2 Sheets—Sheet 1.

F. McDUFFEE.

COMBINED TIME AND COMBINATION LOCK.

No. 178,940. Patented June 20, 1876.

Fig. 1.

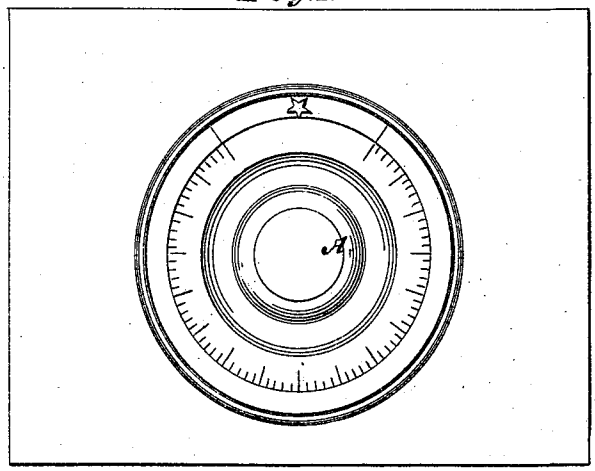


Fig. 2.

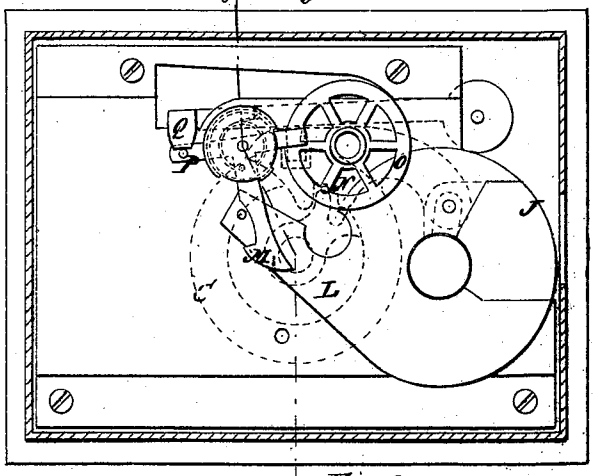
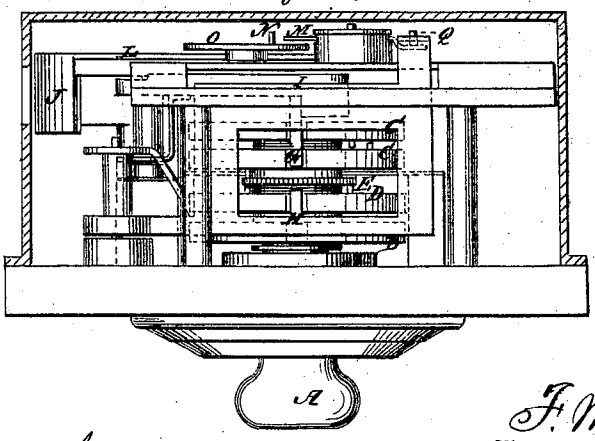


Fig. 3.



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2 Sheets—Sheet 2.

F. McDUFFEE.

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Fig. 4.

