

A. METZGER.  
PERMUTATION LOCK.

Patented Dec. 16. 1890.

A diagram of a rectangular block with points labeled  $B'$ ,  $C$ ,  $D'$ , and  $F'$ . A cross-section of the block is shown below the main diagram, illustrating its internal structure.

A technical drawing of a mechanical assembly. It shows a cylindrical component with a hexagonal base and a threaded section, mounted on a rectangular base. A label 'D' is placed near the base, and a label 'D'' is placed near the cylindrical part.

Fred G. Dietrich  
Geo. H. Evans

Alphonse Metzger.

Wm. L.

**ATTORNEYS**



# UNITED STATES PATENT OFFICE.

ALPHONSE METZGER, OF MILTON, PENNSYLVANIA.

## PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 442,778, dated December 16, 1890.

Application filed August 16, 1890. Serial No. 362,237. (Model.)

*To all whom it may concern:*

Be it known that I, ALPHONSE METZGER, a citizen of the United States, residing at Milton, Northumberland county, and State of Pennsylvania, have invented certain new and useful Improvements in Permutation-Locks, of which the following is a full, complete, and exact specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of the lock. Fig. 2 is a longitudinal section; Fig. 3, an end view with the end cap removed. Fig. 4 is a section on line 4 4. Fig. 5 is a section on line 5. Fig. 6 is a view of the lock applied to a key-hole. Figs. 7, 8, and 11 are views of detached parts. Fig. 9 shows the lock as used to secure a box-lid, and Fig. 10 shows the lock applied to a bag-frame.

The invention will be hereinafter fully described, and then specifically pointed out in the claims.

A represents the tubular case or barrel of the lock, having a reduced inner end  $A^3$ , from which projects the externally-threaded stem  $A'$ , the body and stem being longitudinally slotted, as at  $A^2$ . The barrel A has three exterior annular grooves  $A^4$  in its reduced portion, and upon the annular rings  $A^5$ , formed by these slots, turn three rings B, each having a series of apertures  $b$  extending through it from the inner to the outer side and a series of external notches  $b'$ . Within all of the apertures  $b$ , save one, of each ring pins  $b^2$  are placed, the pins projecting into the several annular grooves  $A^4$ , and these pins are held in place by outer bands  $B'$ , which closely fit the exteriors of the rings B. In order that the bands  $B'$  may be held from rotation on the ring B, said bands are each provided with an inwardly-extending lug  $B^2$  to engage any one of the notches  $b'$  of the respective rings.

The bands  $B'$  have a series of letters or characters on their outer faces corresponding in number and position with the apertures  $b$ , so that by bringing a desired letter or character of each band into register with the openings  $b$ , which have no pins, the combination is set, and it may be varied by removing the bands  $B'$  and replacing them with different letters or characters in register with the pinless openings  $b$ . When the three pinless openings  $b$  register with the slot  $A^2$ , the latter

is unobstructed, but otherwise the pins cross the upper or open side of the slot, as will be readily understood.

C is an end cap internally threaded to screw on the stem  $A'$ , and provided with a rectangular end aperture  $C'$  in longitudinal alignment with the slot  $A^2$ , and provided with an internal longitudinal slot  $C^2$ , registering with the upper or open side of the slot  $A^2$ .

D is the longitudinally-sliding bolt, rectangular in cross-section, and having three notches  $d$  in its upper edge to register with the three grooves  $A^4$  to be engaged by the pins  $b^2$ , and thereby be prevented from being thrown longitudinally in either direction; but when the three pinless apertures  $b$  are brought into register with the said notches the bolt is free to be moved longitudinally.

In order to operate the bolt D and prevent its withdrawal from the barrel A, it is provided with a reduced portion or shank  $D'$ , which snugly fits the aperture  $C'$ , and thus also prevents the rotation of the end cap.

The lock may be constructed so that the bolt may lock various devices by its throw forward, according to the purpose for which the lock may be desired or the place where it is desired to locate it; but I have shown in Figs. 1 to 9, as one of the many constructions, two longitudinally-projecting hasps or arms E E', having oppositely-projecting bends or hooks  $e$   $e'$ , respectively, at their outer ends.

The lower hasp or arm E is rigidly connected to the barrel or body A and projects outward in the plane thereof, and the upper hasp or arm E' is pivoted near its inner end within the bore of the barrel over the hasp or arm E and has its inner end beveled on its upper side to form a toe  $e^2$ , which lies in the path of the inner beveled end of the bolt D, so that when the bolt is pushed in it will depress the toe  $e^2$  and throw the outer end of the arm E' outward. After the bolt has been pushed in in this manner its notches will register with the annular grooves or slots  $A^4$  and the three pinless apertures  $b$ , so that by turning the rings the pins  $b^2$  will enter said notches and lock the bolt, as hereinafter described.

