(Model.)

F. W. MIX.

PADLOCK.

No. 361,072. Patented Apr. 12, 1887.

Fig. 1.

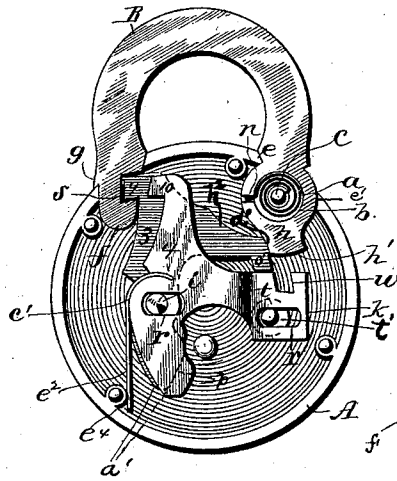


Fig. 3.

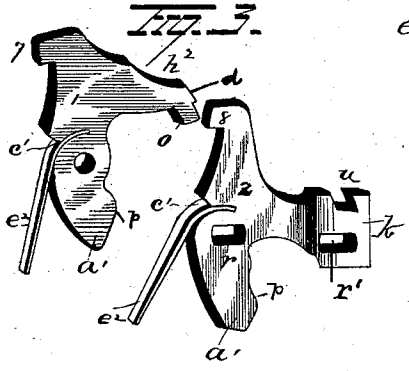


Fig. 5.

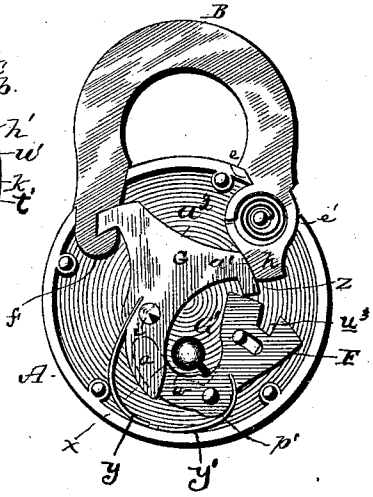


Fig. 2.

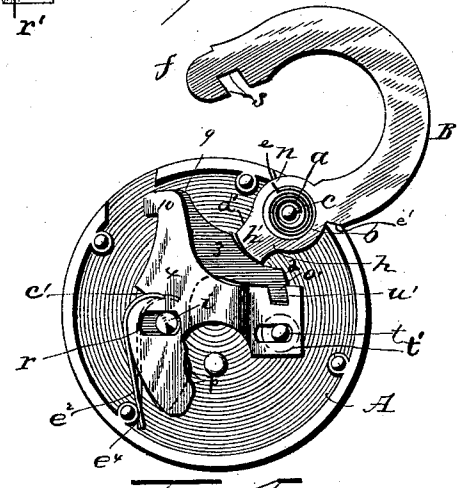
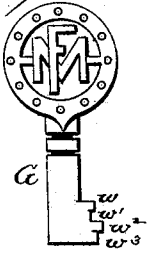


Fig. 4.



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PADLOCK.

SPECIFICATION forming part of Letters Patent No. 361,072, dated April 12, 1887.

Application filed November 5, 1886. Serial No. 218,075. (Model.)

To all whom it may concern:

Be it known that I, FRANK W. MIX, of New Britain, in the county of Hartford and State of Connecticut, have invented a certain new and useful Improvement in Padlocks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in padlocks.

The object is to provide a tumbler-padlock of simple construction, and yet of such peculiar arrangement of parts as will render it proof against being picked or unlocked without the use of its specially-fitted key.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of the padlock with front plate removed, showing the mechanism in its locked position. Fig. 2 is also a view in side elevation showing the relative position of parts when the padlock is unlocked. Fig. 3 is a detached view of two of the tumblers. Fig. 4 is a view of the key. Fig. 5 is a modification of the padlock.

In Figs. 1 and 2, A represents the casing of the padlock, preferably of a circular form; but it might be variously formed. The necessary studs or rivets for securing the detachable face-plate to the padlock are made intact with the body or casing in the usual manner.

The hasp or shackle B is preferably provided with a circular chamber or box, *b*, at the heel, in which the volute spring *a* is coiled. The outer end of this spring *a* is secured in the notch *n*, formed in the wall of the box *b*, while its inner end is fastened in a slot formed in the face of the pivot bolt or stud *c*, which stud projects from the interior of the casing A into the center of the box *b*, so that the spring *a*, by its mode of fastening within the box *b* and its tension, holds the hasp or shackle B normally open, as shown in Fig. 2. Portions of the outside of the pivoted end of the hasp or shackle B are rounded, so as to be concentric with the pivot-bolt *c*, thus enabling the wall-shoulders *e e'* of the lock-casing to have a neat and continual contact with this rounded portion, thereby preventing the ingress of dust.

