

(No Model.)

2 Sheets—Sheet 1.

J. H. MORRIS.
PERMUTATION LOCK.

No. 495,100.

Patented Apr. 11, 1893.

Fig. 1.

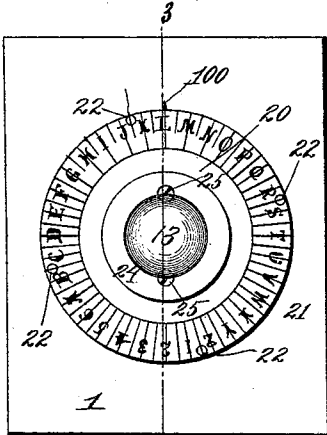


Fig. 2.

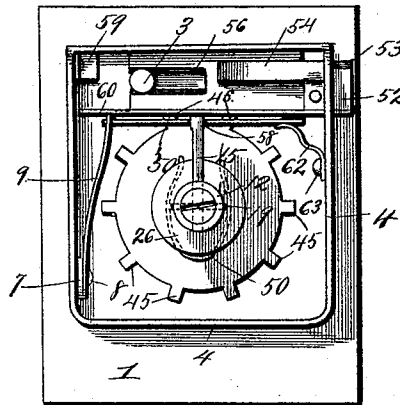


Fig. 4.

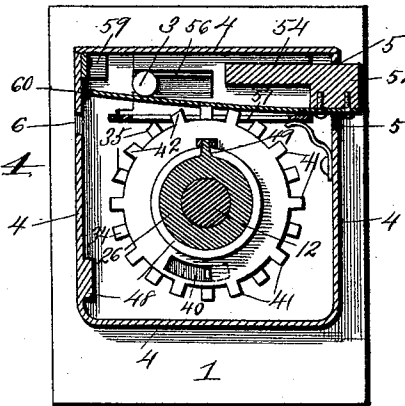
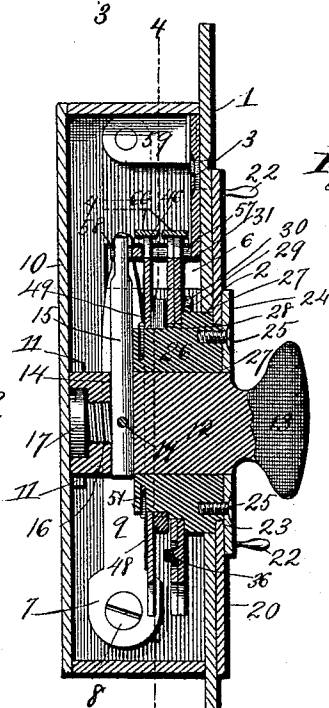


Fig. 3.



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(No Model.)

2 Sheets—Sheet 2.

J. H. MORRIS.
PERMUTATION LOCK.

No. 495,100.

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Fig. 5.

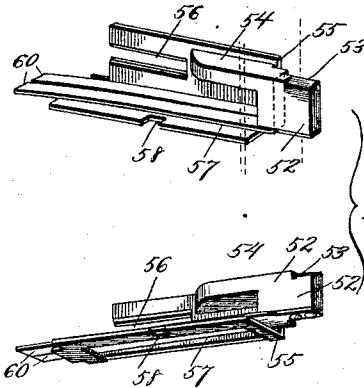
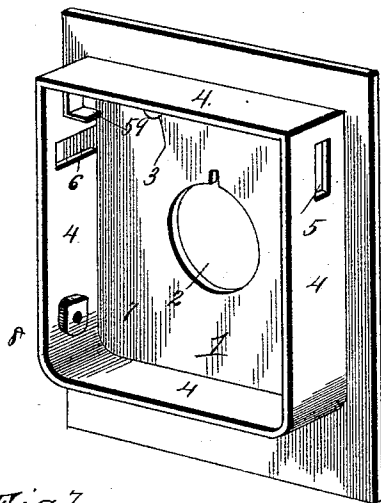


Fig. 6.

Fig. 7.

Fig. 10.

Fig. 8.

