(Model.)

A. C. LAWRENCE.

PERMUTATION LOCK.

No. 417,873. Patented Dec. 24, 1889.

Fig. 1.

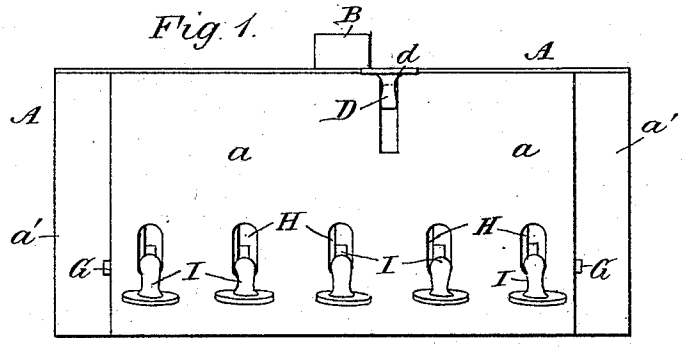


Fig. 2.

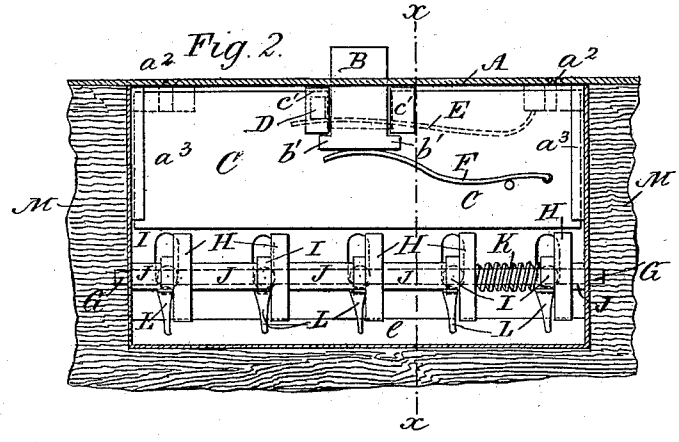


Fig. 3.

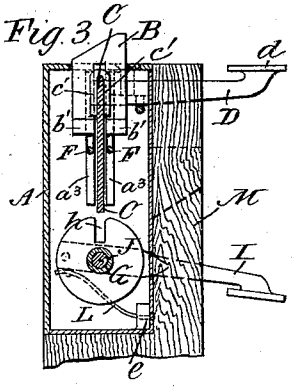


Fig. 4.

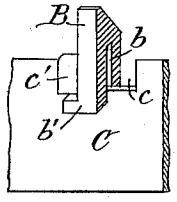


Fig. 5.

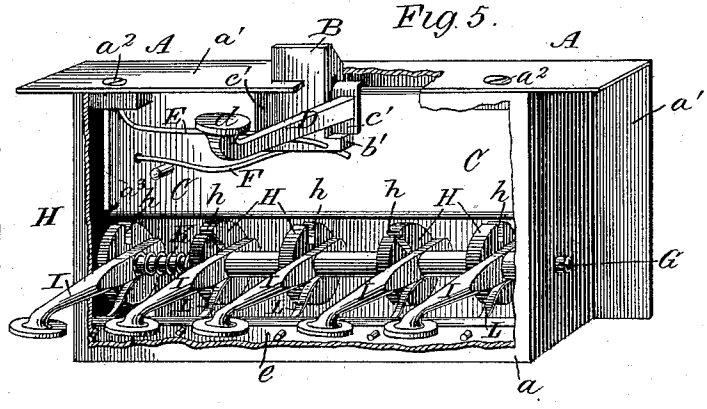


Fig. 6.

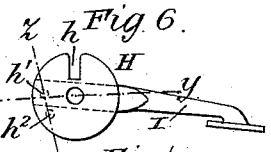


Fig. 7.

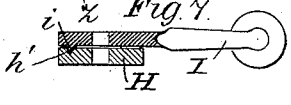
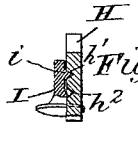


Fig. 8.



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UNITED STATES PATENT OFFICE.

ALFRED C. LAWRENCE, OF TORONTO, ONTARIO, CANADA.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 417,873, dated December 24, 1889.

Application filed August 28, 1889. Serial No. 322,246. (Model.)

To all whom it may concern:

Be it known that I, ALFRED C. LAWRENCE, of Toronto, in the Province of Ontario and Dominion of Canada, have invented a new and Improved Permutation-Lock, of which the following is a full, clear, and exact description.

My invention relates to a permutation-lock designed more especially for money-drawers at cashier's desks or under counters or shelves in stores, offices, or other places; and the invention has for its object to provide a simple, inexpensive, and effective lock of the class which may be operated only by authorized persons knowing the proper order in which the permutation levers or parts must be worked to allow withdrawal of the bolt.

