(No Model.) 2 Sheets—Sheet 1.

J. ROCHE.

LOCK.

No. 524,148. Patented Aug. 7, 1894.

Fig. 1.

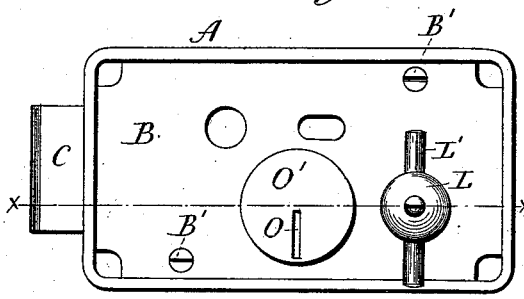


Fig. 2

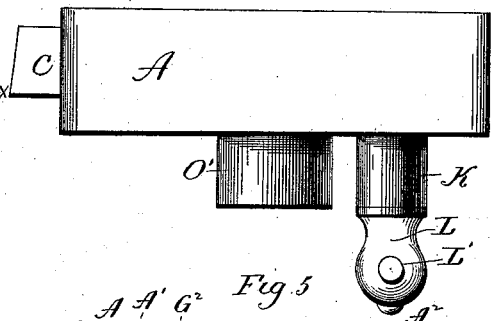


Fig. 3

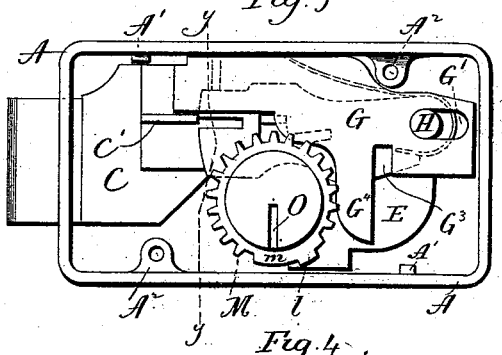


Fig. 5

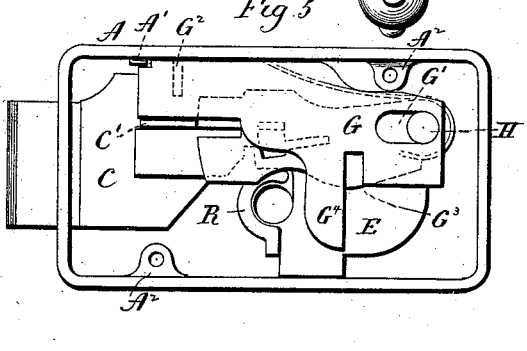


Fig. 4

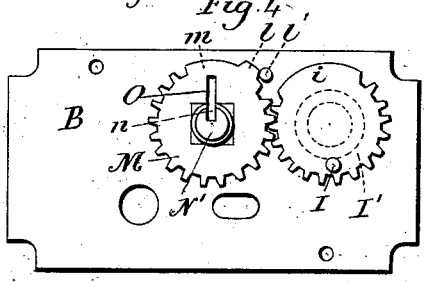


Fig. 6

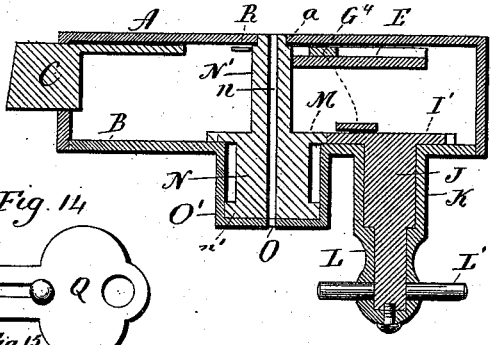


Fig. 12

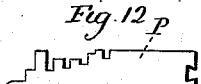


Fig. 13

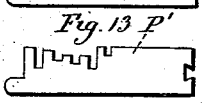


Fig. 7

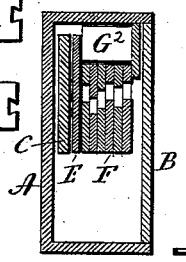


Fig. 14

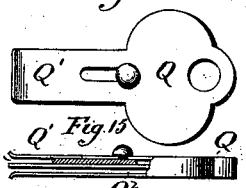
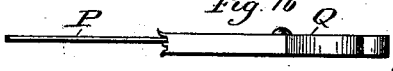


Fig. 15

Fig. 16



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Lillian D. Kelsey

James Roche,
Inventor.
By atty Earle & Seymour

(No Model.) 2 Sheets—Sheet 2.

