(No Model.)

H. D. CHIPMAN.

COMBINATION LOCK.

No. 590,131. Patented Sept. 14, 1897.

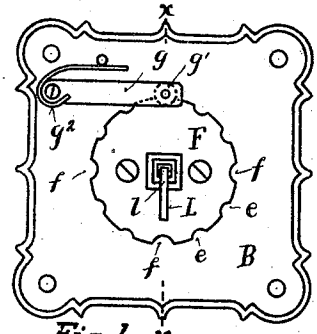


Fig. 1.

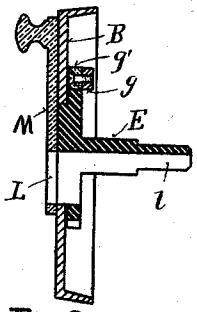


Fig. 2.

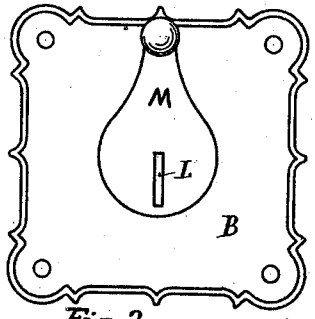


Fig. 3.

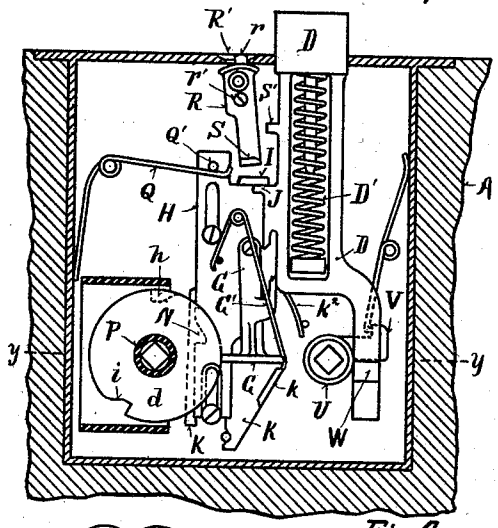


Fig. 4.

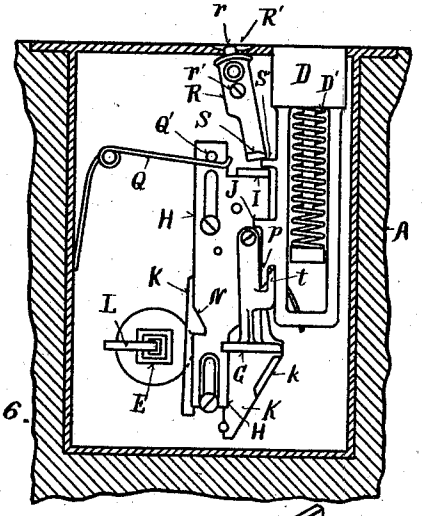


Fig. 6.

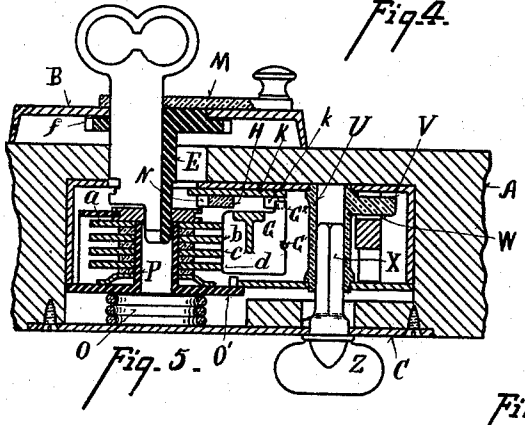


Fig. 5.

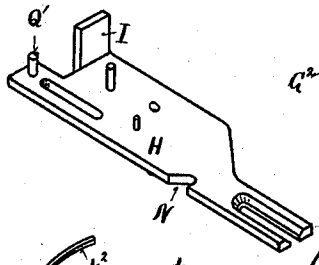


Fig. 8.

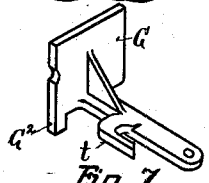


Fig. 7.

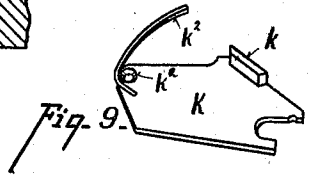


Fig. 9.

Witnesses

M. F. Wood

Oliver B. Kaiser.

Inventor

Horace D. Chipman

By Wood & Boyd

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HORACE D. CHIPMAN, OF HOME CITY, OHIO.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 590,131, dated September 14, 1897.

Application filed March 16, 1897. Serial No. 627,806. (No model.)

To all whom it may concern:

Be it known that I, HORACE D. CHIPMAN, residing at Home City, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Combination-Locks, of which the following is a specification.

