(No Model.)

G. L. BARNEY.

KEYLESS LOCK.

No. 564,268. Patented July 21, 1896.

Fig. 1.

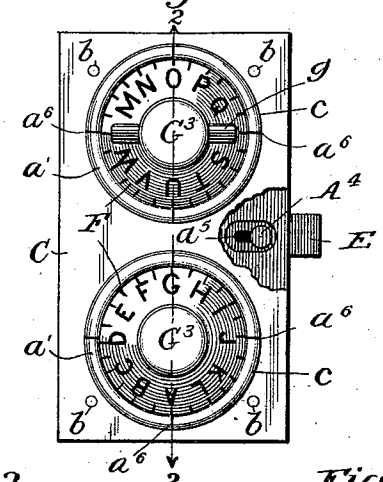


Fig. 2.

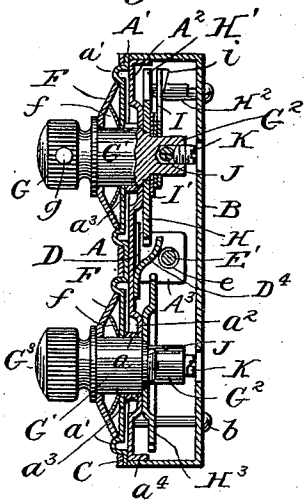


Fig. 3.

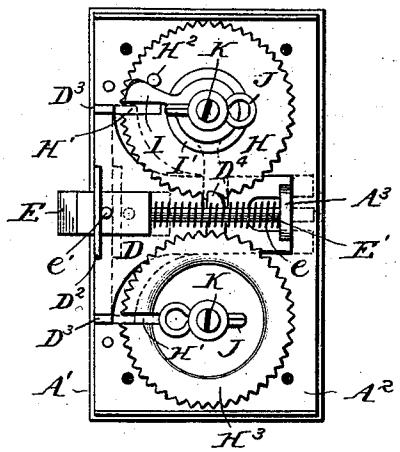


Fig. 4.

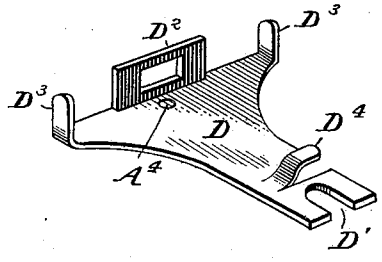
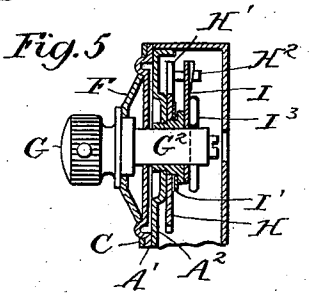


Fig. 5



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UNITED STATES PATENT OFFICE.

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KEYLESS LOCK.

SPECIFICATION forming part of Letters Patent No. 564,268, dated July 21, 1896.

Application filed January 24, 1895. Serial No. 536,118. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. BARNEY, a citizen of the United States, residing at Indianapolis, Marion county, State of Indiana, have invented certain new and useful Improvements in Keyless Locks, of which the following is a specification.

My invention relates to improvements in permutation or combination locks, and while it is applicable to locks of various kinds it is designed more especially for such locks as are adapted to be applied to lock-boxes, drawers, desks, and similar articles of that general class that are illustrated in my prior patent, No. 471,262.

My present invention has for its object to improve the construction of such locks, to lessen their cost, and, further and more particularly, to provide means whereby they shall be less liable to be fraudulently opened by unauthorized persons, as well as to provide means whereby they may be more readily and easily opened and unlocked by an authorized person; and to these ends my invention consists in the various features of construction and arrangements of parts, and having a mode of operation substantially as hereinafter more particularly pointed out.

Referring to the accompanying drawings, wherein one embodiment of my invention is illustrated, Figure 1 is a plan or face view of a lock, the face-plate being partially cut away. Fig. 2 is a longitudinal vertical section of the lock on the lines 2 2, Fig. 1. Fig. 3 is a rear view of the lock with the rear plate removed, showing the construction of the operating parts. Fig. 4 is a perspective view of a latch-plate, and Fig. 5 is a section showing a modification.

In the above drawings I have shown my invention as applied to a permutation-lock having two tumblers or wheels, with a single latch having two fingers or projections adapted to enter slots or notches in the periphery of the wheels or tumblers, and while this is a convenient form in which to embody my invention, it is evident that the various features of invention can be applied to locks of other forms and still be within the spirit of my invention, and that the details of construction can be varied to adapt the invention to the various forms to which it is applied.

One of the features of my present invention relates to the manner of operating the latch after the tumblers or wheels have been set to their proper position to allow it to be operated.