J. ROCHE.

LOCK.

No. 524,148. Patented Aug. 7, 1894.

Fig. 8

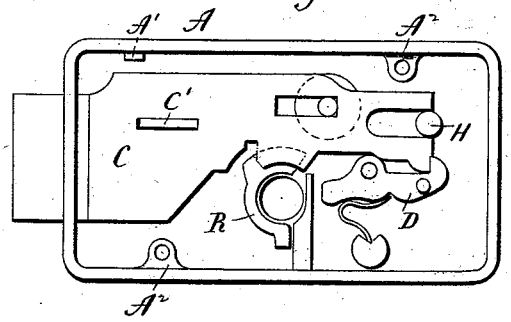


Fig. 9

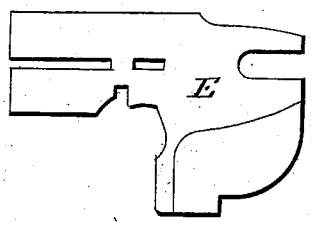


Fig. 10

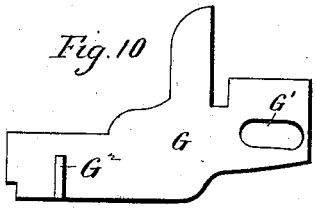
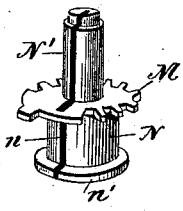


Fig. 11



Witnesses.
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Inventor
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UNITED STATES PATENT OFFICE.

JAMES ROCHE, OF TERRYVILLE, CONNECTICUT, ASSIGNOR TO THE EAGLE LOCK COMPANY, OF SAME PLACE.

LOCK.

SPECIFICATION forming part of Letters Patent No. 524,148, dated August 7, 1894.

Application filed May 8, 1893. Serial No. 473,349. (No model.)

To all whom it may concern:

Be it known that I, JAMES ROCHE, of Terryville, in the county of Hartford and State of Connecticut, have invented a new Improvement in Safety-Locks; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in front elevation of one form which a lock constructed in accordance with my invention may assume; Fig. 2, a plan view thereof; Fig. 3, a view of the lock with the cover removed, the tumbler-bolt being shown in its adjustment for positively locking the tumblers in their locked positions; Fig. 4, an inside view of the cover; Fig. 5, a view of the lock with the cover and the key-hub removed, the tumbler-bolt being shown in its unlocked position in which it is disengaged from the tumblers; Fig. 6, a view of the lock in longitudinal section on the line x—x of Fig. 1; Fig. 7, a view of the lock in transverse section on the line y—y of Fig. 3; Fig. 8, a view of the lock-case with everything removed therefrom except the main bolt, the pivotal locking-dog and the spring employed to eject the bowless keys; Fig. 9, a detached view of the auxiliary or secondary bolt which operates the pivotal dog; Fig. 10, a detached reverse view of the tumbler-bolt; Fig. 11, a detached perspective view of the key-hub; Fig. 12, a view of the bowless guard-key; Fig. 13, a view of the bowless base-key; Fig. 14, a plan view of the key-holder; Fig. 15, an edge view thereof partly in section; Fig. 16, a view of the key-holder and one of the keys as combined.

My invention relates to an improvement in that class of locks particularly designed for the drawers or boxes of safe-deposit vaults, but also applicable for use in other situations, and constructed to be operated in part by the vault-custodian, and in part by the box-owner, and thereto generally provided with a guard-key which is held by the vault-custodian, who uses it to prepare the lock for being unlocked, and with a dissimilar base-key which is held by the box-owner, who cannot use it until the lock is thus prepared, the particular object of my present invention being to produce a compact and comparatively simple lock, not liable to derangement, and having exceptional safe-guards against being picked or tampered with.

With these ends in view, my invention consists, in provision for positively locking the tumblers in their locked positions when the key-hole is open, and for closing the key-hole when the tumblers are unlocked, in a bowless-key and a holder therefor, and in certain details of construction and combinations of parts as will be hereinafter described, and pointed out in the claims.

For the purpose of disclosing my invention, I have chosen to illustrate its embodiment in the safety-lock for which United States Patent No. 481,736 was granted on my application, under date of August 30, 1892, I would have it understood, however, that my present invention is not limited to use in connection with that particular lock.

