

No. 863,292.

PATENTED AUG. 13, 1907.

C. E. LEIGHTON.  
PERMUTATION LOCK.  
APPLICATION FILED JAN. 11, 1907.

Fig. 1

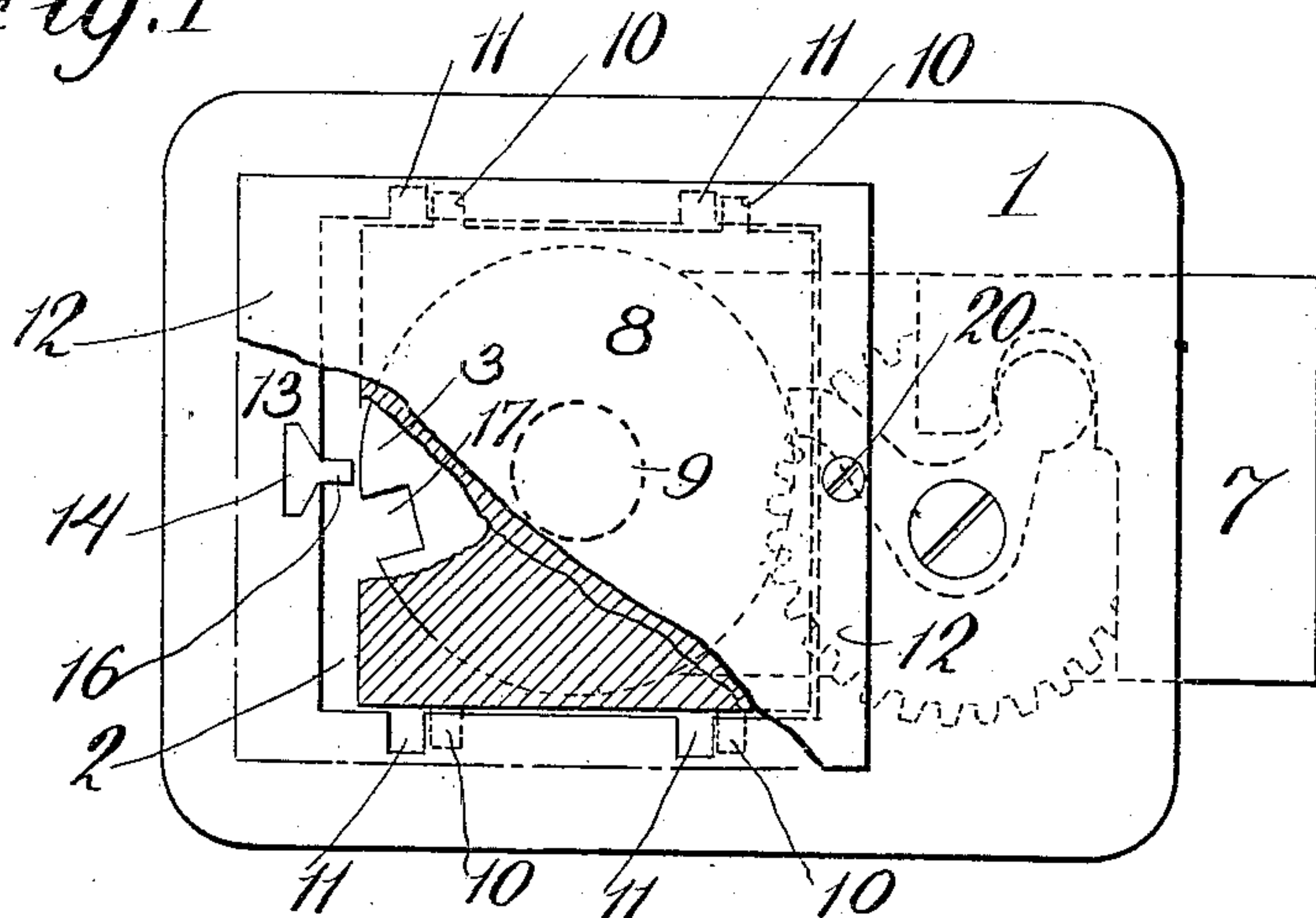