F is an inner end cap fitting over the body or barrel A and having a vertical slot  $F'$  in its end, through which the hasps or arms E



E' project, and in which the arm E' freely works. In order to hold this cap F in place against outward longitudinal movement, I secure a spring G within a longitudinal slot in the upper side of the barrel or case, the outer end of the spring having a catch G', the hooked end g of which engages the upper wall of the slot F' when said cap is slid into position.

The stem A' may, if desired, be cast or otherwise formed integral with the barrel.

To operate the lock as it is shown in Figs. 1 to 9, the hooked ends of the hasps or arms E E' are passed into a key-hole, as shown in Fig. 6, and the bolt D pushed inward to throw the movable arm outward and bring the bolt-notches into position to receive the locking-pins of the several rings. This will prevent the insertion of a key into the key-hole, so that it will be impossible to unlock the lock to which said key-hole leads. If desired, the two hasps or arms may be made in two parts hinged together to fold after the manner of folding keys. Various uses and modifications will suggest themselves to those using the lock, and I do not therefore restrict myself to the exact construction shown and described herein. For instance, the lid of a box may be locked by passing the arms or hasps E E' down through an opening in the lid into an opening in the upper edge of the box, as shown in Fig. 9.

When used as a bag-lock, the hasps E E' are omitted and a slot 10 is formed in the case, across which the inner end of the bolt may be thrown to pass through a hasp 11 on the opposite side of the bag-frame from that which carries the lock, as will be readily understood by referring to Fig. 10.

Having thus described my invention, what I claim as of my invention is—

1. The combination, with the lock case or barrel having a reduced longitudinally-grooved portion provided with annular exterior rings, between which are formed grooves intersected by said longitudinal groove, of the rotary rings turning on the casing-rings and having pins projecting into said grooves and holding said rotary rings in place, each rotary ring having a pinless space to register with the longitudinal groove, and the longitudinally-sliding bolt projecting at its outer end through the casing and having a notched edge in the casing-groove to be engaged by said pins or lugs, substantially as set forth.

2. The combination, with the lock case or barrel having a longitudinally-grooved portion and annular external grooves intersecting the same, of radially-apertured rings having interchangeable pins projecting through their apertures into said annular grooves, and the bolt having a notched edge to be engaged by the inner ends of said pins, substantially as set forth.

3. The combination, in a permutation-lock, of a ring having a series of apertures and pins

or lugs one less in number than said apertures and projecting into the interior of the ring, an outer band having letters or characters corresponding with the pins and encircling the ring to hold the pins from outward movement, and means for securing the band from rotation on the ring, substantially as shown and described.

4. The combination, with the casing having a longitudinal slot communicating with its bore, apertured rings around the slotted part of the casing and having removable and interchangeable pins to interrupt or close the slot and a space between a pair of pins on each ring to register with the slot, and an end cap screwed on the casing and having an angular end opening, of a sliding bolt passing through said angular opening to prevent the cap from unscrewing and having a series of notches in one edge to register with the locking-pins, substantially as shown and described.

5. The combination, with a casing provided with a longitudinally-sliding bolt, of a pivoted locking-hasps, the inner end of which is in the path of the inner end of the sliding bolt, substantially as shown and described.

6. The combination, with the casing having a fixed and a pivoted hasp in one end, of a longitudinally-sliding bolt engaging at its inner end the inner end of the pivoted hasp and projecting at its opposite end through the casing to form an operating-shank, and a permutation-locking mechanism for the said bolt, substantially as shown and described.

7. The combination, with the casing having end caps, one of which is screwed thereon and both provided with angular end slots in line with the bore of the casing, a longitudinal slot in the casing between said caps, permutation-rings turning thereon and having locking-pins to interrupt or close the slot, and pinless spaces to permit the slot to remain open or clear, of a longitudinally-sliding notched bolt projecting through the slot in the screw-cap and provided with notches to operate with the said rings, and a fixed and a pivoted hasp projecting through the slot in the other cap, the inner end of the pivoted hasp being in the path of the said bolt, substantially as shown and described.

8. The combination, with the casing, its hasps, operating-bolt, and permutation mechanism for locking the bolt, of an end cap slid onto the inner end of the casing and having a vertical slot through which the hasps project, and a spring-catch on the casing engaging the upper wall of said slot and preventing the withdrawal of the cap, substantially as shown and described.

9. A permutation-lock comprising the tubular casing having a longitudinally-slotted reduced portion and vertical end slots provided with external annular grooves, rings having changeable pins working in the grooves and external notches, bands inclosing the



rings, holding the pins against outward movement, and provided with lugs entering said notches, the sliding bolt projected through one end slot and having a notched edge working in said longitudinal slot for engagement with the said pins, the fixed and pivoted hasps projecting through the opposite end slot, and a toe on the inner end of the pivoted arm in the path of the inner end of the sliding bolt, substantially as shown and described.

ALPHONSE METZGER.

Witnesses:

MAX OSTEN,  
WILLIAM SMITH.