(Model.)

L. L. BATES.

LOCK.

No. 347,554. Patented Aug. 17, 1886.

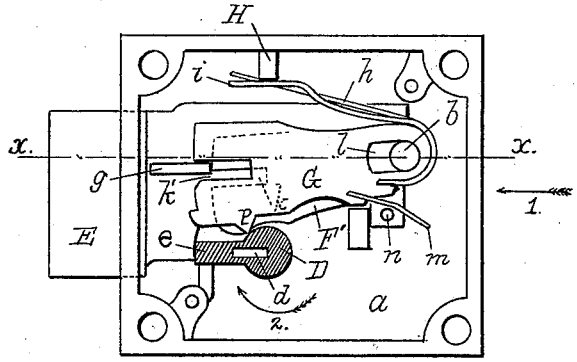


Fig. 2.

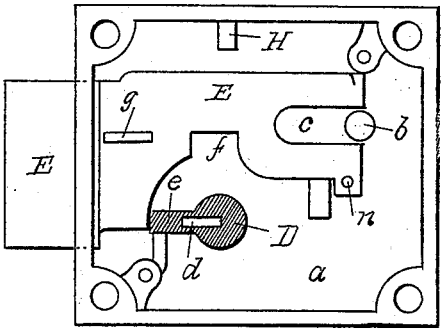


Fig. 1.

Fig. 3.
enlarged.

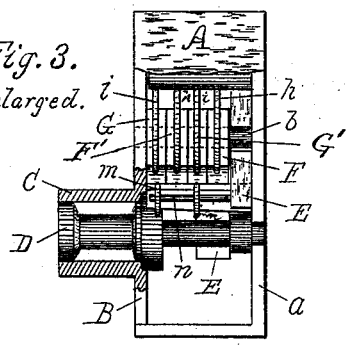
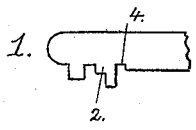


Fig. 7.



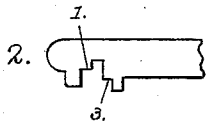


Fig. 8.

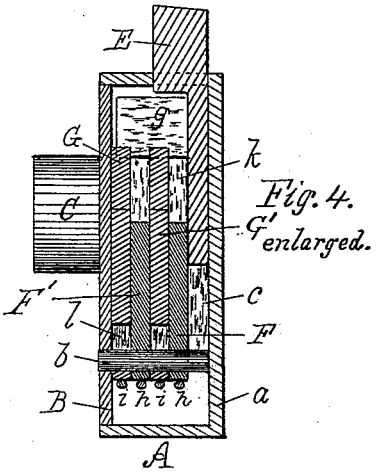


Fig. 4.
enlarged.

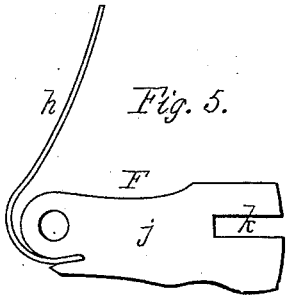


Fig. 5.

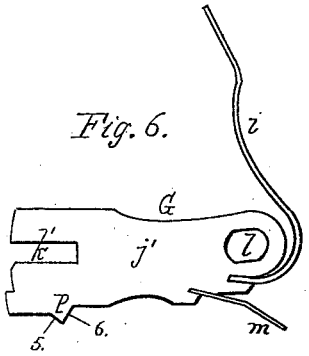


Fig. 6.

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UNITED STATES PATENT OFFICE.

LORING L. BATES, OF EVERETT, MASSACHUSETTS.

LOCK.

SPECIFICATION forming part of Letters Patent No. 347,554, dated August 17, 1886.

Application filed June 17, 1886. Serial No. 205,440. (Model.)

To all whom it may concern:

Be it known that I, LORING L. BATES, a citizen of the United States, residing at Everett, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Locks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of locks for drawers of safety-deposit vaults in which two keys of different forms are requisite to operate the lock, one of which is lodged in the hands of the custodian of the vaults and is used to partially operate the lock, the owner with the other key completing the operation and throwing the bolt to unlock and lock the drawer, in which the property of the owner is deposited. Furthermore, these keys are employed in connection with a single rotating hub, into which each may be introduced successively in order to actuate the bolt-locking mechanism, and thereby fully complete the operation and enable the bolt to be thrown in the act of unlocking and locking the drawer to which the lock is attached.