Fig. 2

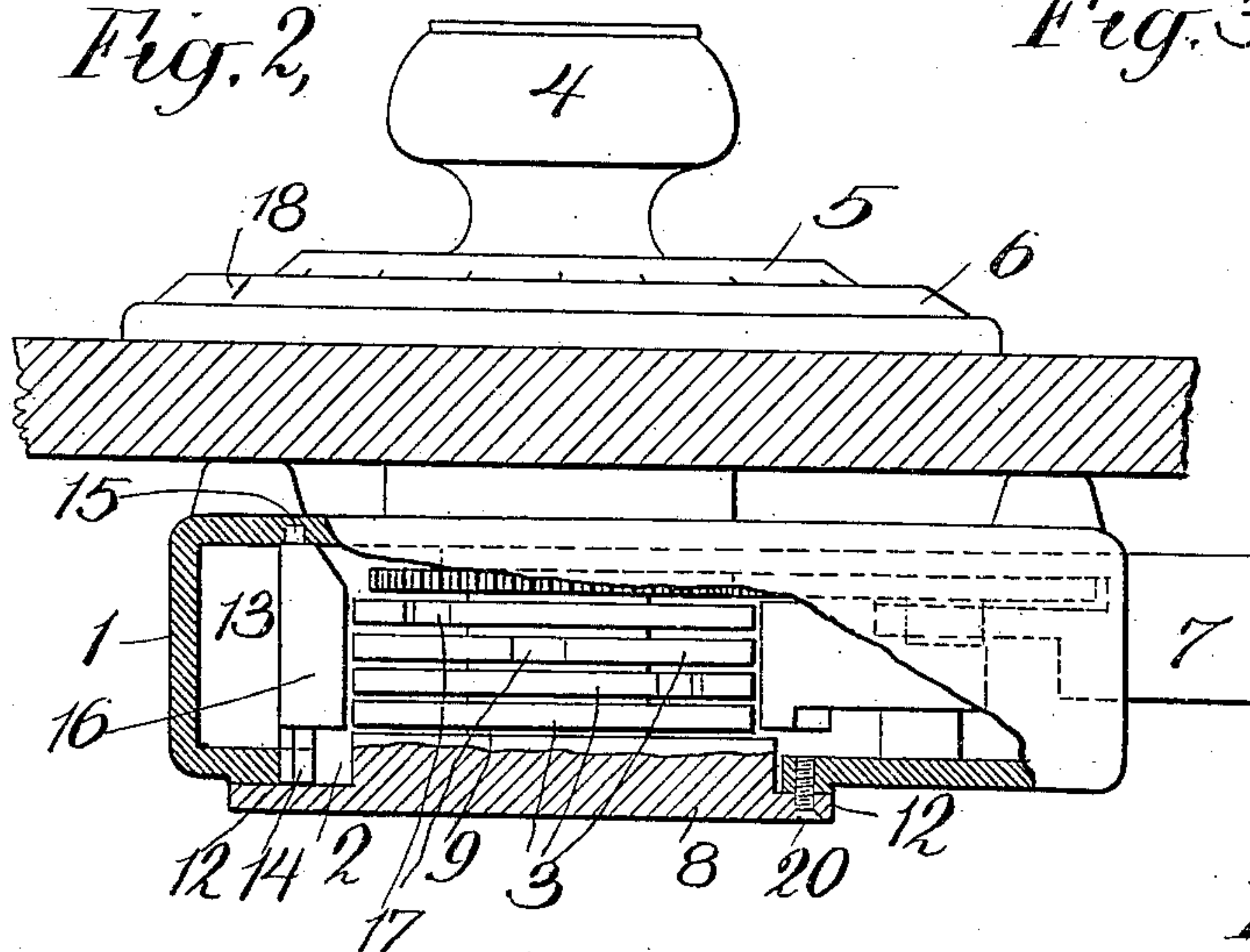


Fig. 3

