

(No Model.)

W. F. FEISTNER.
LOCK.

No. 570,087.

Patented Oct. 27, 1896.

FIG. 1. FIG. 9.

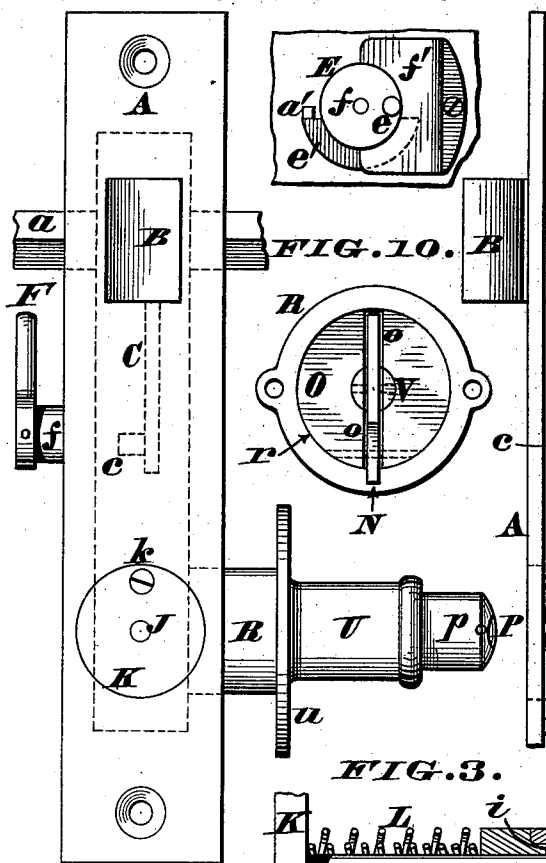


FIG. 2.

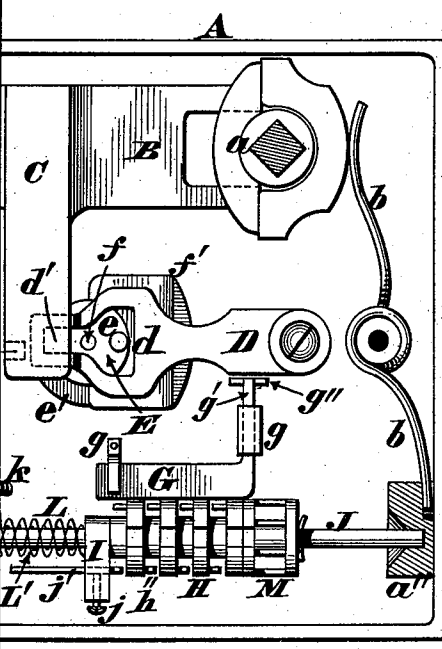


FIG. 10.

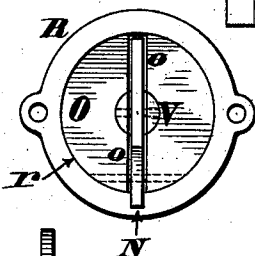


FIG. 3.

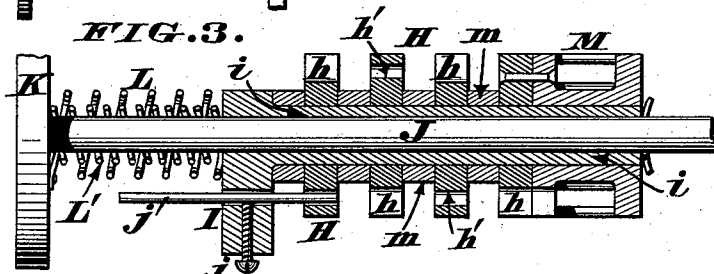


FIG. 4.

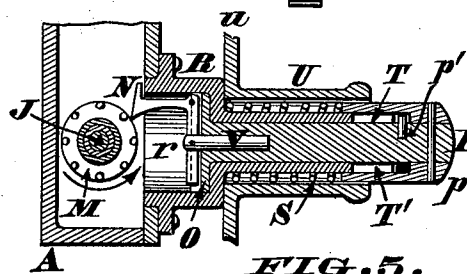


FIG. 7.

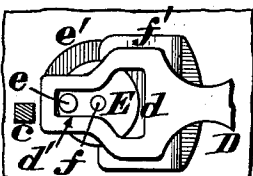


FIG. 8.

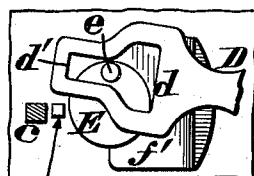


FIG. 5.

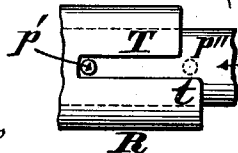
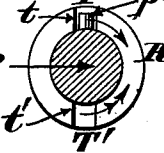


FIG. 6.



