F. A. HERMAN.

PERMUTATION PADLOCK.

APPLICATION FILED MAR. 2, 1912.

1,224,168. Patented May 1, 1917.

Fig. 1.

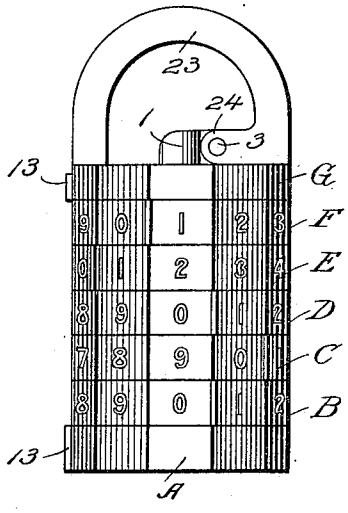


Fig. 2.

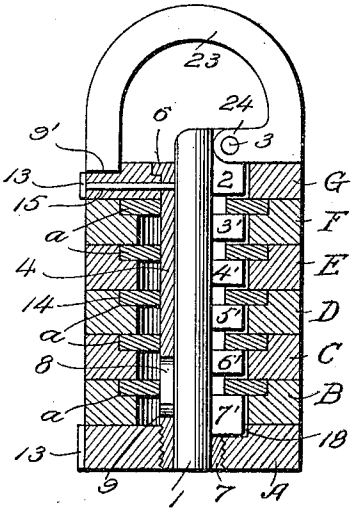


Fig. 3.

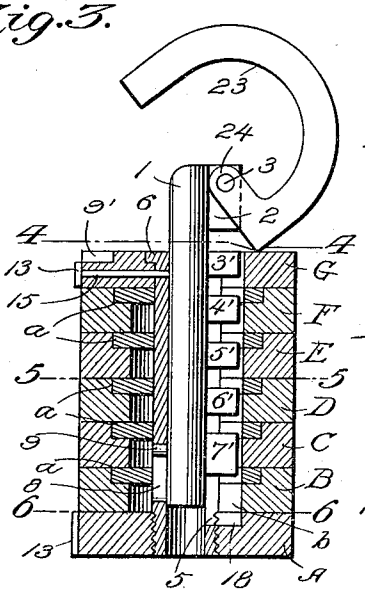


Fig. 4.

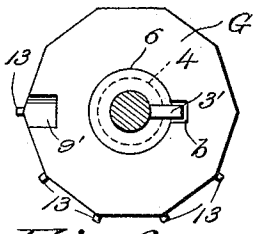


Fig. 5.

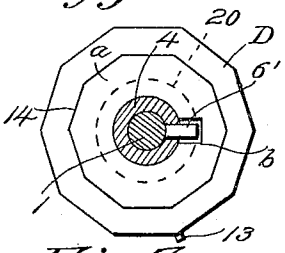


Fig. 6.

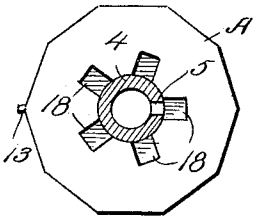
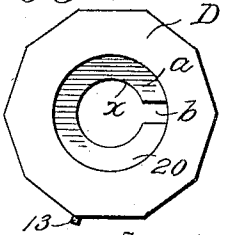


Fig. 7.



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UNITED STATES PATENT OFFICE.

FRANCIS A. HERMAN, OF SLATINGTON, PENNSYLVANIA.

PERMUTATION-PADLOCK.

1,224,168. Specification of Letters Patent. Patented May 1, 1917.

Application filed March 2, 1912. Serial No. 681,037.

To all whom it may concern:

Be it known that I, FRANCIS A. HERMAN, a citizen of the United States, and a resident of Slatington, in the county of Lehigh and State of Pennsylvania, have invented certain new and useful Improvements in Permutation-Padlocks, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to certain new and useful improvements in portable combination locks, of that class known as permutation padlocks; and the object of my invention is to provide a changeable lock of this general character, of a simple and inexpensive nature and of a neat, compact and durable construction, which shall be capable of convenient and accurate adjustment in position through a staple, over a hasp, or through the links of a chain.