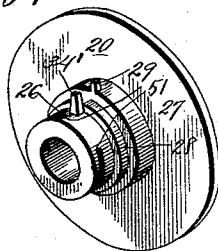


Fig. 9.

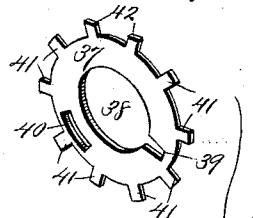
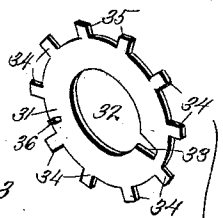
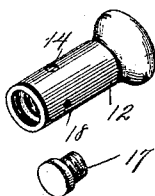


Fig. 11.

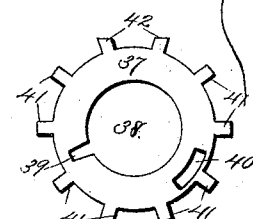
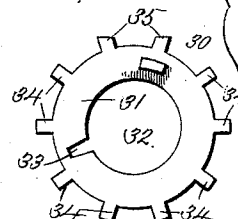
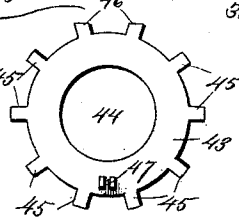
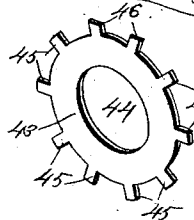


Fig. 12.

Fig. 13.

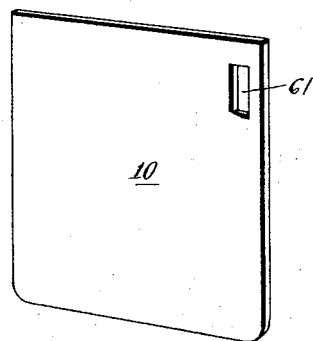
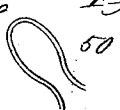
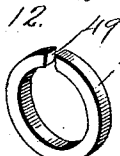


Fig. 14.

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UNITED STATES PATENT OFFICE.

JOHN H. MORRIS, OF SEWARD, NEBRASKA.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 495,100, dated April 11, 1893.

Application filed April 12, 1892. Serial No. 428,774. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. MORRIS, of Seward, Seward county, State of Nebraska, have invented certain new and useful Improvements in Permutation-Locks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to permutation locks or locks in which certain of the movable parts are prearranged and are capable of transposition so that in order to retract the locking bolt it becomes necessary to first effect the predetermined or prearranged relative positions of said movable parts.

My invention relates more particularly, to permutation locks which are designed for use upon post-office boxes, drawers, and similar receptacles.

The objects of my invention are to produce a permutation-lock which shall be simple, strong, durable and inexpensive in construction, and effective and reliable in its operation, and which shall be so constructed as to be readily opened from the inside of the box or other receptacle, by an authorized person, in case the proper user of the lock has forgotten the combination of the same.

A further object of my invention is to produce a permutation-lock which shall require but a single graduated dial-plate upon the front of the lock, and which shall be so constructed as to permit a large or small dial-plate to be used, as preferred.

A further object of my invention is to produce a permutation-lock the face of which shall be provided with both indicating letters and numerals and the indicating spaces of which shall each be graduated to but a single sub-division.

To the above purposes, my invention consists in certain peculiar and novel features of construction and arrangement, as hereinafter described and claimed.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which:

Figure 1 is a front or outer side elevation of a permutation-lock embodying my invention. Fig. 2 is a rear or inner side elevation of the same. Fig. 3 is a transverse vertical section of the same, on the line 3—3 of Fig.