Other features of my invention will be pointed out more particularly hereinafter in connection with the construction which is illustrated in the drawings, and which I will now proceed to describe.

The operative parts of the lock are preferably inclosed in a suitable case, comprising a lock-plate A and an inclosing plate B, which are properly secured together, and preferably the lock-plate is provided with a face-plate C. The lock-plate is preferably made of two separate pieces, suitably united together, in order to secure lightness and cheapness and adapt the plate for the purposes of this invention, and I have shown the lock-plate A as made of two separate plates A' A^2, each composed of relatively thin metal, struck or pressed up into the desired form, and provided with proper openings.

The plate A' is preferably provided with a circular projection or ridge a' to receive the dial hereinafter described, and the plate A^2 is struck up or pressed up to form an inner projection or bearing-surface a^2 for the tumbler, while both are provided with an opening or openings a, on which is preferably fixed a bushing or bearing a^3 for a knob-spindle, hereinafter described. The ends of the plate A^2 are preferably turned up, as at a^4, to form a convenient means for attaching the rear case B. In this way not only can the plate be made relatively very light; but it has relatively great strength, owing to the flanged or struck-up portions, and the parts can be cheaply and readily made and furnish a very substantial bearing for the knob-stems and other parts of the lock, and this construction is of great practical value.

The face-plate C, which may be of more ornamental metal, as brass or other similar metal or material, is provided with openings c, adapted to fit the ridge or ridges a', and

may be held in place in any suitable way, as, for instance, by screws *b*, which may be used to hold all the parts of the lock-case together.

Suitably mounted on or connected with the lock-plate is a latch-plate D, and in the present instance this is arranged to slide upon the rear face of the lock-plate between the two tumblers, one end of the plate being slotted, as at D′, to embrace a stud or projection A^3, and also being provided with a stud A^4, working in a slot a^5 in the lock-plate, thus permitting the latch-plate to move on the lock-plate in a plane parallel thereto. This latch-plate is provided with an upturned portion D^2 to receive the latch E and to permit its moving freely therein, the latch being also provided with a reduced stem E′, in the present instance passing through an opening in the stud or projection A^3, and a spring *e* tends to press the latch outward through the portion D^2, its movements being limited by a pin *e′*. It will thus be seen that the latch E has a movement in the latch-plate independently thereof against the spring, and it also has a movement with the latch-plate against the spring, and this movement is accomplished in a manner hereinafter set forth.

It is further to be remarked that the latch-plate is provided with one or more dogs or fingers D^3, two being shown in the present instance, to coöperate with the tumblers or disk-wheels hereinafter referred to. The latch-plate is also provided with some sort of means by which it may be moved by the knob, and in the present instance I have shown a lip or projection D^4, preferably formed integral with the latch-plate and projecting slightly above the same in a convenient position to be struck and operated by an arm or other device moved by the knob.

Mounted on the face-plate is one or more dials F, which are preferably fitted to fit within the ridge *a′*, and a spring-washer *f* may be interposed between the dial and lock-plate when desirable. This dial may be formed integral with or suitably attached to the stem G′ of the knob G, so as to readily move therewith, and the stem G′ fits loosely in the bearing a^3 in the lock-plate, so that it may rotate freely therein. The ridge *a′* is provided on its outer surface with one or more indicators a^6 to aid in properly adjusting the dial.

The stem G′ of the knob in the present instance is further reduced and has an extension G^2, and preferably on the shoulder thereof is loosely mounted a tumbler or wheel H. Also mounted on the stem is an arm I, and interposed between the tumbler and the arm is a washer I′ to prevent friction between the arm and tumbler, and this arm is adjustably secured to the stem portion G^2 by any suitable means, and in the present instance I have shown a pin J, passing through a hole in the stem, and a set-screw K for pressing the pin against the arm to prevent its movement. By this construction or some equivalent construction which may be used, the arm I may be adjusted on the stem to any position desired and secured so as to rotate with the stem for the purposes hereinafter more particularly set forth.

The tumbler H may be of any desired construction, and I have shown its edge as being toothed, and it is provided with a slot H′ to permit the dog or finger D^3 to pass within the periphery of the tumbler when it is in proper position, and I also provide a stop or pin H^2, mounted on its inner face and projecting inwardly in position to be struck by the arm I, so that the tumbler may be moved thereby.

The arm I is so arranged that it will pass by the lip or projection D^4 of the latch-plate when it is rotated in one direction, but will engage therewith and move the latch-plate when it is rotated in the opposite direction, and for this purpose one of its edges may be curved or turned slightly, as best indicated at *i*, Fig. 2, although, of course, it will readily be understood that other constructions may be used for accomplishing the same purpose, as, for instance, a tripping-pawl may be mounted on the arm, which will readily pass the projection in one direction, but impinge upon it and move it in the other direction.