This invention relates to a combination-lock adapted to be used on doors, desks, drawers, &c., which is operated by a crank, on the shaft of which the tumblers are mounted. Said shaft also carries a notched disk with notches corresponding, preferably, to the dial of a clock, a part of the notches—say 12, 3, 6, and 9—being deeper than the others, and having an indicator engaging with said notches, so that the operator by the sense of feeling can run the combination. The crank-shaft is so combined with the lock-bolt that the bolt can be thrown by the crank when the tumblers are brought into position for shooting the bolt, and when the bolt has been thrown by the crank movement a releasing of the crank will instantly throw out the combination, so that the lock works automatically or is self-setting.

Another object of my invention is to so arrange the tumblers on a separable shaft that they can be easily removed through the back of the lock or through a section of the lock for resetting the combination.

Another object of my invention is to so construct the locking mechanism that when set in a certain position the lock can be operated by a key in a keyway of the crank-shaft as well as by the combination. The working of the key is independent of the combination and does not disturb it.

Another object of my invention is to provide a lock which, when a number are to be used in a series, as in a school-room, can be operated by a single key, at the same time allowing each lock to have a combination different from every other lock, so that the holder of the key can have access to all the locks while the owner of each lock can only operate the same by means of its particular combination; also, in case the lock is to be applied to a front door either the key or the combination may be employed, as desired.

Other features of my invention relate to novelties of construction which are more fully set forth in the description of the accompanying drawings, making a part of this specification, in which—

Figure 1 is an inside view of the front plate of the lock. Fig. 2 is a section on line $x\,x$, Fig. 1. Fig. 3 is a front view of the face-plate of the lock. Fig. 4 is a plan view of the lock with the back plate removed. Fig. 5 is a central section on line $y\,y$, Fig. 4. Fig. 6 is a plan view of the lock with the back plate and tumblers removed. Fig. 7 is a detailed view of the dog engaging with the notches of the tumblers. Fig. 8 is a perspective view of the sliding-bolt frame. Fig. 9 is a perspective view of the automatic setting device.

A represents the framework of a door or other structure to which my lock is attached.

B represents the front plate.

C represents the back plate of the lock.

D represents the bolt.

E represents the tumbler-shaft, upon which are mounted the tumblers $a\ b\ c\ d$. These are constructed in the ordinary manner.

F represents a dial-plate provided with a series of notches $e\ f$ around its periphery. Notches f are deeper than notches e and are placed, preferably, in positions corresponding to the figures 12, 3, 6, and 9 of the dial of a clock, notches e being intermediate. Of course the placing of the deep notches is somewhat arbitrary and more or less may be employed, serving to indicate the location of the other notches and to assist the operator in working the combination.

g represents an arm carrying a roller or friction-wheel g', which travels on the periphery of the dial and engages with said notches. g^2 represents a spring for holding the said friction-roller in easy contact with the notches.

G represents a dog engaging with the notches of the tumblers when they are brought in line with each other. It is held in contact with the periphery of the tumblers by spring G'.

In order to shoot the bolts by the crank-movement which operates the tumblers, the last tumbler is provided with a notch h, having a square shoulder at the rear edge of its line of travel when coming into position. The other three tumblers are provided with the square shoulders on the front edges of their notches i, as shown in Fig. 4. By this means

when the tumblers have been brought into position and the dog G has fallen into the notches a reverse movement of the crank brings the square shoulder of notch *h* in firm contact with the dog and shoots the bolt in the following manner: Dog G is pivoted upon the sliding-lock frame H, which is provided with a lug I, which engages with a lug J on the lock-bolt D, so that the movement of the crank and tumblers will retract the bolt.

In order that the lock may automatically set itself as soon as the bolt is retracted and the crank released, I provide the following devices: K represents a plate, which is provided with a lug *k*. When the dog G slips into the tumbler-notches and is retracted, lug G^2 strikes the inner inclined face of the lug *k* and turns the plate K on its pivot *k'*. Spring k^3 depresses the plate as soon as the dog has passed in rear of the lug, and when the bolt D is projected by the spring D' the dog G^2 will slide over the outer face of lug *k* and drop in front of it, bringing dog G into engagement with the peripheries of the tumblers, which will rest on the tumblers in front of the notches *i*, so that the tumblers will have to be operated to bring the notches in line before the dog will reëngage with the notches of the tumblers. Lug *k* also serves to lock dog G against retraction, except when it rests in the tumbler-notches.

In order that the bolt may be operated by a key, I provide the following devices: L represents a slot through the axis of the crank M. The crank-shaft E is provided with a slot or keyway I. N represents a notch in the sliding-lock frame H, with which the ward of the key engages and retracts the same, drawing back with it the bolt D. The key also moves the plate K and lug *k* out of the path of lug G^2, thus operating without affecting the combination. It will be observed that the keyway in the shaft E must be in such relation to the lug N' of the sliding-bolt frame that the ward of the key will engage with the same in turning and throw the bolt.

