom of the continuation of the non-rotating shell, which is supposed to be removed for better view of the same. Fig. 13 shows one of two similar parts of the cover, showing the screw that fastens in the shell. Fig. 14 is a side view of the piece having the helical inclined surfaces.

A is the lock-case. B is the bolt, held in position by the face-plate C and the back plate D, and bearing the stops *a a'*, against one of which the latch E impinges to hold the bolt projected or retracted. F is the ring and its wing, having on its interior surface the teeth *d d'*, on one side whereof are the inclined surfaces *c c'*, said teeth being impinged to rotate the wing by the tooth *b* on the fence G, said tooth *b* being slightly inclined at the points *f f'*, to assure the easy ascent of the fence G up the inclined surfaces *e e'* of the continuation H of the non-rotating shell I. The part H has cut in it, in line under the fence, a slot, K, into which the tooth *b* falls when the fence enters the tumbler-notches. A part of said slot K, and on either end of it, are the smaller slots *g g'*, into which the teeth *d d'* escape when rotated by the tooth *b*. Said part H has a ring-shaped flange, which holds the ring F in place. The shell I contains the key-groove *h*, and is fastened into the lock by the screw *k*, which, passing through a flange on the lock-cover L, enters one of the screw-holes *m m'* in said part I. Through the openings *i i'* and slots *n n'* are passed the set-screws *l l'*, to fasten the extension-cap M to the rotating shell N, which is turned down from the point *o* to the front end, so as to admit of its entrance into the extension-cap M, the outer diameter of which is the same as that of the unturned portion of the shell N. Said shell N has a ring-shaped flange, which, bearing upon the part H and in a recess in the part I, holds it in place. Disposed in a chamber, P, in the back end and one side of the shell N, lie the tumblers *t t t t t*, bearing fence-notches *q*, and movable by the key R in the direction of its axis as the key-bit *p* advances in the groove *h*. Between the tumblers are placed furrings *r r r r*, which, with the false tumbler S, (used as a stop for the key in case of wear of the bit *p*,) are held in place by a pin in the chamber P, while the tumblers move across the same with slots. The rear portion of each tumbler is cut in the form of two inclined surfaces, *s s'*, (having an apex between them,) said inclinations *s s'* facilitating their restoration by the part T, which has the two helical inclined surfaces *u u'*, uniting at *v*, and forms part of the case. The part T is placed directly back of the tumblers in the bottom of the part H. U is a stationary rosette, in which the escutcheon of the cap M rotates, which is held to the lock's place of attachment by a flange on the escutcheon and by screws, which prevent its rotation.

The mode of operation is as follows: The parts of the lock are supposed to be as in Figs. 2 and 6, and are in the same position

when it is locked and unlocked, excepting the bolt and ring bearing the wing, which are seen in the locked position in Fig. 1, and in the unlocked position in Figs. 2 and 6. The processes of locking and unlocking are similar, excepting that the rotation is reversed, and will be understood from the same description. The tumblers and fence are rotated in common with the shell N. At the beginning the apexes of the tumblers rest upon the most advanced part *v* of the part T. The key-bit *p*, on the key's insertion, enters the groove *h*, and, by its rotation therein, propels the key forward as the shell N is rotated, while the tumblers, being rotated away from the advanced portion *v* of the part T, gain room behind them for projection in proportion as the key advances in *h*, and are driven forward unevenly by the varied key-bits until the fence-notches *q* are in line with the plane of the fence. Said notches, at first on the under side, have now been carried by rotation until they are on the upper side of the tumblers, while the fence drops into them by its own weight, thereby projecting the tooth *b* thereon into the slot K in the part H, where lies the tooth *d* or *d'* of the ring F in position to be impinged by the tooth *b*. The bit *p* has now entered the annular part of the groove *h*, and the tumblers have been rotated away from the part T, so that they neither advance nor recede while the fence is in the notches. The tooth *b* strikes the tooth *d* or *d'*, and rotates the wing, which lifts the latch E, releasing the hold thereof on the stop *a'*, and, taking into the talon *w*, operates the bolt, when, having passed the highest portion of its arc of motion, it descends, allowing the latch E to drop on the other side of *a'*, and lock the bolt in the new position. The wing is stopped and held in place by the leg *h'* or *b'*, the downward pressure of the latch, increased by the spring V, aiding the hold thereof. When the wing stops, the tooth *d'* or *d* is in position in the slot K to be engaged in the next operation.