1. Fig. 4 is a transverse vertical section of the same, on the line 4—4 of Fig. 3; the plane of this section being at right angles to that of the plane of the section on which Fig. 3 is taken. Fig. 5 is a detached perspective view of the lock-casing, viewed toward its inner or rear side. Fig. 6 comprises two detached perspective views of the locking-bolt; the upper view presenting the bolt as it appears when viewed from above its middle longitudinal, and the lower view representing said bolt as it appears when viewed from below its middle longitudinal plane. Fig. 7 is a detached perspective view of the dial-plate and its hubs; the said plate being viewed toward its inner side. Fig. 8 comprises a detached perspective view of the spindle of the lock and a similar view of its clamping-screw. Fig. 9 comprises two detached perspective views of the outer or front tumbler-disk; the upper view being taken looking toward the inner surface of the disk, and the lower view looking toward the outer side of said disk. Fig. 10 comprises two detached perspective views of the intermediate tumbler disk; the upper view being taken looking toward the inner side of the disk, and the lower view looking toward the outside of the disk. Fig. 11 comprises two detached perspective views of the inner tumbler-disk; the left hand view being taken looking toward the inner surface of the disk, and the right hand view looking toward the outer surface of the disk. Fig. 12 is a detached perspective view of the ring or washer which is interposed between the intermediate and inner tumbler-disks. Fig. 13 is a detached perspective view of one of the springs for retaining the tumbler disks and washer upon the hub of the lock. Fig. 14 is a detached perspective view of the lock-plate of the lock-casing.

In the said drawings, 1 designates the front or face-plate of the lock-casing, the said front-plate being preferably of rectangular form, as shown, and being secured to or formed upon the door of the receptacle to which the lock is applied. Through the middle of this plate is formed an opening 2, the margin of which is of circular contour, and which is designed to receive and support the outer end of the hub of the lock, as hereinafter explained, the opening 2 being formed with a radial marginal recess 2^a to permit of the

passage of the radial studs of the lock when putting the parts of the lock together. At a point above and a suitable distance to one side of this opening 2 is located a stud 3 which projects inwardly from the inner surface of the front or face plate 1, and the purpose of which will be hereinafter also explained. Upon the rear or inner side of this front or face plate 1 is formed, or suitably secured, a rectangular side-casing 4, in the upper part of one of the vertical portions of which is formed an opening or slot 5, through which works the outer end portion of the locking-bolt, as hereinafter described. In the upper part of the opposite vertical portion of the side-casing 4 is formed a slot or opening 6, for a purpose to be hereinafter also explained. Upon the lower part of the inner surface of the vertical portion which is provided with the slot 6, is formed, or suitably secured a lug or enlargement 7 which projects inwardly from the inner surface of said vertical portion, and upon this lug is secured, by a screw 8, or an equivalent device, the lower end of a leaf-spring 9 which extends thence obliquely upward and inward from said point of attachment, for a purpose to be hereinafter explained.

10 designates the back-plate of the lock-case, this plate being of rectangular form and corresponding in surface area with the side-frame 4 of the lock-case; said back-plate being riveted or otherwise suitably secured to the rear margin of the side-frame or casing 4. At the middle of its front or inner surface, this back-plate is formed with a socket 11 for the rear end of the lock-spindle, as hereinafter described.

12 designates the spindle of the lock, the said spindle being of cylindrical form, and being also formed, or otherwise provided, at its front or outer end with a suitable head or knob 13 which is designed to be grasped by the operator's fingers while manipulating the lock. Near its rear end, this spindle is formed with a transverse channel 14 through which extends the inner end of a radial bolt-actuating arm 15. The inner extremity of the spindle 12 is formed with a longitudinal or axial cavity 16 which is internally screw-threaded to receive the externally screw-threaded stem of a clamp-screw 17; the inner end of the stem of the screw abutting against the inner end of the arm 15, and thus serving to retain said arm in its required operative position. The inner end of the spindle 12 is also formed with a transverse channel 18 which extends at right angles to the plane of the channel 14, and into which is inserted a short wire key 19 which also passes transversely through the inner end of the arm 15, and aids in retaining said arm in its required operative position.

