(No Model.)

L. H. PENNEPACKER.

PADLOCK.

No. 588,654. Patented Aug. 24, 1897.

Fig. 1.

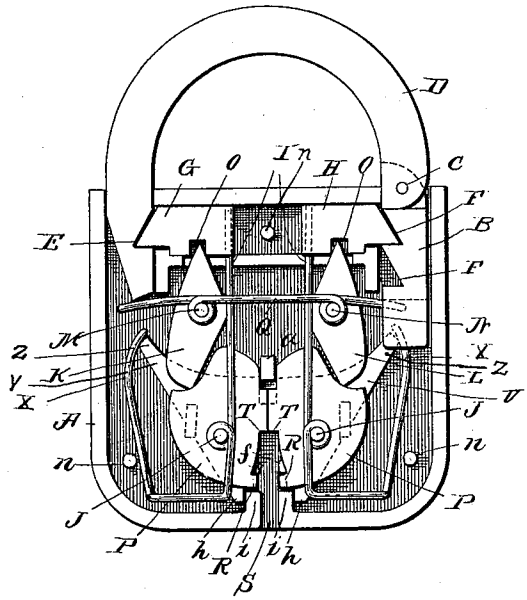


Fig. 2.

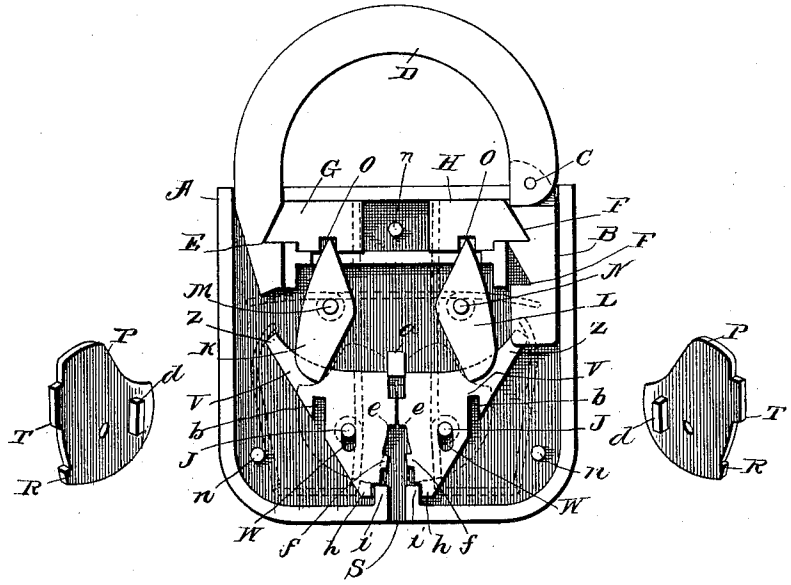
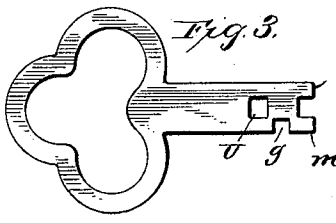


Fig. 3.



Witnesses
E. C. Burdeman
S. J. Williamson

Inventor
Lewis H. Pennepacker
by Geo. H. Holgate
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LEWIS H. PENNEPACKER, OF PHILADELPHIA, PENNSYLVANIA.

PADLOCK.

SPECIFICATION forming part of Letters Patent No. 588,654, dated August 24, 1897.

Application filed September 17, 1896. Serial No. 606,075. (No model.)

To all whom it may concern:

Be it known that I, LEWIS H. PENNEPACKER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Padlocks, of which the following is a specification.

My invention relates to a new and useful improvement in padlocks, and has for its object to so construct such a lock as to increase the difficulty of opening the same without the proper key, and also to permit the upward movement of the shackle to such an extent as to permit it to embrace a larger staple without unduly swinging, and to generally improve upon the construction of padlocks as usually made.

With these ends in view this invention consists in the details of construction and combination of elements hereinafter set forth and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, the construction and operation will now be described in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a view looking into the lock-casing of a lock made in accordance with my improvement, the cap being removed; Fig. 2, a similar view, the tumblers being removed and shown in detail in perspective upon either side of the lock, their positions and that of the springs being illustrated in dotted lines; and Fig. 3 represents the key adapted for use in connection with this lock.