A further object is to provide a portable permutation lock so constructed that the combination can be easily changed.

With these and other objects in view, the present invention consists in the combination and arrangement of parts as will be hereinafter more fully described and finally pointed out in the appended claims, it being further understood that changes in the specific structure shown and described may be made within the scope of the claims, without departing from the spirit of the invention.

In the accompanying drawings forming a part of this specification and in which like numerals of reference indicate similar parts in the several views:

Figure 1, shows an elevational view of a lock constructed according to my invention.

Fig. 2, is a central sectional view, showing the lock in its closed condition.

Fig. 3, shows a central sectional view, disclosing the lock in its open position.

Fig. 4, is a top view on line 4, 4 of Fig. 3.

Fig. 5, is a section on line 5, 5 of Fig. 3.

Fig. 6, is a section on line 6, 6 of Fig. 3.

Fig. 7, shows a detached detail of one of the annular tumblers, showing a bottom view thereof.

In carrying out the aim of my invention, I employ a tubular arbor 4 having its lower end 7 threaded while the upper end is provided with the outstanding stop flange 6. As shown in Fig. 3 this tubular arbor is provided with the lengthwise running slot 5 and the lengthwise running aperture 8.

Threaded upon the end 7 of the tubular arbor is the base plate A, which upon its inner face has a plurality of radially extending forward seats 18. In Fig. 6, an inner face view of this base plate A is shown. The base plate A must be secured upon the arbor in such a way that one of the seats 18 will register with the arbor slot 5, as shown in Fig. 6. The base plate A is provided with the rib 13.

Held to the arbor 4 and below the flange 6 is the top plate G, which has the edge entering seat 9, and a lugway *b*, as shown in Fig. 4. This top plate G also has an outstanding lengthwise running rib 13 and an opening to receive the pin 15, which passes through the top plate G, into the arbor 5 as shown in Fig. 2.

Slidably held within the arbor 4 is the bolt 1, which at one end has the ear 2 and at the opposite end the base lug 7′ with the intermediately positioned alined key lugs 3′, 4′, 5′, and 6′, shown in Figs. 2 and 3. The bolt 1 is provided with a stud 9 which is slidably held within the aperture 8, this stud serving as a limiting stop controlling the outward movement of the bolt. In the closed condition of the lock, the base lug 7′ is arranged to be held within one of the seats 18, as shown in Fig. 2.

Revolubly held between the top and bottom plates are a plurality of annular tumblers, five being shown in the drawings and marked B, C, D, E, F.

Each annular tumbler has a socket 14 within one face, arranged to removably receive a key disk *a*. In order to hold these key disks to the tumblers against rotation, each socket is made in the form of a polygon, as shown in Fig. 5, where the tumbler D is shown with its attached key disk *a*. Each key disk is provided with a lugway *b*. As disclosed in Fig. 2, the disks *a* are very much thinner than the tumblers to which they are connected, and held within the tumblers and between the adjacent disks are the key lugs 3′, 4′, 5′, 6′, and 7′, as shown in Fig. 2. These key disks are removably held within the tumblers and when assembled are held in place by means of the adjacent tumbler resting upon the same, excepting in the case of the top tumbler F, where the key disk *a*, is held in place by means of the top plate G.

As shown in Fig. 1, each tumbler is provided with a series of numerals which are preferably cut into the tumblers so that they can be readily felt when it is necessary to operate the lock in the dark. The numbers run from 0 to 9. The ribs 13 upon the

tumblers mark the point where the numbers begin and thus facilitate the finding of the starting points in the dark.

Held to the pin ear 2, as shown in Fig. 2, is the pin 3 giving pivotal support to the bow 23, the end of which, when the lock is closed, is arranged to seat within the socket 9′. This bow 23 has the outstanding foot 24, the bottom of which is flat, and when the bolt 1 is set as shown in Fig. 2, the flat base of the foot 24 rests upon the top plate G.