A shoulder, *g*, is formed on the exterior of the hasp or shackle B near its free end *f*. This shoulder *g* is made to abut against the wall of the casing and limit the depression of the shackle, thus preventing injury to the locking mechanism that otherwise might result from a blow upon the shackle B.

The locking-tumblers 1 3 and guard-tumblers 2 and 4 are provided, respectively, on their upwardly-projecting ends with hooks 7, 9, 8, and 10, adapted to enter the notch *s*, formed in the end *f* of the shackle B. The locking-tumblers 1 3 and guard-tumblers 2 and 4 are placed successively and alternately over the pivot-stud *i*, which projects inwardly from the inner wall of the lock-casing A.

The locking-tumbler 1 is first placed upon the pivot-stud *i* in contact with the inner face of the casing A. Projecting in a rearward direction from the hook 7 the locking-tumbler 1 terminates in a hook, *o*, and in a corresponding position on the locking-tumbler 3 there is also a hook, *o'*. The outer faces, *d*, of these hooks *o o'* are located at such a distance from the pivot-stud *i* as to allow a close sliding engagement with the curved inner side, *d'*, of the depending projection *h* of shackle B when the latter is in locked adjustment, and on the other hand the convex lower face, *h'*, of the depending projection *h* will impinge on the upper concaved faces, h^2, of the locking-tumblers 1 3, which faces h^2 are approximately concentric with the pivot bolt or stud *c*, on which shackle B rocks when the latter is in unlocked adjustment.

Guard-tumblers 2 and 4 are each provided with rearward extensions *k*, and also with the elongated slots *r* and *r'*—the former located in the forward portion or body of the tumbler and adapted to receive the pivot-stud *i*, while the latter is located in the rearward extension *k* and adapted to receive the stud *t*. On guard-tumbler 2 the rearward extension *k* is projected laterally out of the plane of the body of the tumbler sufficiently to fall into the plane of the adjacent and inner locking-tumbler, 1, thus bringing this end into contact with the interior wall of the casing A, and also bringing the notch *u* in position to receive the hook

o of locking-tumbler 1 when the shackle B is thrown back. The guard-tumbler 4 is precisely similar in form to the one just described, the notch *u'* in this one being adapted, when the shackle B is thrown back, to receive the hook *o'* of locking-tumbler 3, in the plane of which it falls at proper intervals, the rearward extension *k* being separated at a suitable distance from the rearward extension *k* of the guard-tumbler 2 by a washer, *t'*, placed on the stud *t* between said rearward extensions *k*.

The locking-tumblers 1 and 3 and guard-tumblers 2 and 4 are each provided with a depending leg, *a'*, the inner swelling cam-edge, *p*, of which the several wards of the key G engage in the operation of unlocking the padlock. These locking-tumblers are further provided at a point, *c'*, on the outer edge, immediately above the pivot-stud *i*, with the finger-springs e^2, the free ends of which engage the lugs e^4 on the inner wall of the casing A, their tension throwing the hooks 7 and 9 into the notch *s* of the shackle B and the hooks 8 and 10 backward. These hooks 7 and 9, formed, respectively, on the locking-tumblers 1 and 3, are the actual locking-catches, the hooks 8 and 10 on guard-tumblers 2 and 4 being normally held out of the notch *s* by the action of their springs e^2, and, owing to the elongated formation of their slots *r r'*, the rearward extensions *k* of the guard-tumblers are brought under and in contact with the hooks *o* and *o'* of the locking-tumblers, thus holding the hooks 7 and 9 wedged, as it were, in the notch *s* of the shackle.

The depending legs *a'*, against which the key G abuts when turned in the padlock, have a formation on their inner edges to correspond with the varied lengths of the wards *w w' w²* w^3 of the key G, so that when acted upon by the turn of the latter the guard-tumblers 2 and 4 are shifted forward until their notches *u u'* are opposite the hooks *o o'* of locking-tumblers 1 and 3, in which the said hooks *o o'* drop from the downward impulse given the hooks *o o'* by the engagement of the wards *w'* w^3 with the swelling cam-edge *p*.

When the parts of the lock are in locked adjustment, should a key with wards too short be used to unlock it, it is evident that the hooks *o o'* will not register with the notches *u u'*, and the depending projection *h* of the shackle will still hold the locking-tumblers 1 and 3 wedged so that their hooks 7 and 9 will register with the notch *s* of the shackle B. If, on the other hand, a key with wards too long is used to open the lock, the hooks 8 and 10 on guard-tumblers 2 and 4 will be thrown forward to register with the notch *s* in the shackle B, and so making it difficult to pick the lock or open it without the use of its own key.