The invention consists in certain novel features of construction and combinations of parts of the lock, all as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is an outside face view of my improved lock. Fig. 2 is an inside face view of the lock with its case in section, and shows also a portion of a drawer to which the lock is applied. Fig. 3 is a transverse section taken on the line $x\,x$ in Fig. 2. Fig. 4 is a detail perspective view of parts of the bolt-plate and its movable latching or locking head. Fig. 5 is an inside perspective view of the lock with its casing partly broken away. Fig. 6 is a side view of one of the permutation-disk tumblers and its adjustable operating-lever. Fig. 7 is a horizontal sectional view taken on the line $y\,y$ in Fig. 6, and Fig. 8 is a transverse section taken on the line $z\,z$ in Fig. 6.

The lock-casing A is made in two parts—a box-like portion a, in which the operative parts of the lock are mainly inclosed, and an angularly-formed inner plate a', the upper portion of which has a few holes, through which screws a^2 pass into lugs cast on the box a to secure the two parts of the case A together. The latch-bolt B on the movable bolt-plate C projects through an opening provided for it in the part a' of the case. The opposite ends of the casing-box a are provided with suitable vertical guides a^3 a^3, between which the bolt-plate C is fitted to slide vertically, and to this plate is fixed an arm D, which preferably carries a thumb plate or key d at its outer end, and so that by depressing the arm the bolt-plate will also be depressed.

The bolt B is provided with a slot b, in which the plate C fits loosely, and the plate is also preferably provided with an open slot c, which allows the bolt to have independent vertical movement on the plate; or, in other words, the bolt may be lowered without lowering the plate; but the bolt has lower laterally-projecting side lugs b', which underlie projecting shoulders or lugs c' on the plate; hence when the bolt-plate C is depressed the bolt B will be lowered with it. The lug c' at one side or end of the bolt is fixed to the bolt-plate after the bolt is placed on the plate, with its lugs b' at one end under the other shoulder-piece c' on the plate. A spring E, fixed at one end to the case A, acts by its free end on the arm D to lift the bolt-plate C to normal raised position, and a spring F, fixed to or held in the bolt-plate C, acts by its free ends beneath the bolt B to lift it to normal raised or locking position. These springs are shown made of wires, and the one F is doubled on itself and is held by its bent end or part in the plate C, and bears by its two limbs against the bottom of the bolt B at opposite sides of the plate, as clearly shown in Figs. 2 and 3 of the drawings. Below the bolt-plate C a shaft or rod G is held in the casing A, and on this shaft are placed loosely any desired number of metal disks H, each of which is slotted radially at h to allow the lowered bolt-plate C to enter it when the slot is aligned with the plate. Next each disk H is placed loosely on the shaft G a finger-lever I, which is provided at one face with a stud or projection i, adapted to engage either one of two notches h' h^2, made in the side of the disk. The outer end of each of the levers I is provided with a finger piece or plate for greater convenience of operation. On the shaft G, between the series of disks and their actuating-levers H I, are placed a series of tubes or sleeves J, which maintain the disks and levers at proper distance apart; but at one place on the shaft a normally-expanding spring K is

placed, so that by its pressure it holds each of the levers I into engagement with either notch h' h^2 of its corresponding disk H, but will allow any one or more of the levers to be turned on the shaft independently of its disk H, to slip the lever-stud i from one to the other of the two notches h' h^2 of its corresponding disk. A series of springs L, held in any approved manner to the case A—as, for instance, to a rod l, fixed to the case—act one under the farther end of each lever I to raise that end and normally depress its other end, which projects from the lock-case.

From the aforesaid description it is obvious that the shaft G forms a fulcrum common to all the finger-levers I, and also forms a bearing on which each slotted disk H may be partially rotated independently of every other disk, and the shaft also sustains the spacing-sleeves J and the spring K, the construction being simple, inexpensive, and efficient.