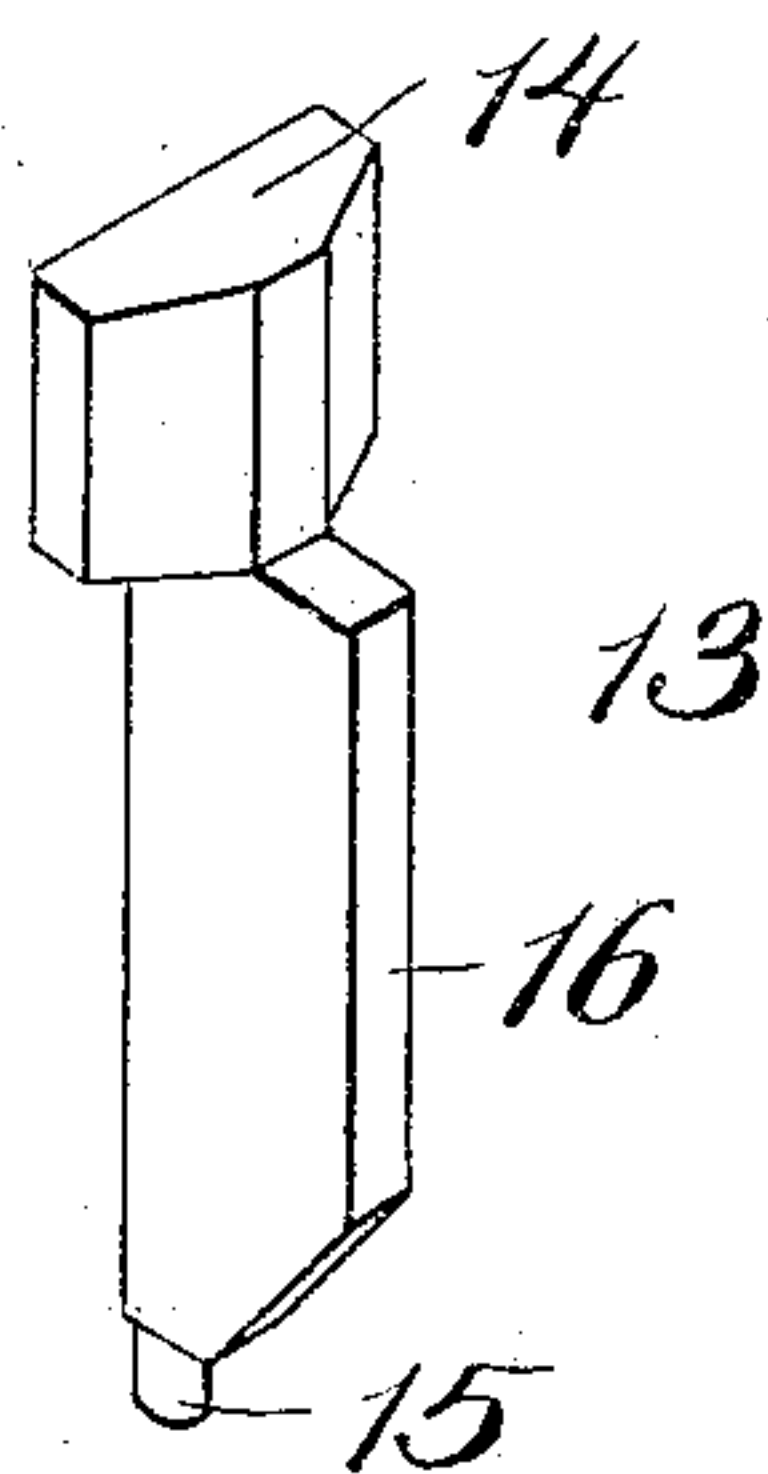
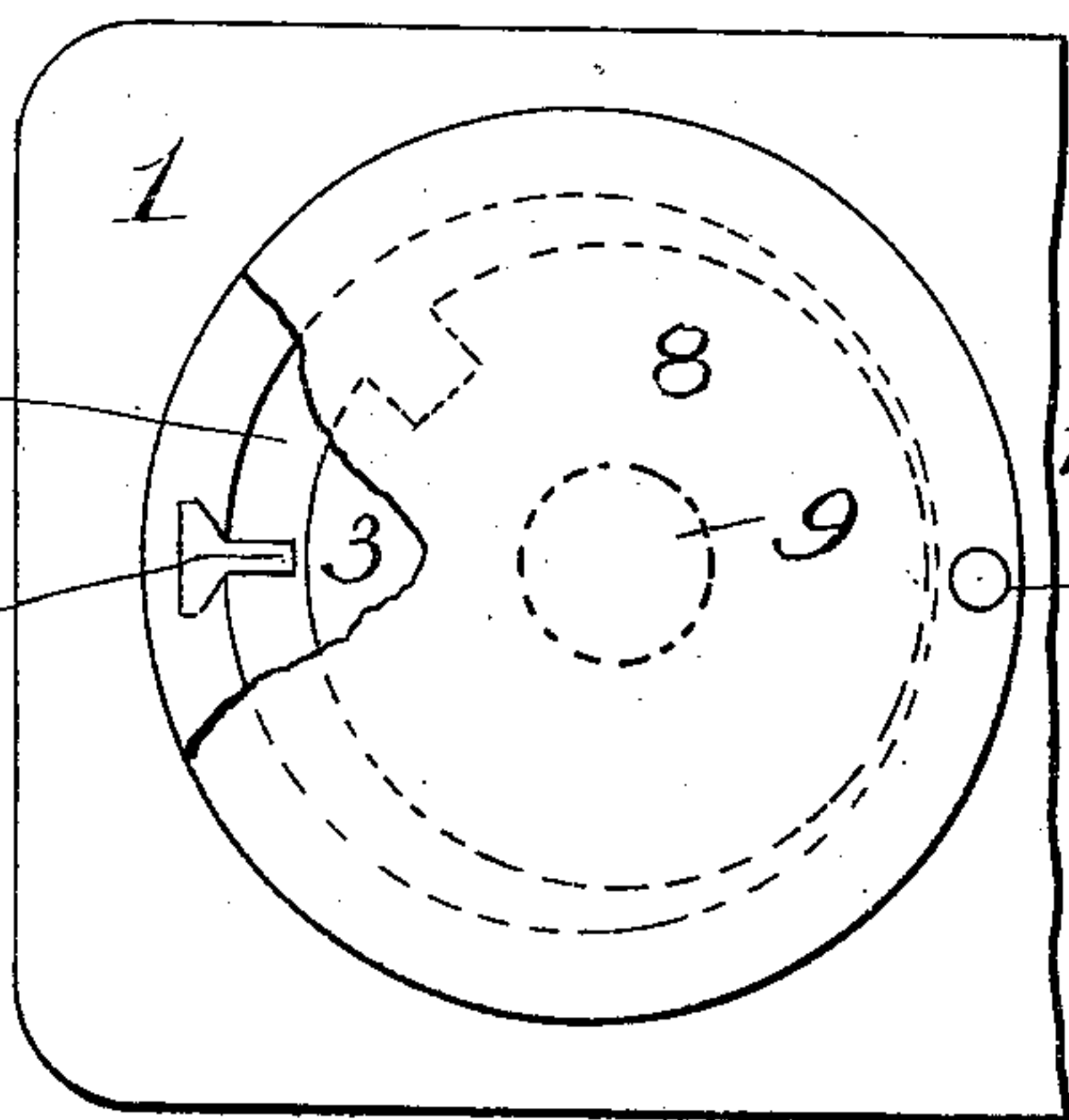