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LOCK.

SPECIFICATION forming part of Letters Patent No. 570,087, dated October 27, 1896.

Application filed May 27, 1896. Serial No. 593,243. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. FEISTNER, a citizen of the United States, residing at Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Locks; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the annexed drawings, which form a part of this specification.

The principal feature of my invention consists in constructing a lock in such a manner as to enable its bolt to be retracted when a combination of a set of revolving tumblers is restored, or said bolt can be used independently of said tumblers, as a simple spring-bolt; but by another movement the bolt can be fastened independently of the tumblers, thereby enabling the lock to be used as a "night-latch." These changes, by which the lock is rendered capable of three distinct uses, are effected by the simple turning of a handle or switch applied to the lock-case, as hereinafter more fully described.

Another feature of my invention consists in applying a single reciprocating-stem to a lock-case for the purpose of turning a driving-wheel of the tumblers, the stem being capable of a semirevolution in addition to its longitudinal motion, as hereinafter more fully described.

My invention further includes certain minor details in the construction of the lock, as hereinafter more fully described, and then pointed out in the claims.

In the annexed drawings, Figure 1 is a front elevation of a lock embodying my improvements, the opposite ends of its spindle being broken away and the switch being set to enable the bolt to be used as a simple spring-bolt. Fig. 2 is a side elevation of the operative parts of the lock, the switch being set to permit the retraction of the bolt as soon as the proper combination of the tumblers is restored, all the gates of said tumblers being shown in a horizontal plane level with the supporting-shaft. Fig. 3 is an enlarged axial section of the tumbler mechanism detached from the lock-case. Fig. 4 is a vertical section of the reciprocating push-stem and its accessories. Fig. 5 is a plan of a portion of said stem and its inclosing guide. Fig. 6 is

an end view of said guide, the stem that traverses it being sectioned. Fig. 7 is a detail view showing how the bolt is locked to serve as a night-latch. Fig. 8 is a detail view showing how the bolt is liberated to act as a simple spring-bolt. Fig. 9 shows a disk attached to the switch, the disk being arrested in such a position as to enable the bolt to be used with the tumbler mechanism. Fig. 10 is an enlarged elevation of a chambered end of the tubular guide, a head of the push-stem being seen in said chamber and a feed-pawl of said head being shown in its lower position.

The lock-case A is traversed by a spindle *a*, to the ends of which ordinary knobs or handles are secured, in order that the only bolt B of the lock may be operated either from the outside or inside in the usual way, the bolt being normally shot by a suitable spring *b* acting against its inner end. Projecting from this bolt is a vertical arm C, whose inner side has a short horizontal lug *c*, for a purpose that will presently appear.

Located below the bolt and pivoted within the case is a lever D, having a transverse opening *d* in it and a longitudinal slot *d'* communicating with said opening, the slot being of such a width as to permit the free passage of a pin *e*, projecting horizontally from a disk E, which latter has an annular flange *e'* extending almost half-way around it. Disk E is secured to the concealed end of a shaft *f*, whose exposed end carries a switch F, located on the inner side of the door. *f'* is a plate-spring that bears against the flange *e'*, so as to prevent accidental turning of the disk E, the rotation of the latter, both to the right and left, being arrested by a stop *a'* of the lock-case, as more clearly seen in Fig. 9.

Situated below the lever D is a vertically-acting fence G, confined to a proper path by guides *g*, and having at one end a rod *g'* with a stop-pin *g''* at top, the fence being adapted at the proper moment to drop and engage with the coincident gates *h* of any desired number of disk tumblers H, mounted upon an elongated sleeve *i* of an arm I. This sleeve is either integral with said arm or is so rigidly united thereto as to enable these two devices *i* and I to swing freely upon a shaft J, one end of the latter being securely fastened to a disk K, while its other end is supported

within a bearing a'' of the lock-case. k is a screw that holds said disk within a circular bearing in the end plate of the case A.

L L' are two springs coiled in opposite directions around the shaft J, and having their outer ends secured to said shaft or to the disk K, the inner ends of said springs being fastened to the arm I in order that the latter may normally hang directly under said shaft and yet be free to swing within the limited distance afforded by the side plates of the lock-case.

j is a screw tapped vertically within the arm J to hold a rod j' , which may be shifted longitudinally for the purpose of entering holes h' of the tumblers whenever it is desired to lock them against rotation. h'' are the customary pins that communicate motion from one tumbler to another, the tumbler at the extreme right of the series being attached to a trundle-pinion M, as seen in Fig. 3. m are customary washers between the various tumblers.

Pinion M is operated by a pawl N, pivoted within a groove o , running diametrically across the circular head O of a reciprocating and revolving push-stem P, to the outer end of which a knob p is secured. Head O plays back and forth within a chamber or enlargement r of a tubular guide R, around which latter is coiled a spring S, that bears against the knob p and thereby advances the push-stem.