When the bolt 1 is withdrawn, the bow 23 can be tilted as is shown in Fig. 3, so that the same can be readily attached or detached. The excursion of the bolt 1 is controlled by the stud 9 in the manner disclosed in Fig. 3. Each tumbler is provided with a central opening 20, as shown in Fig. 7, and indicated in dotted lines in Fig. 5. These openings are large enough so that the tumblers can be freely rotated without the lugs interfering.

The lock can be readily assembled or disassembled in order to make changes in the combination. In assembling the lock, the operator first secures the top plate G to the arbor by means of the pin 15. The bolt 1 is then inserted, after which the stud 9 is placed in position. The tumblers F, E, D, C, and B are then placed upon the arbor so that the lugways *b* of each key disk will be engaged by one of the key lugs. As shown in Fig. 7, each key disk *a*, has an opening *x* of a size to snugly accommodate the arbor 4. When all the lugways *b* are alined, a record is made of the numbers in alinement with the top and bottom ribs 13.

Care must be taken that the base plate A is so adjusted that one of the seats 18 will register with the key-way *b* of the key disk, of the tumbler B, as shown in Fig 3. As long as all of the lugways *b* are in alinement, the bolt 1 can be drawn outward to permit the tilting of the bow 23. After the bolt has been shoved home, however, in securing the lock, all of the tumblers are moved so that the lugways are out of alinement, as shown in Fig. 2. In order to withdraw the bolt 1, it will then be necessary to adjust the tumblers so that the lugways will again aline with the lugs. This, of course, can be easily accomplished in arranging the tumblers according to the combination.

Locks embodying my invention may be made of various sizes. The lock further is simple, inexpensive in construction, and both durable and efficient in operation, and can be expeditiously secured in locked position and readily un-locked in arranging the tumblers according to the combination.

Instead of numbers, it is of course understood that letters may be used.

In order to change the combination, it is simply necessary for the operator to remove the base plate A and re-adjust the key disks *a*. The base plate A can however only be removed when the bolt 1 is withdrawn, as is shown in Fig. 3. When the lock is closed, as shown in Fig. 2, the bottom lug 7′, rests partly within one of the seats 18, so that the base plate cannot be turned.

Having thus described my said invention, what I claim as new and desire to secure by United States Letters Patent is:

1. The combination in a lock of the class described, of a tubular arbor having a lengthwise extending slot and an outstanding flange at its upper end, a top plate held below said flange. a base plate fixed to the lower end of said arbor having a plurality of seats one of said seats registering with said slot, a plurality of annular tumblers held between said top and base plates, a key disk having a lugway removably secured within each tumbler each key disk being revolubly held upon said arbor whereby said tumblers may be rotated, a slidably held bolt within said arbor having a plurality of key lugs one lug being held within each annular tumbler and below a key disk the lowermost key lug being held within one of said seats, a stud secured to said bolt limiting the outward movement of said bolt, and a bow pivotally secured to said bolt.

2. The combination in a lock of the class described, of a tubular arbor having a lengthwise extending slot and an outstanding flange at its upper end, a top plate held below said flange, a base plate fixed to the lower end of said arbor having a plurality of seats one of said seats registering with said slot, a plurality of annular tumblers held between said top and base plates, a key disk having a lugway removably secured within each tumbler each key disk being revolubly held upon said arbor whereby said tumblers may be rotated, a slidably held bolt within said arbor having a plurality of key lugs one lug being held within each annular tumbler and below a key disk the lowermost key lug being held within one of said seats, a stud secured to said bolt limiting the outward movement of said bolt, a bow pivotally secured to said bolt, and an outstanding foot extending from the said bow arranged to rest in one position on said top plate whereby said bow is held in locked position.

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

FRANCIS A. HERMAN.

Witnesses:
SYLVESTER HERMAN,
LILLIE HERNEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."