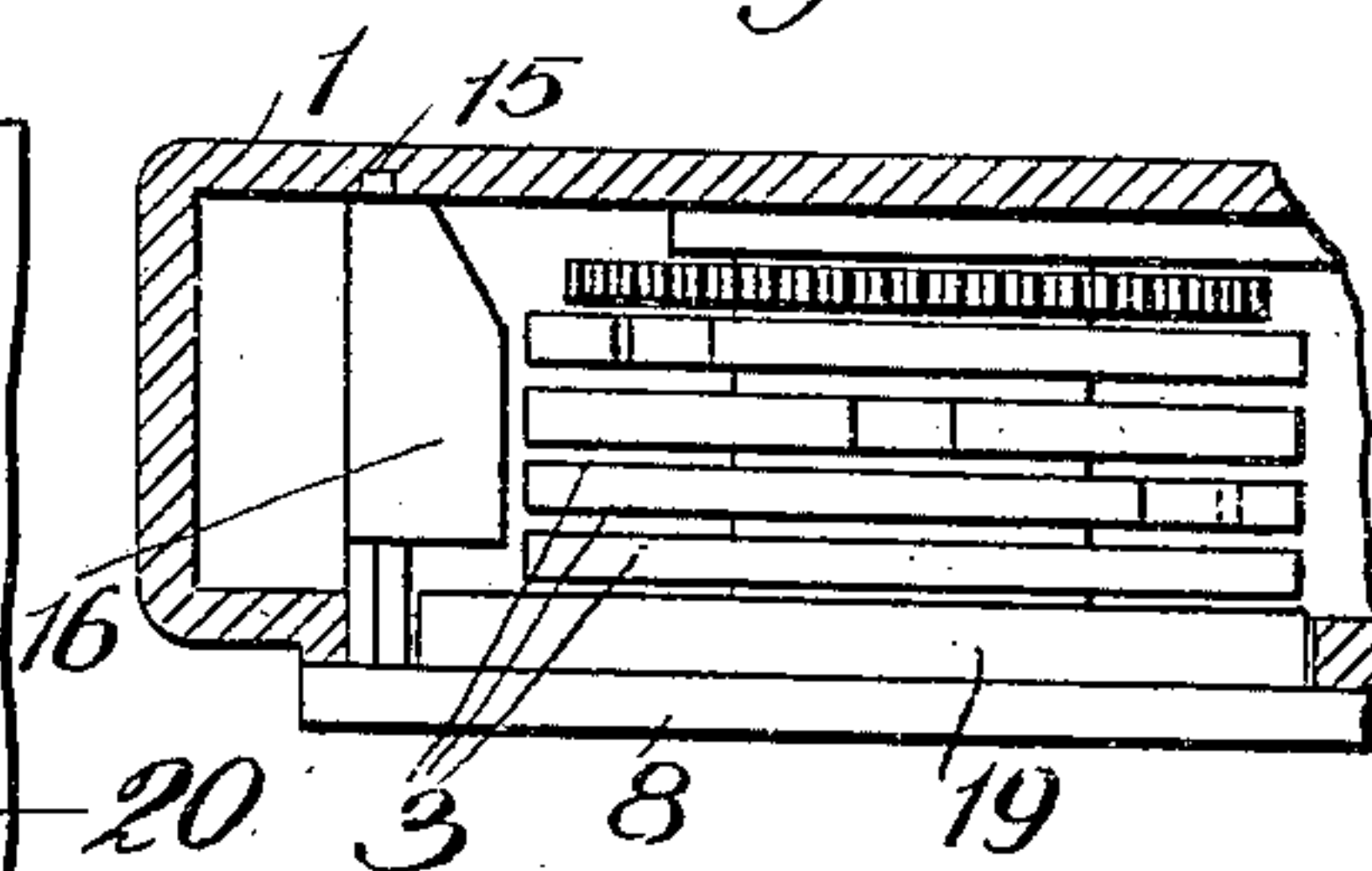
Fig. 4



WITNESSES:

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Fig. 5



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# UNITED STATES PATENT OFFICE.

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## PERMUTATION-LOCK.

No. 863,292.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed January 11, 1907. Serial No. 351,872.

*To all whom it may concern:*

Be it known that I, CHARLES E. LEIGHTON, a citizen of the United States, residing at New York, in the borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Permutation-Locks; and I do hereby declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in locks, particularly permutation locks such as those commonly used on the doors of safes or vaults; the purpose of my invention being to prevent persons who do not have the combination of the lock from opening the lock and obtaining access to the permutation mechanism thereof, while the door of the safe or vault is open, and so to prevent such persons from learning the combination of the lock by examination thereof, and to prevent tampering with the lock such as may lead to derangement thereof, and in fact to prevent examination of the lock mechanism altogether except by those possessing the correct combination.

My invention consists in the novel means employed for causing the permutation mechanism of the lock to control opening of the lock case; in the novel means employed for preventing accidental "locking out"; and in other features of invention as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings I illustrate certain forms of permutation lock construction embodying my invention.