The relative extension of the cam-edges *p* and wards on the key may be changed for different locks, to avoid similarity in keys, and, if desired, this change may be effected in each individual lock, so as to make it unique in its locking mechanism and means of operating the same.

It is obvious that the alternate position given to the locking-tumblers may be changed so as to place the locking and guard tumblers in other relative locations in regard to each other and to the casing of the lock and its shackle. There may, if desired, be a change made in the number of these locking and guard tumblers—as, for example, a locking-tumbler, 1, and guard-tumblers 2, or tumblers 1, 2, and 4, might be employed without deviating from the principle involved in my improved padlock.

In the modification shown in Fig. 5, while the main features are identical with the construction just described, there are slight changes in the operating mechanism. In this figure, A is the casing, B the shackle, and G' the key. The key has a straight single bit notched on the edge to produce a proper number of wards to correspond with the locking-tumblers. Each ward on the key is cut relatively to a swelling edge or abutment, *x*, on the depending leg *a* of its complementary locking-tumbler, so as to press these locking-tumblers in proper position to release the shackle, which release is effected by the appropriate ward of the key G' rocking the guard-tumbler F by impinging the cam-edge *w*, which is then concentric with the stud on which the key turns, thus causing the locking-tumblers to turn on the pivot-stud *i* until the notches w^3 in the upper convex edge of the guard-tumblers F are thrown in line to receive the hooks *z* of the locking-tumblers G, where they are held during a further turn of the key, which, bearing against the swelling edge or abutment *x* of the locking-tumblers G, oscillates them, throwing the hooks *z* backward and downward, causing them to enter the notches w^3. Now, the opening of the shackle B carries its depending projection *h* in contact with the upper concaved edges, a^3, of the locking-tumblers, in which position the locking-tumblers are locked until the closure of the shackle withdraws the depending projection *h* from the concaved edges a^3, causing the release of the locking-tumblers, the several parts then taking the position shown in Fig. 5, the finger-springs *y* and *y'* automatically throwing the upper ends of the locking-tumblers and guard-tumblers outward.

Slight changes might be made in the parts of this padlock without departing from the spirit and scope of my invention; hence I do not wish to limit myself strictly to the exact construction and exact forms herein set forth, nor to the combinations shown; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a padlock, the combination, with a casing and a shackle, of a locking-tumbler and a guard-tumbler, each having a depending portion arranged so as to be engaged by a single-

bitted key, the said locking-tumbler having a hook and the guard-tumbler a corresponding notch adapted to receive said hook as the locking-tumbler is moved away from the free end of the hasp, substantially as set forth.

2. In a padlock, the combination, with a casing and spring-operated shackle, of two locking-tumblers and two guard-tumblers placed on a common pivot, the locking-tumblers having a rocking motion and the guard-tumblers a sliding movement on this pivot, substantially as set forth.

3. In a padlock, the combination, with a casing and a spring-operated shackle, of two locking-tumblers and two guard-tumblers placed alternately on a common pivot and each provided with a spring on its edge, the springs being adapted to cause an interlocking engagement of a hook on each locking-tumbler with its opposed notch on a complementary guard-tumbler when the shackle is in an unlocked position, substantially as set forth.

4. In a padlock, the combination, with a casing and a spring-operated shackle, of two vibrating locking-tumblers and two sliding guard-tumblers, a spring on each tumbler, two retaining-studs for the guard-tumblers, one of which studs holds pivotally for rocking motion the locking-tumblers, and hooks on lateral arms on the locking-tumblers which engage the edges of the rearward extensions on the guard-tumblers, substantially as set forth.

5. In a padlock, the combination, with the casing and a spring-operated shackle, of two vibrating locking-tumblers, two sliding guard-tumblers, a spring to each tumbler, two retaining-studs for the slotted guard-tumblers, a pivot for the vibrating locking-tumblers, hooks on the locking-tumblers to engage notches in the guard-tumblers, a depending projection on the shackle to engage the lateral arms of the locking-tumblers, a hook on the upper end of each locking-tumbler, a guard-hook on the upper end of each guard-tumbler, and a depending leg on each tumbler for abutment of the wards of a single-bitted key, whose wards are adjusted relatively to the tumblers to move them together properly to disengage the shackle, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRANK W. MIX.

Witnesses:
S. N. CHAFFEE,
E. L. PRIOR.