During this process the wing is driven by the tooth *b* until the tooth *d* or *d'* enters the slot *g'* or *g*, when the tooth *b*, being wider than said slot, cannot enter; but the inclined surface *f* or *f'* strikes against the inclined surface *e'* or *e*, lying each side of the slot *g'* or *g*, and the fence is driven thereby out of the slot K entirely into the shell N, and out of the notches *q*, and is held out of the notches by the uncut portion of the part H.

The lower part of the bolt-talon is curved, and is so arranged with reference to the wing and the inclined surfaces *e'* and *e* that the wing has no labor in moving the bolt after the tooth *b* has begun to ascend one of the said inclined surfaces, and when it is therefore subject to greater friction, and has a shorter bit upon the tooth *d* or *d'*. At the same time the spring V aids in throwing the wing.

As soon as the fence has been driven out of the slot K, and out of the notches *q*, the tumblers reach the ascending surface *u'* or *u* of the part T, and are propelled forward by rotation thereon until they are completely restored, while the key-bit *p*, reaching the ascending portion of the groove *h*, is driven forward thereby harmoniously with the tumblers to its point of exit, when the revolution and operation are completed.

The track of the tumblers, or the track which they would have described if projected through the entire key-thrust, is indicated by the dotted lines in Fig. 12, the one nearest the center of the shell N describing No. 1, and so on till the one farthest therefrom describes No. 5.

This lock is a mortise-lock, and is thus attached to a door: The face-plate C is removed, and the screw *k* is loosened, when the part I, the shell N, with the tumblers, fence, and all parts contained in the shells I and N, are freely removed from the lock, leaving the parts H and F as seen in Fig. 8. The lock is then mortised into the door, a hole of suitable size to receive the part I bored into the mortise, measurement taken of the distance from the front end of the part H to the door's surface, the set-screws *l* and *l'* loosened, and the interior of the rosette U (with the escutcheon of the cap therein, as in Fig. 2) set by the screws *l* and *l'* the same distance from the farther edge of the flange *k'* as the said measurement. The shell I and all said removed parts are put in their proper place in the lock through the hole in the front surface of the door and cover L. The screw *k* is, through the front end of the lock, turned forward into the screw-hole *m'*—if changed to a left-hand lock, then through *m*—in the shell I, and the face-plate refastened to its place.

This lock is adjustable to either right or left hand doors as follows: The face-plate C and back plate D are removable from the lock-case, and have their screw-holes so placed relatively to the screw-holes in which their screws fasten them to the lock-case that they interchangeably fit either side of the lock, while the bolt may be turned over, so as to project from the other end of the lock through the changed face-plate, and the bolt-talon is so arranged with relation to the wing as to work equally well when the bolt projects from either end of the lock, and the stop *a* takes the place of the stop *a'*, so that the bolt is locked, projected, or retracted in the same manner as before the change of position. The screw *k* changes from *m'* to *m;* but the other parts remain unchanged in their places.

If it is desired to have the key-hole farther from the door's edge relatively to the lock's length, the face-plate may simply be built out or thickened, the adjustment depending on the interior surfaces.

In the drawing the distance is greater from

the key-hole to the surface of the front than of the back plate.

The tumblers are curved, in order that the chamber P, in which they are placed, may be upon the outer edge of the rotating shell N, and thus placed at the farthest possible point from the center of motion, so that the tumblers placed therein may have the easier ascent up the inclined surface *u* or *u'*, the angle of ascent varying inversely as the distance from said center.

Secondly, if the tumblers were in a chamber central to the shell N, the key-bit *p* would require to be of inconvenient length to reach the shell I.

In a former application the inventor described an inclined surface, cross-bar, and bearing, limiting the cross-bar's motion, to restore tumblers, avoiding the failures and uncertain action of springs; but in this lock the same improvement is added to rotating tumblers without using the cross-bar, thereby much cheapening the device.