In said drawings Figure 1 shows a rear elevation and partial section of a permutation lock embodying my invention in one of its forms. Fig. 2 shows a top view of such lock, with the casing partly in section. Fig. 3 is a detail perspective view of the removable locking member. Fig. 4 is a view similar to Fig. 1, but illustrating an alternative construction. Fig. 5 is a view similar to Fig. 2, of this alternative construction.

According to my invention, I provide the lock with an inclosing casing provided, as usual, with an opening through which access may be gained to its interior, such opening being closed normally by a removable member of the casing; said opening being commonly in the back of the lock casing, the said removable member or closure constituting a removable back plate. These parts are of the usual construction, except in the respects herein noted. The lock mechanism is not in any wise changed, but may be the same as is commonly used. I do not limit myself to any particular lock mechanism, as the same forms no portion of my invention.

In the drawings, 1 designates the lock case, 2 an opening in the rear thereof through which the tumblers

may be inserted and removed, 3 the said tumblers, 4 a knob for rotating the tumblers in the well-known way, 5 the dial, 6 the dial ring, and 7 the main bolt. The opening 2 is normally closed by a back plate 8 forming a removable section of the casing 1; and said casing and back plate are so constructed relatively that the back plate can be removed or replaced only by a movement in a plane parallel to the planes of rotation of the tumblers, and in such movement carries the tumblers with it; the latter object being accomplished preferably by mounting the tumblers on a spindle 9 formed on the back plate, as is commonly done in permutation locks.

In the construction shown in Figs. 1 and 2, the main portion of the back plate is somewhat smaller, longitudinally, than the opening 2, and is provided with locking lugs 10 adapted, in one position of the back plate, to pass through slots 11 in the main portion of the casing, and then, by longitudinal movement of the back plate, to interlock with the casing so as to prevent removal of the back plate. Said back plate has a flange 12 of width sufficient to cover the opening 2 in any position of the back plate.

In the lock is a locking key 13, preferably so held as to be removable. In the construction shown this key has a dovetail head 14, adapted to fit into a corresponding dovetail slot in one wall of the main portion of the casing, and has also a foot-pin 15 adapted to fit into a corresponding recess in the opposite wall of the lock case; the construction being such, as will be seen, that the key may be removed readily by moving it longitudinally, but when in place is held firmly against all but longitudinal movements. The back plate, or more properly a portion of the flange 12 thereof, normally covers the head of key 13 and prevents removal of said key. This key 13 has a portion 16 adapted to enter the usual notch 17 in each of the tumblers 3, and so to permit longitudinal movement of the back plate with the tumblers thereon when the notches of the several tumblers are lined up opposite said portion 16; but otherwise to prevent longitudinal movement of the back plate 8 sufficient to disengage the locking lugs 10 from the casing.

In the use of the construction shown in Figs. 1 and 2, to remove the back plate from the lock, the permutation mechanism must first be operated according to the correct combination read with respect to, not the mark on the dial ring ordinarily used when locking and unlocking the door on which the lock is mounted, but with respect to a special mark 18 on the dial ring located thereon with particular reference to the location of the key 13. By so operating the permutation mechanism with respect to mark 18, the tumblers are rotated so that their notches 17 are all lined up opposite key 13. The back plate is then slid backward (to the left of Figs. 110



1 and 2), which movement the notches 17 permit since they are lined up opposite key 13, which key enters said notches during such movement. This movement brings the locking lugs 10 opposite openings 11; and the back plate is then pulled out from the casing, carrying with it the tumblers. To replace the back plate the reverse operation is performed, the notches 17 being first lined up opposite the key 13, which is necessary in order that the said key may permit the tumblers to enter the lock and may permit lugs 10 to enter slots 11; and the tumblers and back plate having so been inserted, the back plate is moved to the right of Figs. 1 and 2, so as to cause the lugs 10 to lock it in place, and the knob 4 is turned far enough to carry the notch 17 of one or more of the tumblers away from key 13. The back plate is then locked in place, and can be removed only by operating the permutation mechanism again, or by breaking some portion of the lock casing or lock mechanism.