In the drawings, A represents a casing of suitable design having arranged to slide therein the shackle-block B, to which is pivoted at C the shackle D in such a manner as to swing on the shackle-block when the same is extended, but being unable to swing when the shackle-block is in its inner position. A notch E is formed in the end of the shackle D, and similar notches are formed in the shackle-block, as indicated at F, and the bolts G and H are arranged to enter into engagement with the notches in the shackle nose and block, respectively, these bolts being beveled downwardly upon their outer ends in order that they may be cammed inward when pressure is brought to bear upon these beveled surfaces. These bolts are normally held outward by the upper ends of the springs I, which are composed of single pieces of wire and are held in place by being coiled about the posts J.

K and L are dogs pivoted upon the posts M and N, respectively, so as to swing, and the upper ends of these dogs project into engagement with the notches O, formed in the bolts G and H, so that when the dogs are swung the bolts are caused to be retracted or when the bolts move outward the dogs are swung in the reverse direction. The lower ends of these dogs bear against the tumblers P, which latter are pivoted upon the posts J, so that when they are swung upon their pivoted points the lower ends of the dogs will be moved from each other, causing their upper ends to retract the bolts G and H, thereby releasing the nose of the shackle and the shackle-block, thus permitting said shackle to first move upward and then be swung upon the point C. When the shackle and shackle-block are thus released, they will be given an initial upward movement by the outer ends of the spring Q, which is coiled about the posts M and N, after which a further upward movement of the shackle-block may be effected by pulling upon said shackle, after which the latter may be swung upon its pivot C.

The tumblers P are provided with wards R, set at such a distance apart as to just permit the passage of the key when the latter is inserted through the keyhole S, formed in the bottom of the casing, and when this key is forced upward against the shoulders T with sufficient pressure to bring about the action of the dogs the lower ends of the tumblers will swing inward, and the wards carried thereby must have an unobstructed passage through the key in order that they may be permitted to swing. Therefore said key is provided with an opening U for the passage of these wards, and should this opening be placed other than in alinement with the wards when they are swung inward it is obvious that the lock could not be opened. Thus a variety of combinations may be had by vary-

ing the location of the opening U and correspondingly varying the positions of the wards upon the tumblers.

The spring action of the dogs, which is transmitted to the latter from the bolts, is in turn transmitted to the tumblers by contact therewith, as before described.

Next below the tumblers P are pivoted the tumblers V and upon the posts J, and these last-named tumblers are so pivoted by elongated holes W in order that they may be permitted to have a slight vertical movement independent of their swinging movement and are held in normal position by the short ends X of the springs I, which bear against the extensions Z in such manner as to not only force said extensions inward until arrested by the striking of the upper end of the tumblers against the stop-post *a*, but also force these tumblers downward so as to cause the upper end of the elongated holes to bear against the posts J for the purpose hereinafter set forth.

The tumblers V have formed therein the notches *b*, and the tumblers P have projecting downward therefrom the lugs *d*, which normally fit within these notches, thereby locking the two sets of tumblers together and preventing any independent movement thereof. The tumblers V are also provided with the shoulders *e*, against which the end of the key may be thrust for the movement of said tumblers, and when the key is thus used the first action upon the tumblers will be to move the same upward until the lower ends of the elongated holes W come in contact with the posts J. A further upward movement of the key will cause the tumblers V to so swing as to move the wards *f*, formed thereon, toward each other, and to permit this movement an opening must be formed in the key in alinement with these wards at this time, which is here shown at *g*. This arrangement will increase combinations to be had, since the position of the notch *g* may be varied upon the key, with a corresponding variance of the wards *f*, and as the two sets of tumblers at all times work in unison it will be seen that unless all the wards carried by said tumblers are permitted to freely pass within corresponding openings in the key the lock cannot be opened. The second notch is formed on the shackle-block for the purpose of allowing the bolt H to spring outward when the shackle-block is withdrawn, so that the wards *f* will be disengaged from the key to permit it to be removed.