Each of the tumblers has also on its inner end the inclined surfaces *s s'*, which, reacting on the part T, located in position to react upon said surfaces when said tumbler is rotated in shell N, would restore said tumbler, whether said part T should have the inclined surfaces *u u'* or not, and whatever shape said part may have, it being only essential that of the two parts—the tumbler and part T—the one shall partake of the motion of the key, while the other does not, and they shall be located to react upon each other through one of the surfaces *s'* or *s* when the tumbler is to be restored, whereby the tumbler, being guided by shell N, is restored on the mechanical principle of the inclined plane.

Obviously the mechanism described heretofore to restore the tumblers is applicable irrespective of the fence-notches *q q q q q*, the purpose being not only to disarrange said notches, but to obliterate the key's impression from the parts taking the same, which impression might otherwise in this case be obtained through the key-hole by the lock-pick; wherefore, by the term tumbler in claim 5 and tumblers in claim 7 it is intended to include the parts receiving the key's impression, whether the same have the fence-notches or not.

If the tumbler-notches are not correctly set, the tooth *b* does not fall outside of the shell N; wherefore it cannot come in connection with either of the teeth actuating the wing, and does not affect the same or the bolt, so that the rotating shell may be turned freely by anything that will enter the key-hole, while the bolt is only affected by the true key.

No force, therefore, can be used by the lock-pick to bring pressure more than the fence-weight upon the tumblers, or to overcome the resistance to the bolt's retraction.

The inventor is aware that devices have been used in that class of locks having tumblers which are set separately and in succession, whereby the wing or other piece conveying motion to the bolt does not act thereon unless the tumblers are set and the fence enters the same; but this device is still more necessary with tumblers set simultaneously for sundry reasons, particularly because in the first class the tumblers are not set by a key, (the key being metal,) but by a shaft or piece uniform in many locks, which may be left in the lock, closing all access, while in the latter class the key is variable—that is, different for different locks—and so must be removed, as it bears the secret of the lock, leaving a key-hole and access to the tumblers and various parts, in case of breakage or strain, to discover and feel the notches, and operate otherwise on the parts to open the lock.

Similar mechanism has been used with circular tumblers set by a key, and having their notches brought into line parallel to the key's axis, but not, so far as the inventor is aware, with tumblers set by the key with a motion rectilineal with the key's axis, owing to the difficulty of causing the fence to enter the tumbler-notches simultaneously.

The teeth *d* and *d'* have each an inclination, *c* and *c'*, on one side—to wit, on the side which would be impinged by the tooth *b* in an attempt to rotate the wing a second time in the same direction—which inclinations raise the fence in case of such attempt, and prevent its action on the wing, thereby preventing strain upon the parts when the operator using the true key turns it in the wrong direction.

What I claim, and for which I pray Letters Patent, is—

1. The curvature of one or more of the tumblers *t t t t t*, combined with one or more of the inclined surfaces *u u'* on part T, and with shell N.

2. A face-plate, C, and back plate D, made interchangeably adjustable to either end of the lock, as described, for the purposes described.

3. The combination of one or more inclined surfaces, *e* or *e'*, on the stationary shell H, with the fence and shell N, for the purposes described.

4. The combination, with the tooth *b* on the fence, of one or more of the inclined surfaces *c c'* on the teeth *d d'* of the ring F, arranged as described.

5. A tumbler having one or more of the inclined surfaces *s s'*, combined with a part, T, as described, when the one partakes of the rotary motion of the key, while the other does not, and when said tumbler and part are arranged to react the one upon the other, and restore said tumbler by the reaction of said part, and of one of said inclined surfaces.

6. The combination of a bolt-operating device, thrown into connection with the rotat-

ing shell by the entry of the fence into the fence-notches in the tumblers, with said fence and shell, and with a system of tumblers, which have a motion while being set substantially rectilineal with the key's axis, and which have fence-notches set simultaneously by key in position to receive the fence, all combined with the key, and operating as described.

7. The combination, with tumblers partaking of the rotary motion of the key, of an inclined surface to restore them.

HENRY WINN.

Executed in presence of—
ALFRED BOWEN,
DANIEL POWERS.