My improvemens relate more particularly to the invention as shown and described in Letters Patent No. 174,182, issued to myself on the 29th day of February, 1876; and it consists in the peculiar arrangement of the levers of the lock, by which the general construction is very much simplified. Furthermore, in the attachment to the series of levers having endwise movement of yielding fingers or springs, by which, upon partial movement of the bolt, with which they engage and which actuates said fingers and levers, the latter are brought positively into their extremes of movement; hence it is not necessary to shoot the bolt fully back, as heretofore required, in order to properly position said levers for further operation. Thus, in the event of the bolt being thrust hastily and not fully back, no derangement of the levers can occur, since, as before premised, only partial travel of the bolt operates said levers fully and completely, and upon relocking or advance of the bolt said levers are in proper position to act when so required.

In the drawings, Figure 1 represents a side elevation, with the cover and levers removed, of a lock embodying my invention. Fig. 2 is a similar view with the levers in place, showing their position after the insertion, rotation, and removal of key No. 1. Fig. 3 is an end elevation in direction of arrow 1 with part of the lock-case removed, while Fig. 4 is a horizontal section on line *x x*, Fig. 1. Figs. 5 and 6 are side elevations showing the special construction of the sets of levers used. Figs. 7 and 8 are the two keys required to operate the bolt and the bolt locking and latching mechanism.

In the above drawings, Figs. 3 and 4 are enlarged transversely, the width of the bits in the keys showing the true thickness of the levers.

In these drawings, A represents the lock-case, rectangular in shape, and with a cover, B, secured thereto. Cast integral upon said cover is the hub C, within which a key-hub, D, is disposed and turns. The bolt is shown at E as resting against the back *a* of the case A, and is guided and supported at its rear end by the stud *b*, which engages the slot *c*. This key-hub D is formed with a keyway or slot, *d*, longitudinally thereof, and is further provided with a bit, *e*, which engages the notch *f* in the bolt, and thus retracts or advances the latter, when the "fence" *g*, formed thereupon, can enter the slots in the levers—that is, when all said slots are axially aligned with each other.

F F′ G G′ in the drawings represent a series of spring-actuated levers disposed between the cover B and the bolt E, and in parallelism with the latter. Since these two sets of levers are somewhat differently constructed and operated I will term those marked F F′ "levers." This set or series have simply rocking movement upon the stud *b*, and are maintained by springs *h h*, normally resting upon the key-hub D. (See Fig. 2.) On the other hand, those of the series which are lettered G G′, I have designated as "tumblers," since they are

likewise pivoted upon the stud *b* and actuated by springs *i i*, but have rocking and reciprocating endwise movement. In the present instance I have shown only two levers of each kind; but these may be varied in number and in construction to suit the requirements of the lock.

I will now proceed to describe more specifically the levers F F'. These are similar, and shown in Fig. 5 as consisting of a thin metallic plate, *j*, provided with a slot, *k*, at its free end, while at the rear or pivot end it is furnished with a spring, *h*, bearing against a boss, H, within the lock-case. The shape of its lower side, which rests upon the key-hub D, is adapted to be engaged and wiped by the bit 1 on key No. 2. Now, the reciprocating levers or tumblers G G' are somewhat similarly constructed to the series F F'—that is, the body consists of a thin metallic plate, *j'*, slotted at its free end at *k'*; but at the rear end a longitudinally-shaped hole, *l*, secures it to the stud *b*, and permits of endwise reciprocations thereon. Furthermore, at this end are secured two oppositely-arranged springs. The upper one, *i*, serves to maintain the tumbler G down upon the key-hub, and is so shaped as to bear against the boss H, and yet not oppose the endwise movement or travel of the tumbler. The other and lower one, *m*, engages a pin, *n*, secured to and projecting at right angles from the bolt E. (See Fig. 3.) Thus it is evident that if the bolt is only partially shot back, still the yielding springs *m*, bearing against the pin *n*, impel the tumblers to their extreme retracted position, thus placing them in a proper attitude for the next movement, while the said springs, yielding as they do, easily permit the bolt to be thrown back to its full extent, as usual.