The tumblers are normally prevented from swinging upon their pivot-points by the projections *h*, formed with the tumblers V, lying behind and in engagement with the shoulders *i*, from which they are only released by the upward movement of said tumblers, as just described. From this it will be seen that the unlocking of the shackle by sudden or violent jars is impossible, while at the same time the shackle may be locked by the spring action of the bolts, and the liability of unlocking said shackle by a jar is further obviated by the two bolts G and H being arranged in line and operating in opposite directions, so that a blow upon the casing that would retract one bolt would have the tendency to force the other bolt in the opposite direction, which would increase its hold upon the notch into which it is adapted to enter. A further safety of my improved lock is the fact that the tumblers V must move upward before swinging. Therefore should they be freed to swing by a greater or less upward movement, which would be regulated by the projections *h*, the wards *f* would be caused to strike against the key and prevent the swinging of said tumblers at different points. This also increases the possible number of combinations to be had.

A further safety is provided by the stop-post *a*, against which the end of the key will abut, so that the length of the key will enter into the combination by which the lock must be opened, and to increase the utilization of this principle the end of the key is notched, so that the tang *m* is of the proper length to bring about the movement of the tumblers V by the pressure against the shoulders *e*, while the inner wall of the notch is for the operation of the tumblers P by pressure against the shoulders T, and the tang *j* is for contact with the stop-post.

While my improved lock is comparatively inexpensive to manufacture, yet it is exceedingly safe against being picked and is susceptible to an exceedingly large number of combinations, so that it may be utilized for all purposes for which the padlock of any description is capable of use.

A suitable cap is provided (here not shown) for the casing and is held in place by the passage of the rivet-posts *n* therethrough, said posts being headed upon the casing in the well-known manner of riveting.

Having thus fully described my invention, what I claim as new and useful is—

1. A padlock, comprising a casing, a shackle-block arranged to slide therein, a shackle pivoted to said block, two bolts arranged to engage the block and shackle, dogs for operating the bolts in one direction, springs for forcing said bolts in the opposite direction, tumblers arranged to actuate the dogs, and other tumblers with which the first-named tumblers are caused to move in unison, and means for operating the tumblers, as specified.

2. In combination with a lock, a shackle-block arranged to slide within the casing, a shackle pivoted to said block, said block and shackle being notched, two bolts arranged to enter into engagement with said notches, dogs for retracting said bolts from the notches, tumblers P for operating the dogs in one direction, wards R formed with said tumblers, tumblers V so pivoted within the casing as to have a vertical sliding movement, means for connecting the last-named tumblers with

the first named, wards *f* and projections *h*, the latter arranged to prevent the swinging of the tumblers V except at a predetermined time, and means for operating said tumblers, as specified.

3. The herein-described combination of a casing, a shackle-block arranged to slide therein, a shackle pivoted thereto, said shackle and block having notches formed therein, two bolts arranged to engage said notches, springs for holding said bolts in engagement with the notches, dogs for retracting bolts from the notches, tumblers P pivoted within the casing and arranged to so operate the dogs as to retract the bolts, wards R formed upon the tumblers, shoulders T also formed upon said tumblers, tumblers V so pivoted within the casing as to have a vertical movement independent of their swinging movement, springs for holding said tumblers in their normal position, lugs *d* for connecting the tumblers P and V by means of the slot *b*, wards *f* formed upon the last-named tumblers, shoulders *e* also formed upon said tumblers, projections *h* formed with the last-named tumblers adapted to engage the shoulders *i*, and a stop-post *a* for limiting the thrust of the key, substantially as specified.

4. In a padlock, a casing having a keyhole, tumblers slidably pivoted to the casing on either side of said keyhole, shoulders formed on said tumblers to engage the end of a key when forced through said keyhole and thereby cause the tumblers to slide and turn and wards on the tumblers to pass through holes in the key when the tumblers turn, as and for the purpose described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

LEWIS H. PENNEPACKER.

Witnesses:
S. S. WILLIAMSON,
MARK BUFORD.