The case A, and cover B, of the lock are of ordinary construction, except as hereinafter specified, the latter being adapted to fit within the open side of the former, and to rest upon two simple ribs A′ A′, and two counter-bored and threaded ribs A^2 A^2 formed therein. Two screws B′ B′ pass through the cover into the counter-bored and threaded ribs A^2 A^2 of the case, and hold the cover in place. The key bolt C, pivotal locking-dog D, auxiliary or secondary-bolt E, and slotted tumblers F of the lock, are substantially the same in construction and operation as the corresponding parts shown and described in the patent referred to, and do not need detailed description herein. For the purpose of positively locking all of the tumblers F in their locked positions, I employ a tumbler-bolt G, consisting as herein shown, of a flat plate of peculiar formation, which is superimposed upon the outer tumbler, of which the lock represented has five, though that number of course may be varied. The said tumbler-bolt G, is arranged to slide back and forth upon the said tumblers, being thereto constructed, at its outer end, with an elongated slot G′, which receives the stud H, on which the tumblers swing, and, at its inner end, being

adapted to pass between the adjacent wall of the lock-case and the stump C′ of the bolt C. A transverse locking-finger G², (Figs. 3, 5, 7 and 10) located upon the inner face of the inner end of the tumbler-bolt, stands at a right angle to the plane thereof. The said finger, which is in fact the tumbler-bolt, extends transversely to the length of the same, and is adapted in width to so occupy the space between the outer edges of the tumblers when the same are in their locked positions, and the inner face of the adjacent side of the case, that they cannot be moved, whereby they are positively locked in such positions. The interposition of the said finger between the tumblers and the case, is clearly shown in Figs. 3 and 7 of the drawings.

In order to unlock the tumblers to permit them to be swung into their unlocked positions, the tumbler-bolt must be moved so as to clear its locking-finger from the tumblers. That is effected by moving the said bolt inward for a distance represented by the length of its slot, whereby the locking-finger is carried beyond the inner ends of the tumblers, as shown by Fig. 5 of the drawings, the tumblers being now free to be operated in the ordinary manner.

I wish to emphasize the fact that when the tumblers are in their locked positions, they are positively locked therein by means of my improved tumbler-bolt. At this time the inner edges of all of the tumblers will be in line, as shown by Fig. 7 of the drawings, so that a wire or other instrument passed over the edges of the tumblers, will give no indication of the character of the key required to operate them, and the tumblers being locked and not yielding under the pressure of any tool, baffle inquiry in that direction.

For the purpose of operating the tumbler-bolt, that is, sliding it back and forth, I construct it with an operating notch G³, formed in its outer edge, and near its outer end, and with a long operating-finger G⁴, located inside of the said notch, so to speak, and forming one wall thereof. The said notch receives an operating pin I, projecting inwardly from the edge of a pinion I′, secured to the inner end of a shaft J, having bearing in a sleeve K, projecting outward from the cover B, of the lock, the said shaft being reduced in diameter at its outer end, and having applied thereto an operating handle, comprising a head L, and a cross-bar L′, mounted therein. The pinion I′, aforesaid, meshes into a pinion M, approximately corresponding to it in size, and mounted upon the key-hub of the lock. The said pinion M, which bears against the inner face of the cover, is constructed with a stop-lug *l*, for engagement with a stop pin *l′*, projecting inward from the cover, whereby the key-hub is arrested when rotated through the agency of the pinions I′ and M, with its key-slot *n* in line with a key-hole O, formed in a cylindrical housing O′, projecting outward from the cover of the lock, and inclosing the enlarged outer end N, of the key hub, the said end of the hub having a flange *n′*, which takes a bearing upon the side walls of the housing. The face of the said end of the hub is intersected by the key-slot *n*, but is otherwise imperforate, and as it bears against the inner face of the end of the housing, will close the key-hole O, formed therein, except when the stud is turned to bring its key-slot into line with the key-hole. The peripheries of the respective pinions have corresponding uncut portions *i* and *m* which engage with each other to limit the reverse rotation of the pinions, their rotation in the opposite direction being limited, as before mentioned, by means of the stop-lug *l* and stop-pin *l′*. It will be understood that by turning the handle before mentioned, the key hub is rotated in one direction or the other without the use of a key. The inner end N′ of the key-stud is of ordinary construction, and reduced at its extremity to fit in the usual manner into a socket *a* formed to receive it in the lock-case A. The pinion M, carried by the stud is interposed between the large and small portions thereof, as will be seen by reference to Fig. 11 of the drawings.