When more than one dial and knob are used in the lock, as shown in the drawings, it is unnecessary to provide more than one arm, and the tumbler, as H^3, may be dished, as indicated in Fig. 2, or otherwise formed, so as to lie in a plane parallel to but out of line with the plane of the tumbler H.

Such being the preferred construction of the parts, and they being assembled as indicated in the drawings, their operation will be readily understood, and supposing it is desired to open the lock, it will first be necessary to move the knob G^3 to set the tumbler H^3 in proper position to have its slot H′ coincide with one of the dogs D^3 of the latch-plate, and this is done by having the tumbler adjusted on the knob so that when a certain predetermined letter on its dial comes opposite or in certain relations to its indicator a^6 the slot H′ will be in proper position to allow the latch-plate to be moved. Of course, it will be understood that this knob and tumbler are not necessary to the operation of my invention, or that there may be more than one if desired.

In order to move the tumbler H, the knob G is turned and the arm I rotated thereby until it impinges upon the pin H^2, when the tumbler will be rotated until the proper indicating-mark on the dial to which it has been adjusted is opposite the indicating-mark a^6 on the plate, when the slot H′ is in proper position to permit the dog D^3 to enter within the periphery of the tumbler. The knob is then turned in the opposite direction, when the arm I will engage with the lip or projection D^4 on the latch-plate and draw said latch-plate within the case, and with it the latch E, when the lock is opened. As soon, how-

ever, as the knob is released, the spring *e* will project the latch and latch-plate into locking position. As above indicated, the arm is so arranged that in turning in one direction it will pass freely by the lip or projection D^4, so that the tumbler may be readily adjusted in proper position, but when it is moved in the opposite direction it will impinge upon the lip and either be prevented from moving farther in that direction when the tumblers are not in proper position, or permit it to withdraw the latch and latch-plate when they are in proper position.

By simply loosening the securing device, as, for instance, the screw K, the arm I may be adjusted in any proper or desired relation to the stop or pin H^2, so that the combination can be readily changed.

It will thus be seen that not only is this construction exceedingly simple, cheap, and light, but that it permits the latch to be withdrawn by the same knob that adjusts at least one of the tumblers, and it further reduces the chances of the lock being opened by unauthorized persons, and when more than one tumbler is used it is convenient to designate the final latch-operating knob by a difference in construction, as by the cross-pin *g*, or other projecting portion on the knob G.

In Fig. 5 I have shown another means for mounting the tumbler to permit it being turned by the arm to bring the notch in proper position to receive the dog D^3, and to permit the arm to be turned in the reverse direction to move the latch without disturbing the tumbler. In this case there is a cylindrical washer I^3, surrounding the stem G^2, forming a collar for the tumbler H, and a spring-washer I′ is interposed between the tumbler and the collar on the cylindrical washer, and the other parts are arranged as in the other construction. This permits the arm I to be tightly clamped and adjusted, but does not turn the tumbler except when the arm I bears against the pin H^2, as above set forth.

Having thus described the preferred embodiment of my invention and pointed out the principles on which it is constructed and operated, without limiting myself to the precise construction and arrangement of parts set forth, what I claim is—

1. In a permutation-lock, a lock-plate composed of two separate pieces united together and having ridges on one side, and an opening through both of the pieces, substantially as described.

2. In a permutation-lock, a lock-plate composed of two separate pieces united together and having ridges formed on one side, an opening through both the pieces, and a bearing-ring secured in said opening, substantially as described.

3. In a permutation-lock, a lock-plate composed of two separate pieces united together, a ridge on one face of the lock-plate, a dial-plate supported on said lock-plate within the ridge, a bearing or projection on the opposite face of the lock-plate, a tumbler supported on said bearing, and an opening through the lock-plate to receive the knob, substantially as described.

4. In a permutation-lock, the combination with the lock-plate having a ridge within which to support the dial, of a face-plate having an opening surrounding said ridge, and a knob extending through the face-plate and lock-plate and carrying the dial, substantially as described.

5. In a permutation-lock, the combination with a knob and dial-plate, of a tumbler loosely mounted on the knob-stem and having a stud, a latch-plate having a fixed lip, a bolt arranged to be withdrawn by said latch-plate, and an arm connected to the knob-stem and adapted to bear on the stud to move the tumbler when moved in one direction and to bear on the lip to operate the latch-plate when moved in the other direction, substantially as described.

6. In a permutation-lock, the combination with a tumbler having a slot and a stud, of a spring-actuated latch having a fixed lip or projection, a knob having an arm adjustably attached thereto adapted to bear on the stud to move the tumbler and to slip over the lip when moved in one direction and to contact with the lip to move the latch when moved in the opposite direction, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE L. BARNEY.

Witnesses:
JOHN L. GRIFFITHS,
ALFRED F. POTTS.