20 designates the graduated dial-plate or disk of the lock, the said plate or disk being preferably of relatively large diameter, as compared with the diameter of the spindle 12,

as shown, and upon the outer or front surface of this dial or disk is formed a graduated scale 21 which is concentric to the circular margin of the disk. This scale is divided by longer radial lines into spaces, and each of said spaces is divided into half-spaces by shorter radial lines, or the differences in graduation may be indicated in various other ways, for example, by making the intermediate lines or scores lighter than the principal lines or scores, or otherwise. As shown in the drawings the letters of the alphabet and numerals are employed to designate these spaces. In order to facilitate the rotation of the dial-plate 20 while manipulating the lock a number of outwardly extending studs 22 are screwed into, or otherwise secured to or formed upon the outer face of the plate adjacent to its margin. This dial-plate is formed with a central opening 23 which is covered by a bearing-plate 24; said bearing-plate being secured by screws 25, or riveted or otherwise suitably secured to the hub or sleeve 26 of the lock, and having also a central opening 27 through which protrudes the outer or front end of the spindle 12. The spindle 12 is arranged to turn freely within the hub or sleeve 26 of the lock, and said sleeve or hub carries with it, in its rotations, the dial plate or disk 20, and said hub or sleeve is also formed externally with a circular rib or enlargement 27, and with an annular shoulder 28. The rib or enlargement 27 is formed near the outer end of the sleeve or hub, and the dial plate or disk 20 abuts against the outer side of said rib, while the shoulder 28 is formed nearer the inner end of the sleeve and against this shoulder abuts the outer side of the outer tumbler-disk, as hereinafter fully explained.

The rib or enlargement 27 is formed with a single radial stud 29, which engages at times a lug 30 which is carried by the outer tumbler-disk 31. This outer tumbler-disk is formed with a central opening 32 having a circular margin, and surrounding the outer parts of the sleeve or hub 12, and from said opening extends radially an extension-opening or recess 33. A radial stud 34' is formed on one side of the inner portion of the hub or sleeve 13 and, when the disk 31 is being placed in position upon the hub or disk 12 or removed therefrom, the said stud and the stud 29 pass through the opening or recess 33 of the disk. This disk 31 is formed marginally with eight radial teeth 34, all of which are of the same length, and also with two shorter radial teeth 35 which are placed next to each other and which serve to break or reduce the continuous circular contour of an imaginary line described at the outer ends of the teeth 34. Upon its inner surface, the disk 31 is formed with an inwardly extending stud 36, the purpose of which will be hereinafter explained.

37 designates the intermediate tumbler-disk, said disk being formed with a central opening 38 having a circular margin and surrounding the hub or sleeve 12, and provided

also with a radial extension or recess 39; the radial stud 3 passing through the recess 38, when the disk 37 is being placed upon or removed from the hub or sleeve 26. At one side of the center of the disk 37, near its margin, said disk is formed with a segmental slot 40, for a purpose to be hereinafter explained. This disk 37 is formed, at its margin, with eight radial teeth 41 each of which is of equal length with the others, and also with two radial teeth 42 which are of less length than the teeth 41 and which are placed next to each other; thus reducing the circular contour of an imaginary circular line drawn through the outer ends of the teeth 41.

43 designates the inner tumbler-disk, said disk being formed with a central opening 44 of circular contour, and which embraces the inner end portion of the hub or sleeve 26 of the lock. This disk is formed with eight teeth 45, each of which is of the same length as the others, and also with two teeth 46 which are placed next to each other and which thus reduce the circular contour of an imaginary line drawn about the ends of the longer teeth 45. On its inner side, near the margin thereof, this disk 43 is formed with two parallel studs 47, for a purpose to be hereinafter explained. Between the inner tumbler-disk 43 and the intermediate tumbler-disk 37, is interposed a ring or washer which surrounds the hub or sleeve 26 and which is split at one side, as at 49, to receive the radial stud 34, and the two studs 47, and thus allow the studs 47 to embrace the radial stud 34. These disks 31, 37, and 43, and the ring 48, are retained in position upon the hub or sleeve 26 by a spring-key 50 which is of skeleton form, and of approximately U-shape with divergent ends, as shown. The arms of this key straddle the inner end of the hub or sleeve 26, and enter longitudinally two notches 51 which are formed on the inner end of the sleeve or hub 26, at opposite sides thereof; the key thus extending transversely of the hub or sleeve 26 and abutting against the inner surface of the inner disk 43, so as to retain all of the disks in their required relative positions.