Guide R is secured to the proper side of the lock-case, and has at its outer end a pair of diametrically opposite slots T T' and shoulders $t t'$, as more clearly seen in Figs. 5 and 6.

Push-stem P has a pin p' , adapted to traverse either one of these slots T or T'.

U is an outer casing that incloses the spring S and a portion of the knob p and has an annular flange u , capable of being fastened to the outer side of a door.

V is a plug coupled to the pawl N and adapted to have a limited longitudinal play within an axial bore of the push-stem P.

In constructing my lock it is unnecessary to number the peripheries of the tumblers H, because the combinations that bring their gates in line with each other are determined when the pins h'' are first inserted in the sides of said tumblers. Consequently the user of the lock can never change the position of these pins, but must be informed of the exact combinations by the manufacturer, and for the purpose of explanation let it be supposed the tumblers are "set up" on the numbers "12," "8," "6," and "4," or, in other words, twelve, eight, six, and four distinct movements must be made before all the gates h can be brought in line with each other and the fence G permitted to engage with them, and, as these movements can be effected only by means of the single push-stem P, a description of its action will now be given.

By referring to Fig. 4 it will be noticed that the stem is normally advanced by the spring

S, and the pin p' occupies the position indicated by the dotted circle p'' in Fig. 5. Evidently this pin now bears against the shoulder t and prevents the stem P being turned in the wrong direction, while at the same time said pin is free to play back and forth within the slot T. The operator accordingly pushes this stem in twelve times, which act turns the tumbler nearest the arm I to such a position as to bring its gate directly under the fence G. The stem is then turned around in the direction of the single-headed arrow seen in Fig. 6 until said stem is arrested by its pin p' coming in contact with the bottom shoulder t' . Said stem is now pushed in eight times, after which act it is turned back in the direction of the double-headed arrow, and as soon as the pin p' strikes the upper shoulder or stop t six pushes are given to the stem. Another turn is finally made to bring the pin p' against the lower shoulder t' , and then the stem is pushed in four times, the result of these various movements being to bring all the gates vertically above the shaft J, at which instant the fence G drops into said coincident gates, the descent of the fence being arrested by its cross-bar g'' striking the top of guide g .

It is evident the free end of lever D immediately swings down, because the pin e of disk E now occupies the transverse hole d of said lever. Consequently the extreme free end of the lever is now below and out of contact with the lug c of arm C, and there being nothing to prevent the retraction of the bolt it can be drawn back by turning either one of the knobs attached to the spindle a .

Every time the stem P is pushed in, while its pin p' traverses the upper slot T, the pawl N acts on the pinion M above its axis and turns said pinion in the direction of the arrow seen in Fig. 4, but when this stem is so turned around as to cause its pin to traverse the lower slot T' the pawl acts on said pinion below its axis and revolves the device M in an opposite direction to said arrow.

The lower position of the pawl is seen in Fig. 10, and as the pivot of said pawl is now quite near the bottom of head O it is evident the device N has a tendency to swing down, and might drop so far as to be incapable of engaging with the pinion; but the friction of the plug V within the bore of the push-stem is sufficient to retain the pawl in a proper position for acting against the teeth of the pinion.

The tumblers can be "scattered" by operating the stem either when the pawl occupies the upper or lower position within the chamber r , and without any regard to the number of times said stem is pushed in. Thus if the elevated pawl should be operated repeatedly after the tumblers have been scattered, the only result would be to swing the arm I aside by the contact of the pin of the first tumbler with the rod j' of said arm; but the instant the pawl is retracted the spring arrangement L L' restores the arm to its normal position,

which is vertically under the shaft J; but if the pawl should be operated repeatedly while in the position seen in Fig. 10 the pin of the first tumbler would then come in contact with the other side of rod *j'* and swing the arm in an opposite direction to what the elevated pawl would do; but immediately on the retraction of said depressed pawl the springs L L' again restore the arm to its normal vertical position. It will thus be seen that said springs act as a safety device that prevents the tumbler mechanism being injured by tampering with the lock.

By simply disengaging the screw *k* the circular plate K, together with the entire tumbler mechanism, can be drawn bodily out of the lock-case, as seen in Fig. 3. After this withdrawal the rod *j'* can be passed through the holes *h'* of one or more of the tumblers, and then by tightening up the screw *j* such tumblers will be locked to the arm I and thereby rendered inoperative for the time being. This is the only control the user of the lock has over the tumblers, and by using but one or two of them the combination can be restored very speedily.