It will be understood from the construction just described, that when the handle is turned in one direction or the other, it not only throws the tumbler-bolt, but also rotates the key-hub, and virtually couples the bolt and hub together, so that they cannot operate independently, but compels them to move in unison. When the parts are assembled, the hub and bolt are related so that when the bolt is in position to positively lock the tumblers in their locked positions, the key-slot of the key-hub will be in alignment with the key-hole, whereby the same is left open for the insertion of the keys into the lock. On the other hand, when the tumbler-bolt is moved so as to be disengaged from the tumblers, leaving the same unlocked, the key-hub is rotated so that its enlarged outer end will close the key-hole, preventing the introduction of the keys, or anything else into the lock.

I do not limit myself to constructing the tumbler-bolt, nor the key-hub as described, nor to using the mechanism specified for connecting them and operating them in unison, my invention comprehending devices of whatever description for positively locking the tumblers in their locked positions when the key-hole is open, and closing the key-hole when the tumblers are unlocked with respect to the said tumbler-bolt, for it is not to be understood that in speaking of the unlocking of the tumblers, I refer to throwing them for the movement of the main-bolt C of the lock.

I employ with my improved lock a bowless guard-key P, and a bowless base-key P′. These keys, as shown, are flat keys, each having one edge notched or bitted, and each adapted in length to be introduced entirely within the lock, in which they have simply

the function of operating the tumblers but are not used for the rotation of the key-hub. By reference to Figs. 12 and 13 of the drawings, it will be observed that in respect of their bits or notches, they are dissimilar, the guard-key being specially adapted for operating the secondary bolt E of the lock, while the base-key is designed to throw the main-bolt C, and operate the tumblers F, thereof. For the handling of these short keys, I employ a key-holder shown in Figs. 14, 15 and 16 of the drawings, and consisting of a body or frame Q, having the general outline of the outer end or bow of a key, and containing a slide Q′, furnished with a button Q^2, by which it is operated, the said slide corresponding in transverse section to the transverse section of either of the keys. The said slide is located in an opening *q* formed in the key-holder, and adapted to receive the outer end of either of the bowless keys P P′, which are inserted into the said chamber preparatory to their application to the lock. For the ejection of the bowless keys, I employ a thin sheet-metal spring R, which is secured to the bottom of the lock-case A, in position to be engaged by the inner ends of the keys when they are in the lock.

Having thus described the construction of my improved lock in detail, I will now proceed to set forth the operation thereof. Assuming the lock to be locked, its handle will first be turned so as to open the key-hole, and that cannot be done, as I have already stated, without at the same time moving the tumbler-bolt into position to positively lock the tumblers in their locked positions. The guard-key is now applied to the key-holder, and the key inserted into the key-hole and pushed entirely within the same by means of the slide. Then after the key has passed within the key-hole, the handle is turned, whereby the key-hub is rotated, and the key with it, the key-hole being closed, and the key lost to view. As the hub is rotated the tumbler bolt is moved inward and disengaged from the tumblers, after which the key acts upon the tumblers which it moves to unlock the auxiliary or secondary bolt E, which it then throws for disengaging the pivotal dog D, from the main bolt C. The handle is now reversed, whereby the key-stud is reversely rotated with the key which returns the auxiliary bolt to its normal position, and then permits the tumblers to return to their locked positions after which the tumbler-bolt is thrown back to again lock the tumblers positively in their locked positions, which takes place before the key slot in the key-stud is brought into alignment with the key-hole from which the bowless key is now partially ejected by the key-spring R in the bottom of the lock-case, so that it may be seized by the fingers, and recovered from the lock. The base-key P′ is now introduced into the lock in the same manner. Then when the handle is turned, the tumbler-bolt is retired and disengaged from the tumblers, which are then moved outward by the bits of the key, which, after the tumblers have been so moved, shoots the main-bolt C into its unlocked position. Then when the handle is reversed, the key-stud will turn and with it the key, which will first shoot the main-bolt back into its locked position, and then permit the tumblers to return into their locked positions, after which the tumbler-bolt will be moved into position for locking them therein. Then the key-slot in the key-hub will be brought into line with the key-hole, from which the base-key will be ejected by the key-spring R, leaving the key-hole open, but all of the tumblers positively locked in their locked positions.