52 designates the bolt of the lock, said bolt having on its upper edge an inwardly and downwardly beveled portion 53 to engage the keeper of the lock, and having also a rearward extension 54, as shown. This bolt is formed upon or suitably secured to the outer end of a bolt-carrying plate 55 which is of substantially L-shape, in cross-section; the extension 54 of the bolt lying against the inner surface of the vertical outer portion of the plate, and the under side of the bolt lying against the upper surface of the lower horizontal portion of said plate. In the vertical portion of the bolt-carrying plate 55 is formed a longitudinal slot or recess 56 which opens out of that end of the plate which is remote from the bolt; this recess receiving the stem of the stud 3 above referred to and the head of the stud overlying the margins of the recess so

as to guide and limit the sliding movements of the bolt, and at the same time support the plate in its required position. Through the horizontal portion of the plate 55 is formed a longitudinal slot 57, which receives the tumblers or teeth of the tumbler-disks, above described, and as hereinafter explained. The inner margin of the horizontal portion of the bolt-carrying plate 55 is formed, about midway of its length, with a transverse recess 58 into which engages the upper end of the radial bolt-throwing arm 15, above described. The inner end of the horizontal portion of the plate 55 engages the upper end of the spring 9, the tendency of said spring being to throw or shoot the bolt outward into locked position, and the inward or retractive movement of the plate is limited by contact with the lower end of an L-shaped stop-plate 59 which is pivoted in the upper corner of the lock-casing, as shown.

60 designates two spring-arms which are riveted or otherwise secured to the under side of the bolt 52 and which extend parallel with each other above the horizontal portion of the plate 55, and directly over the slot 57 of said plate, and also beyond the inner end of the plate; the inner ends of these spring-arms extending also beyond the inner end of the plate 55, and entering, at times, the opening 6 of the side-casing 4 of the lock.

In the upper right hand corner of the back-plate 10 is formed a vertically elongated slot 61 through which a finger of the hand may be inserted to depress the bolt 52, and thus unlock the receptacle from the inside, or rear, as hereinafter described. To the upper part of the inner surface of that vertical portion of the side-casing 4 through which passes the bolt 52, is secured, by a rivet 63, or equivalent means, a spring 62; said spring pressing upward beneath the bolt-carrying plate 55 and serving to sustain the outer end of the plate in its normal operative position.

The operation of the above-described lock is as follows: In the lock shown in the drawings and above described, the combination may consist of one letter of the alphabet and one numeral, or two letters of the alphabet or two numerals. Now, assuming that the combination which is to be formed, in order to open the lock, is "A" and "L," the dial-plate 20 is first turned to the right so as to bring the radial score-mark of "A" into register with the index-score 100 upon the face-plate 1 of the lock. This movement of the dial causes the radial stud 29 to engage the lug 30 upon the front side of the front tumbler-disk 31, and thus partially rotate such disk; the initial movement of this disk 31 causing the stud 36 to engage the end-margin of the slot 40 of the intermediate tumbler-disk 37. This movement of the disk 37 carries its teeth 41 and 42 slightly past the teeth 34 and 35 of the disk 31. The dial plate 20 is now turned in the reverse direction which causes a slight reversed movement of the disk 37 and brings