In order that the tumblers may be removed through the back plate of the lock or a section thereof, I provide the following instrumentalities: O represents a coil-spring, which rests between the back plate of the lock and the back plate O' of the tumbler-frame. The tumblers are supported on a sleeve P, which is made integral with the tumbler-frame. The crank-shaft E loosely fits in said sleeve, so that the tumbler-frame and the tumblers journaled therein may be detached by removing the back plate C and the spring O, and the combination can readily be changed without disturbing any part of the locking mechanism. Q represents a spring engaging with the pin Q' on the bolt-frame H for retracting the same.

In order that the dog G may be held out of the way for detaching the tumblers, I provide the following mechanisms: R represents a detent which is operated through the slot R' of the lock by pin *r* turning on the pivot *r'*. S represents a catch which engages with the lug S' on the lock-bolt and holds the lock back, the dog G being in the position shown in Fig. 6. The catch *t* on said dog engages with the catch *p* on the bolt, thus holding the dog out of the way.

When the lock is to be used on a door and it is desired to open the door from the inside without the use of a key, I provide the following mechanism: U represents a tumbler provided with a finger V, projecting upward and engaging with the lug W on the bolt. X represents a socket-bolt resting in the tumbler U for turning the same upon the inside of the door by the thumb-piece Z in the ordinary manner of operating a night-latch.

I thus provide a combination-lock which has all the conveniences of an ordinary outside door-lock which may be operated readily by the combination from the outside and which may be thrown out of use whenever desired.

Having described my invention, what I claim is—

1. In a permutation-lock, the combination with the bolt and a sliding-lock frame adapted to be engaged and actuated by a key, of a series of tumblers, a tumbler-frame detachably connected with the lock mechanism and having integral with said frame a sleeve upon which said tumblers are mounted, and a shaft loosely fitted into said sleeve and provided with a handle and a keyway, substantially as described.

2. In a permutation-lock, the combination with the bolt, a series of tumblers, and a sliding-lock frame, of a detachable tumbler-frame having integral therewith a sleeve on which said tumblers are mounted, dog mechanism pivoted on the said sliding-lock frame to engage the tumblers, and a shaft fitted into the tumbler-sleeve and provided with a crank-handle, substantially as described.

3. In combination with a permutation-lock having a series of tumblers mounted upon a shaft, the sliding-bolt frame, the dog pivoted thereon, and engaging with the setting-plate K, for raising the dog and passing it over the notches for automatically resetting the combination substantially as specified.

4. In a permutation-lock the combination of a series of tumblers mounted upon a shaft, a sliding-lock frame, a dog pivoted thereon, the resetting-plate K, the independent lock-bolt D and means for the engagement of the lock with the bolt, substantially as specified.

5. In a permutation-lock, the combination with the bolt, and a sliding-lock frame, of a series of tumblers mounted upon a sleeve that is integral with a detachable tumbler-frame, and a detachable shaft fitted into said sleeve and provided with a crank, substantially as described.

6. In a permutation-lock, the combination with the bolt and a sliding-lock frame adapted to be engaged and actuated by a key, of a

series of tumblers, a dog pivoted to the sliding-lock frame to engage the said tumblers for actuating the lock through the same, and a tumbler-shaft provided with a keyway for insertion of a key to engage the sliding-lock frame and actuate the lock independent of the said tumblers, substantially as described.

7. In a permutation-lock, the combination with the series of tumblers, and a sleeve on which said tumblers are mounted, of the crank-shaft fitted into said sleeve and provided with a dial-plate having a series of deep and shallow notches, and a pivoted arm in frictional engagement with the periphery and notches of said dial-plate, substantially as described.

8. In a permutation-lock, having a series of tumblers operated by a crank-shaft engaging with a dog of the sliding-lock frame, a keyway formed in said shaft and a notch in the sliding-bolt mechanism adapted to engage with a key inserted in said keyway, substantially as specified.

9. In a permutation-lock, the combination with the bolt, the sliding-lock frame, and a dog pivoted to said lock-frame, of a tumbler-frame having a sleeve integral therewith, a series of tumblers mounted on said sleeve and provided with notches *h i* to be engaged by the dog on the sliding-lock frame, and a crank-shaft fitted in the said sleeve that supports the tumblers, substantially as described.

10. In a combination-lock having a series of tumblers operated on a shaft, a dog engaging with the notch of said tumbler and pivoted upon the sliding-bolt mechanism adapted to engage with the bolt D when the bolt is retracted and a locking-arm R for holding said bolt and dog in position for removing the tumblers, substantially as specified.

11. In a combination-lock having a series of notched tumblers mounted upon an operating-shaft, a sliding-lock frame, a dog pivoted upon said lock-frame, the lock-bolt D having a movement independent of said lock-frame, a tumbler U having an engagement with the lock-bolt D and means for operating said bolt independent of the tumbler-shaft, substantially as specified.

In testimony whereof I have hereunto set my hand.

HORACE D. CHIPMAN.

Witnesses:
W. R. WOOD,
OLIVER B. KAISER.