In Figs. 2 and 3 of the drawings the lock is shown fitted into the front of a drawer M, which, like the side of the case-box a, is slotted to allow operation of the arm D and disk-levers I, which are moved toward each other in working the lock, the operation of which is as follows: When the studs i of all the levers I are in the notches h' of their corresponding disks H, the radial slots h of all the disks will be fairly presented to the bolt-plate C, which then may be depressed by pressing down the arm D, which will carry the bolt B downward and free it from its catch-plate at the drawer-casing, and which may be on the counter of a store or office. The drawer M may now be opened by any one who simply depresses the arm D. When, however, it is desired to set the lock so it may be opened only by an authorized person or persons, the bolt-plate C will be depressed into the notches h of the disks to prevent their turning on the shaft G, and the lever I of one or more of the disks will then be drawn upward to cause the stud i of the lever to spring out of the disk-notch h' into the disk-notch h^2, and when the arm D is released the spring E will instantly lift the bolt-plate and bolt to normal position, and as the bolt-plate leaves the disk-slots h the spring of the lever I, which had been shifted to the disk-notch h^2, will instantly lower the lever, and thereby carry the slot h of the disk it engages around out of line with the bolt-plate C, so that this plate with its bolt cannot be lowered again until the lever or levers I, which had been adjusted in disk-notches h^2, are raised to swing their disk-slots into line with the bolt-plate and with the slots h of the other disks whose levers I, had not been shifted to change the combination. In Fig. 5 of the drawings the levers I of the second and fourth disks H have been readjusted into the disk-notches h^2; hence to open the drawer it is necessary to first raise the levers I of said second and fourth disks H to swing their slots h around into alignment with the slots of all the other disks, and when this is done by two fingers the thumb will depress the arm D, which will at once lower the bolt B and allow the drawer M to be opened. When the arm and levers D I are released, the springs E L will instantly restore the parts C B H to normal positions. To change the combination again, it is only necessary to raise the second and fourth levers I and again depress the arm D to carry the bolt-plate C down into the slots h of all the disks, and while the parts are thus adjusted the second and fourth levers I will again be depressed to shift their studs i out of the notches h^2 of their respective disks H, and the first and third, or the first and fifth, or the first and fourth, or any one, or two, or three, or four of the levers I may be raised to carry their studs i into the notches h^2 of their corresponding disks, and when the parts D I are released the springs E L will again restore the bolt-plate, bolt, and permutation-levers to normal positions, ready for the opening of the lock only by proper persons who know which of the levers I are to be raised to bring the radial slots of all the disks H into alignment to allow the bolt-plate and bolt to be lowered to unlock the drawer. The object in making the bolt B independently movable on the bolt-plate C is to always allow the drawer to be closed when open, and without working the permutation-disks after the levers I have been released by the person opening the drawer to allow him to make change or calculate charges or discounts on goods bought or sold. It is obvious, when the drawer M is open and the arm D is up and the levers I are all down, and when the bolt-plate C could not be shot into the disk-notches by pressing on the arm D, that as the drawer is pushed in or closed the bolt B will be forced inward, like an ordinary latch-bolt, while the bolt-plate C remains at rest, and when the drawer is fully pushed in the spring F will again lift the bolt behind its catch-plate and hold the drawer securely locked or closed until the next time the proper levers I are operated to allow the bolt-plate C to be lowered by pressure on the arm D of the lock.

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

1. In a permutation-lock, the combination, with a case, a bolt-carrying plate, and means for sliding said plate, of a series of radially-slotted disks, each provided with two side notches, and a corresponding series of levers, each having a stud adapted to either notch of its adjacent disk, substantially as described, for the purposes set forth.

2. In a permutation-lock, the combination, with a case, a bolt-carrying plate, and means for sliding said plate, of a series of radially-slotted disks, each provided with two side notches, a corresponding series of levers, each having a stud adapted to either notch of its

adjacent disk, and springs holding the bolt-plate, disks, and levers in normal positions, substantially as herein set forth.

3. In a permutation-lock, the combination, with a case, of a bolt-plate sliding thereon, a bolt fitted for independent movement on the plate to yield when the plate is immovable, springs normally projecting the bolt-plate and bolt, a series of radially-slotted disks, each provided with two side notches, and a corresponding series of levers, each having a stud adapted to either notch of its adjacent disk, substantially as herein set forth.

4. In a permutation-lock, the combination, with a case, of a sliding bolt-carrying plate having an arm D, a spring projecting said plate, a shaft G, a series of disks H, slotted radially at h and notched at h' h^2 and placed on said shaft, a series of levers I on said shaft, each provided with a stud i, adapted to either notch of the adjacent disk, spacing-pieces between the disks and levers, a spring normally holding the levers to their respective disks, and springs, as L, retracting the disk-levers and disks, substantially as herein set forth.

5. In a permutation-lock, the combination, with a case, of a sliding bolt-plate C, a bolt B, independently movable thereon, springs E F, normally shooting the bolt-plate and bolt, a shaft G, a series of disks H, slotted radially at h and notched at h' h^2 and placed on said shaft, a series of levers I on the shaft, each lever provided with a stud i, adapted to either notch of the adjacent disk, spacing-pieces between the disks and levers, a spring holding the levers to the disks, and springs, as L, retracting the disk-levers and disks, all constructed and arranged for operation substantially as herein set forth.

6. In a lock, the combination, with the sliding bolt-plate C and a bolt B, astride the plate, of a spring E, retracting the bolt-plate and bolt, and a bent spring F, held at its center to the plate C and acting at both ends on the bolt B to project it on the bolt-plate, substantially as herein set forth.

7. In a lock, the combination, with the sliding bolt-plate C, having recess c and shoulders c' c', of a bolt B, slotted at b and placed astride the plate C at its recess c and provided with shoulders b', adapted to the bolt-shoulders c', and a spring normally projecting the bolt on the plate, substantially as herein set forth.

8. In a lock, the combination, with the case, of a shaft therein, a series of permutation-disks H, loose in the shaft and slotted radially at h and notched at h' h^2, a corresponding series of levers I, loose on shaft G and each provided with a side stud i, adapted to either notch h' h^2 of its corresponding disk H, spacing-sleeves J on the shaft G, and a spring K on the shaft and holding each lever to its disk, substantially as herein set forth.

ALFRED C. LAWRENCE.

Witnesses:
CHAS. WARD,
FRANK. C. WARD.