all of the teeth of the two disks into register with each other so as to bring the two shorter teeth 35 and 42 of the two disks into register with the slot 57 of the bolt-carrying plate 55; and thus permit the front spring-arm 60 to drop and its inner end to register with the opening 6 in the side-casing 4; the said spring-arm 60 being previously held in raised position, with its inner end above the opening 6, by the longer teeth 34 of the disk. The dial-plate 20 is now rotated farther in the opposite direction, the inner or rear tumbler-disk 43 being similarly rotated, by the engagement of its lugs 47 with the radial stud 34 of the hub or sleeve 26, and the tumbler-disks 31 and 37 remaining stationary, owing to the disengagement of the stud 29 from the lug 30. The dial-plate 20 is rotated in the reversed direction until the shorter teeth 46 of the disk 43 enter the slot 57 of the bolt-carrying plate 55, and permit the inner spring-arm 60 to drop so that its inner or free end shall also register with the slot 6 of the side-casing 4 (this arm having previously been held elevated by the longer teeth 45 of the disk 43, so as to retain the free end of the arm above the slot 6). The knob 13 can now be turned, causing the radial bolt-retracting arm 15 to move the bolt to the left and thus unlock the receptacle; the free ends of the spring-arms 60 entering the opening 6. When the knob 13 is thus turned to retract the bolt 52, the inner end of the carrier-plate 55 engages the upper end of the spring 9, and forces said spring toward the adjacent side of the side-casing 4, and when the knob 13 is released, the spring 9 forces the plate 55 in the opposite direction, and shoots the bolt 52, so that said bolt projects through the opening 5 of the lock-casing and engages the keeper of the lock. In the event of the user of the lock forgetting the combination of the lock, the postmaster, or other authorized person, can insert his finger through the slot 61 in the back-plate, and by pressing with his finger upon the extension 54 of the bolt 52, can depress said bolt, against the spring 62, (the spring-arms 60 yielding sufficiently for this purpose) and thus release the inclined portion 53 of the bolt from the keeper of the lock, so as to force the door open.

It is obvious that the number of tumbler-disks, and consequently of the spring-arms 60 may be increased, as desired, without departing from the essential spirit of my invention and, from the above description, it will be seen that I have produced a permutation-lock which is simple, strong, durable and inexpensive in construction, and reliable and effective in its action. Also that the lock is capable of application to a great variety of receptacles, and is capable of an indefinite number of combinations.

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

1. The combination in a permutation lock, of a casing, a locking bolt, having a number of parallel spring arms, and a number of revoluble tumbler disks having one or more depressions in their peripheries for engaging the spring arms, substantially as described.

2. The combination in a permutation-lock, of a locking-bolt provided with a number of parallel spring-arms, and a number of revoluble tumbler-disks having longer and shorter teeth for engaging the spring-arms and elevating and permitting said arms to be depressed, substantially as set forth.

3. In a permutation lock, the combination of the casing having a slot formed therein opposite the end of the bolt and a sliding spring-sustained locking bolt, having a number of spring arms to engage with a number of tumbler-disks and actuated through the opening in the casing from the inside, substantially as described.

4. A permutation-lock, the combination of a locking-bolt having a carrying-plate provided with a longitudinal slot, and a number of spring-arms mounted upon the plate and extending across the slot with a series of revoluble tumbler disks held within said longitudinal slot, substantially as set forth.

5. In a permutation-lock, the combination of a bolt-carrying plate of L-form in cross-section, having a longitudinal recess in its upper vertical portion, a longitudinal slot in its lower horizontal portion, and carrying a number of spring-arms with a series of revoluble-tumbler disks, substantially as set forth.

6. In a permutation-lock, the combination of a spindle having a transverse opening in its inner end, and an internally screw-threaded socket at its inner extremity, a radial bolt-operating arm inserted into the transverse opening and a screw-plug inserted into the cavity and clamping the arm, substantially as set forth.

7. The combination in a permutation-lock, of a spindle inserted through the face-plate of the lock, a radial bolt-actuating arm carried by the inner end of the spindle, a dial-plate carrying an inwardly extending sleeve or hub having an external annular rib and an external annular shoulder, a radial stud carried by the rib, a second radial stud carried by the inner end of the hub, a front tumbler-disk having a lug upon its front side, and a second lug upon its rear side, an intermediate tumbler-disk, having a segmental slot, a split washer, an inner or rear tumbler-disk having a pair of studs upon its front side, and a retaining-spring entering notches in the inner end of the hub.

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

JOHN H. MORRIS.

Witnesses:

JNO. L. CONDRON,

G. Y. THORPE.