Hitherto it was necessary, in order to secure the proper retraction of the tumblers G G', that the bolt should be shot to its extreme (in an unlocked position) to compel the fence *g*, which was then engaged in the slots *k'*, to strike the ends thereof and drive the tumblers to their extreme retracted position. In the event of hasty and partial manipulation of the bolt trouble frequently occurred. These tumblers are actuated by the key No. 1 to bring their slots *k' k* axially together to engage the fence *g*, and this is attained as follows: Upon the under side of the tumblers are disposed V-teeth *p*, which engage the bits 2 4 on key No. 1. Thus as this key is turned forward said bits 2 4 wipe against the front faces, 5, of these teeth. Thus the tumblers are lifted upward, and then advanced forward by the bits 2 4 wiping against the rear faces, 6, of the teeth in the act of withdrawing key No. 1. By this means the tumblers are aligned and now rest upon the fence *g*, and are so maintained by their springs *i*. This position is shown in Fig. 2 with the levers F F' depressed, and the bolt is thus still prevented from being operated until the application of key No. 2.

The operation of this lock is as follows: Presuming that the bolt is in a locked position with all the levers depressed, their intact end portions bearing against the fence. Key No. 1 is now inserted in the keyway of the hub D and turned in the direction of arrow 2. The bits 2 4 now wipe against the teeth *p p* and lift the free ends of the tumblers G G'. The key is advanced until it passes the teeth *p p*, when it is then reversed. The bits 2 4 now engage the rear face, 6, of the teeth, and the tumblers are moved endwise, their slots *k' k'* being then in alignment with the fence *g*, into engagement with the latter, which is now held firmly within the slots. During this operation the levers F F', it will be observed, are inoperative, resting upon the key-hub D. The key No. 1 is now removed, and it is seen that the lock is only partially unfastened. Key No. 2 is now inserted and turned in the same direction, (see arrow 2,) while the bits 1 3 now wipe against and lift the levers F F' until their slots *k k* are aligned with the fence or locking-stud *g*. The movement of the key is continued, and the bolt is now shot back by aid of the bit *e*, the fence moving into said slots *k k*, since the movement of the key No. 1 had previously aligned the slots *k' k'* corresponding thereto upon the fence *g*. Simultaneously with the movement of the bolt the pin *n* engages the fingers or springs *m m*, secured to the tumblers, and the latter are thrown to their extreme limit, opposite that shown in Fig. 2 of the drawings. When the bolt is shot to its extreme limit in the act of unlocking a drawer, no further movement of the tumblers occurs, but the springs *m* simply yield without opposing the bolt. In the event of locking the drawer, key No. 2 is now reversed in its rotation, and the key-hub D and bit *e* advance the bolt outwardly, while the fence *g* is first disengaged from the tumblers G G', which drop down, impelled by their springs *i i*. Further and complete advance of the bolt E permits the levers F F' to leave the fence *g*, and they likewise drop, when the lock is securely fastened, and both keys must be again successively introduced, and the same movements repeated in order to unlock the drawer to which this lock may be attached.

I claim—

1. The lock-case A, key-hub D, and bolt E, operated thereby, in combination with the series of rocking-levers F F' and tumblers G G', the latter to receive endwise movement on retreat of the bolt by means of a yielding device which engages the latter, substantially for the purposes herein described.

2. In a lock in which the bolt and the mechanism for locking the same are operated by two keys through one and the same hub, the levers F F' and the reciprocating tumblers G

G′, composed of the plate *j′*, slots *l k′*, springs *i m*, and the tooth *p*, in combination with the bolt E, its fence *g*, pin *n*, keys 1 2, and key-hub D, all operating substantially as set forth and stated.

3. In a lock in which the bolt and the locking mechanism are operated by two keys through one and the same hub, the combination, with the bolt E, its fence *g*, and pin *n*, the key 1, key-hub D, and bit *e*, of the reciprocating spring actuated tumblers G G′, adapted to lift and engage with the fence *g* by partial rotation of key 1, substantially as stated.

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

LORING L. BATES.

Witnesses:
F. CURTIS,
H. E. LODGE.