It will be clear that nothing can be learned regarding the character of the tumblers and the key required to open the lock by inserting a wire or other instrument into the lock through the key-hole, inasmuch as when the the key-hole is open, all of the tumblers are locked in their locked positions with their exposed edges in line, so that the leaving of the key-hole of the lock open, gives no opportunity for tampering with the lock. On the other hand when the tumblers are unlocked, the key-hole is closed, thus preventing access to the interior of the lock.

In carrying out my invention some changes in the construction shown and described may obviously be made. I would therefore have it understood that I do not limit myself to the said construction, but hold myself at liberty to make such alterations therein as fairly fall within the spirit and scope of my invention. I am aware, however, that it is old, broadly speaking, to provide for locking a tumbler in its locked position, or, in other words, in the position in which it locks the key-bolt in the projected position thereof, and I do not, therefore, claim that construction broadly.

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

1. In a lock, the combination with the tumblers thereof, of a tumbler-bolt for positively locking the same in their locked positions, means for closing the key-hole of the lock, and mechanism connecting the said means and tumbler-bolt, substantially as described, and whereby the tumblers are positively locked in their locked positions by the bolt when the key-hole is open, and the key-hole is closed when the tumblers are unlocked, substantially as described.

2. In a lock, the combination with the tumblers thereof, of a tumbler-bolt for positively locking the same in their locked positions, a key-hub having a key-slot, a housing for the said hub having a key-hole, mechanism for rotating the hub, and connection between the said bolt and mechanism, substantially as set forth, and whereby the tumblers are positively locked when the key-hole is open, and the key-hole is closed when they are unlocked.

3. In a lock, the combination with the tum-

blers thereof, of a tumbler-bolt for positively locking the same in their locked positions, a key-hub having a key slot, a housing for the said hub, having a key-hole, a rotary handle, and connection between the same and the bolt and key-hub, for the operation of the same in unison, substantially as set forth, and whereby the bolt is moved to positively lock the tumblers in their locked positions when the key-hole is opened, and the hub rotated to close the key-hole when the bolt is moved to unlock the tumblers.

4. In a lock, the combination with the tumblers thereof, of a tumbler-bolt for positively locking the same in their locked positions, a key-hub having a key-slot, a pinion mounted upon the said hub, a rotary handle, a pinion attached thereto and meshing into the pinion of the hub, and connection between the pinion carried by the handle and the bolt, substantially as described, whereby the bolt and key-hub are operated in unison for positively locking the tumblers when the key-hole is open, and closing the key-hole when the tumblers are unlocked.

5. In a lock, the combination with the tumblers thereof, of a tumbler-bolt for positively locking the same in their locked positions, a key-hub having its outer end enlarged, and having a key-slot, a housing having a key-hole and inclosing the enlarged outer end of the key-hub, mechanism for rotating the hub, and connection between the said bolt and mechanism, substantially as described, whereby the bolt and hub are operated in unison, and the tumblers positively locked in their locked positions when the key-hole is open, and the key-hole closed when the tumblers are unlocked.

6. In a lock, the combination with the tumblers thereof, of a tumbler-bolt for positively locking the same in their locked positions, a key-hub having a key-slot, a housing for the said hub, having a key-hole, mechanism for rotating the hub, connection between the said bolt and mechanism, and a spring located in the lock-case in position to be engaged by the inner end of a bowless key, which is introduced in its entirety into the housing from which it is ejected by the said spring, substantially as described.

7. In a lock, the combination with a bolt furnished with a stump, of tumblers slotted to receive the stump of the bolt, a tumbler-bolt superimposed upon the outer tumbler, so as to slide thereupon, located, in part, between the adjacent edge of the lock-case and the stump of the bolt, and provided with a locking-finger which extends inward between the said edge of the case and the outer edges of the tumblers, and means for operating the said tumbler-bolt, substantially as described.

8. In a lock, the combination with a bolt, of tumblers constructed to have their inner edges aligned when they are in their locked positions, a tumbler-bolt for positively locking the tumblers in their locked positions, a device for closing the key-hole of the lock, and connection between the tumbler-bolt and the said device for the operation of the same and the bolt in unison, substantially as described, and whereby the tumblers are positively locked in their locked positions with their inner edges in alignment when the key-hole is open, and the key-hole closed when they are unlocked.

9. The combination with a holder having a slide, of a bowless key adapted to enter the holder and to be ejected therefrom by the slide thereof, substantially as described.

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

JAMES ROCHE.

Witnesses:
P. J. PLUMB,
J. A. RUSSELL.