The switch F should be so fastened to the shaft *f* as to be in line with the pin *e* of disk E, in order that said pin may be vertically above the axis of said disk, as seen in Fig. 8, when said switch is perpendicular, as represented in Fig. 1. In this position of the pin the lever D is elevated clear of the lug *c*, and the lock can now be used as an ordinary spring-bolt. Furthermore, the tumblers can now be turned without having the least effect on the bolt mechanism; but by swinging the switch around until the pin *e* reaches the position seen in Fig. 7 the lever D is rendered horizontal, and its free end is directly in line with the lug *c*, thereby affording a night-latch that cannot be opened no matter how frequently the combination may be restored. Again by swinging the switch over in a diametrically opposite direction, so as to bring the pin *e* to the position seen in Fig. 2, a lock is afforded that can be opened as soon as its combination is restored.

It will thus be seen that the case A contains the mechanism for a combination-lock, a night-latch, and an ordinary spring-bolt or day-latch; and it will also be noticed that these three different uses are afforded by simply swinging the switch F to the positions above described.

It is also evident that the combinations are restored by turning a single push-stem half-way around in opposite directions, and then properly counting every time it is advanced toward the case A. Therefore there are no letters or figures associated with the lock; neither is there any external indication of the position of the tumblers. Finally, although I have described the single stem P as forced out by a spring and pushed back by the operator, yet this arrangement can be exactly reversed—that is to say, the spring may draw

said stem toward the lock-case, and a handle can be provided to enable the stem to be readily pulled forward or away from said case. 70

I claim as my invention—

1. The combination, in a lock, of a spring-protruded bolt; a revolving gated tumbler; an external device that operates said tumbler; a fence adapted to engage with said gate; shift- 75
able mechanism intermediate of said bolt and fence; and internal means for setting said mechanism, whereby said bolt may be used in conjunction with said tumbler, or be locked independently of it, or serve as a spring-bolt, 80
substantially as herein described, and set forth.

2. The combination, in a lock, of a spring-protruded bolt; a series of reciprocating rotary gated tumblers; an external device that 85
operates said tumblers; a fence adapted to engage with the coincident gates of said tumblers; shiftable mechanism intermediate of said bolt and fence; and internal means for 90
setting said mechanism, whereby said bolt may be used in conjunction with said tumblers, or be locked independently of them, or serve as a spring-bolt, substantially as herein described, and set forth.

3. The combination, in a lock, of the spring- 95
actuated bolt B, having a lateral arm C, provided with a lug *c*; a swinging lever D, having an opening *d*, and longitudinal slot *d'*; a disk E, having a pin *e* that traverses said opening and slot; means for turning said disk E; 100
a fence G, that normally supports said lever D, a series of revolving gated tumblers with which said gate engages and means for operating said tumblers.

4. The combination, in a lock, of a series 105
of gated tumblers journaled upon a shaft and having means for communicating motion from one to another; a vibrating arm carried by said shaft and serving to arrest the first tumbler; and a pair of springs coiled in reverse 110
directions around said shaft and having their inner ends connected to said arm and their outer ends attached to a stationary part of the lock.

5. The combination, in a lock, of a shaft; a 115
vibrating arm and a series of perforated gated tumblers journaled upon said shaft; a longitudinally-shiftable rod applied to said arm; and a pair of springs coiled in reverse directions around said shaft, and having their inner 120
ends secured to said arm and their outer ends attached to a stationary part of the lock.

6. The combination, in a lock, of a tumbler mechanism; a non-rotatable shaft carrying said mechanism; a plate, as K, to which said shaft 125
is fastened; an opening in the outer end of the lock-case to admit said plate; and a retainer, as *k*, that holds said plate in position, all as herein described, and for the purpose stated. 130

7. The combination, in a lock, of a shaft; a toothed wheel and a series of gated tumblers journaled upon said shaft a reciprocating stem having a pawl that actuates said wheel;

and devices that permit said stem being turned, half-way around, and then arrested.

8. The combination, in a lock, of the toothed wheel M, a series of gated tumblers driven
5 by said wheel; a tubular guide R projecting from the lock-case and having a chamber *r* at its inner end, and a pair of shoulders *t, t'*, and longitudinal slots T, T', at its outer end; a reciprocating push-stem P, traversing said
10 guide; and furnished with a pawl N, knob *p*, and pin *p'*; and a spring S, coiled around said guide and serving to protrude said push-stem.

9. The combination, in a lock, of the reciprocating push-stem P, having at its inner end
15 a head O provided with a diametrical groove *o*; a pawl N pivoted within said groove; and

a plug V, coupled to said pawl and adapted to play back and forth within an axial bore of said stem.

10. The combination, in a lock, of the 20 switch F, fastened to a shaft *f*; the disk E, secured to the inner end of said shaft, and having a pin *e*, and semiannular flange *e'*; the plate-spring *f'*, bearing upon said flange; and a stop *a*, for arresting the turning of said 25 disk.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM F. FEISTNER.

Witnesses:

JAMES H. LAYMAN,
JOHN C. ROGERS.