The construction shown in Figs. 4 and 5 is similar to that shown in Figs. 1 and 2, except that instead of sliding the back plate, it is rotated. The opening in the back of the lock case is, in this case, circular, but eccentric with respect to the axis of knob 4; and the back plate has a corresponding circular boss 19, eccentric with respect to spindle 9. It will be obvious that rotation of the back plate when in place in such circular opening carries the back plate to one side or the other, the same as if it were slid as in the construction shown in Figs. 1 and 2.

To prevent actual contact of the key 13 with the edges of the tumblers, while the lock is in use, I provide convenient fastening means, such as a screw 20, which holds the back plate in such position that the tumblers clear the key 13.

Key 13 is made removable, for the convenience of the safe trade, who will desire to be able to remove the back plate at will, before the lock has left their hands, without operating the permutation mechanism, and also—what is of greater importance—to avoid a possible lock-out after changing the combination, through failure to note down the new combination correctly. To these ends, the safe trade will commonly remove the key 13 from the lock while the latter remains in their hands, putting it in place only after the lock has been sold and adjusted by the purchaser to a particular combination. When changing the combination, the key 13 will be removed until the lock has been tried with the new combination and found to work correctly, and will then be replaced. While the key 13 is out of the lock, it will be obvious that the back plate may be removed at will, after unscrewing screw 20, without regard to the position of the tumblers.

What I claim is:—

1. A permutation lock comprising in combination permutation mechanism including notched tumblers, a casing inclosing the same and having an opening and a removable member normally closing the same, said removable member movable in a plane parallel to the planes of rotation

of the tumblers of said permutation mechanism and arranged to carry said tumblers with it in such movement, and provided with locking means arranged to cause said removable member to be held or released by such movement, and a locking member carried by the main portion of the lock, arranged to engage the notches of said tumblers and cause the latter to control movements of said removable member.

2. A permutation lock comprising in combination permutation mechanism comprising notched rotary tumblers, a casing inclosing the same having a removable back plate, locking means for said back plate operated by lateral movement of the latter, said back plate arranged to carry said tumblers with it in such movement, and a key carried by the main portion of the lock and arranged to permit such movement of the tumblers and back plate only when the notches of the tumblers are opposite said key.

3. A permutation lock comprising in combination permutation mechanism comprising rotary notched tumblers, a casing inclosing the same having an opening and a removable member normally closing the same, locking means for said member operated by movement of the latter in a plane parallel to the planes of rotation of said tumblers, said member arranged to carry said tumblers with it in such movement, and a locking member carried by but removable from the main portion of the lock, and arranged to be engaged by the notches of said tumblers to control the movements of said removable member.

4. A permutation lock comprising in combination permutation mechanism comprising rotary notched tumblers, a casing inclosing the same having a removable back plate, locking means for said back plate operated by lateral movement of the latter, said back plate arranged to carry said tumblers with it in such movement, and a key carried by the main portion of the lock but removable therefrom and arranged to be engaged by the notches of said tumblers to control the movements of said back plate.

5. A permutation lock comprising in combination permutation mechanism comprising rotary notched tumblers, a casing inclosing the same having a removable back plate carrying said tumblers and normally closing an opening in said casing adapted to permit lateral movement of said tumblers therein, locking means for said back plate operated by said lateral movement, and other locking means for said back plate engaged by the notches of said tumblers and preventing removal of said back plate until said tumblers are properly operated.

6. A permutation lock comprising in combination permutation mechanism comprising rotary notched tumblers, a casing inclosing the same having a removable back plate carrying said tumblers and normally closing an opening in said casing adapted to permit lateral movement of said tumblers therein, locking means for said back plate operated by said lateral movement, and other removable locking means for said back plate engaged by the notches of said tumblers and preventing removal of said back plate until said tumblers are properly operated.

7. A locking member for locking in place the back plates of permutation locks, comprising a body portion adapted to engage lock tumblers and a dovetail head adapted to fit into a corresponding slot of the lock.

8. A locking member for locking in place the back plates of permutation locks, comprising a body portion adapted to engage lock tumblers provided at its ends with means for removably securing said member in the lock.

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

CHAS. E. LEIGHTON.

Witnesses:

JAMES F. EGAN,  
H. M. MARBLE.