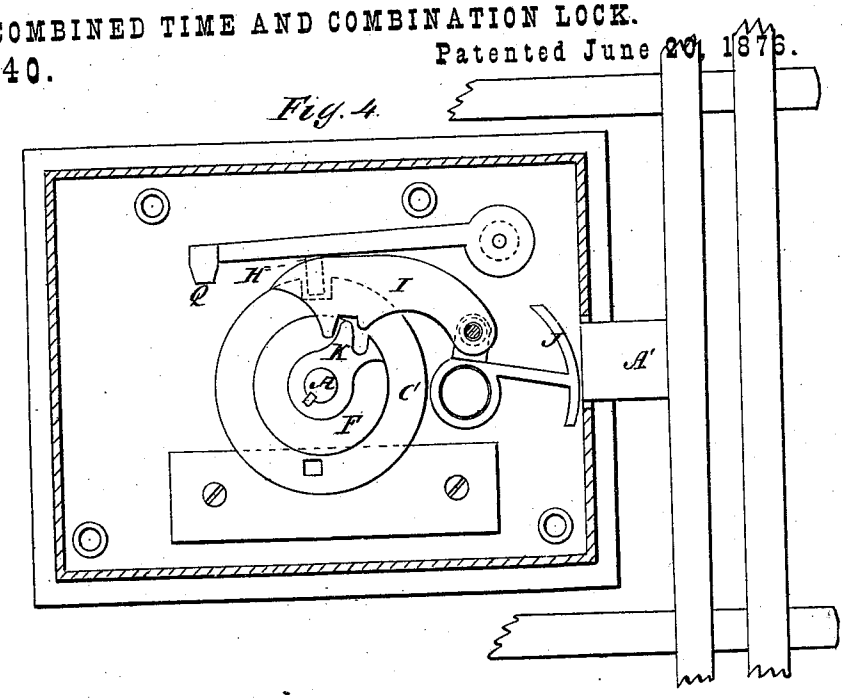
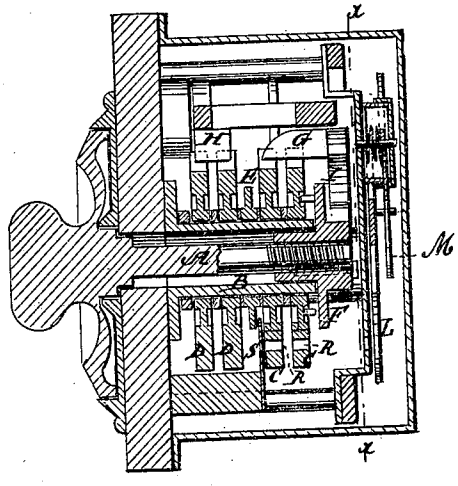


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANKLIN McDUFFEE, OF ROCHESTER, NEW HAMPSHIRE.

IMPROVEMENT IN COMBINED TIME AND COMBINATION LOCKS.

Specification forming part of Letters Patent No. **178,940**, dated June 20, 1876; application filed August 14, 1875.

To all whom it may concern:

Be it known that I, FRANKLIN McDUFFEE, of Rochester, in the county of Strafford, and State of New Hampshire, have invented a new and useful Improvement in Combination and Chronometer Locks, of which the following is a specification:

The object of this improvement, when applied to chronometer-locks, is to remove the following objection: the liability of the officers of a bank to be themselves locked out by the stopping of the clock-work.

The employment of two distinct sets of clock-work as now in use, while they diminish the chances of a lock-out, they do not insure against it. By this improvement only one clock-work will be necessary, as, if this stops from any cause, the lock can still be opened, not by the cashier alone, but by the presence of several persons.

By the chronometer-locks now in general use no entrance can be made to the safe except at certain hours, however imperative the necessity, (as, for instance, an approaching fire.) This objection is completely obviated, as, by this invention, the proper persons arriving can open the lock at any time without waiting for the action of the clock-work to release the bolt.

The object of the improvement, as applied to the common combination-lock, is to contrive double combinations, which one person alone cannot unlock, making it necessary for burglars who attempt to force officers to unlock for them to assemble too many persons for safety. The invention is applied, in this example, to the Sargent combination-lock, with a circular bolt, but can be applied to any other form of bolt now in use. Among the advantages is this, that it requires no separate dial, no additional holes through the door, but makes use of the same dial, tumblers, &c., which are used in most locks now.

The objects of the invention are secured by the following method: The tumblers, all on the same spindle and operated by one dial, are so arranged that they can be locked on two separate combinations set by two individuals, each person being ignorant of the combinations, except his own. For instance, suppose the president and cashier of a bank are the persons intrusted with these combinations. The cashier can set his own part of the lock without the presence of the president, and he can always unlock the lock at such hours as the clock-work permits, and at no other, and can do so without the presence of the president. He cannot be compelled to open the safe, as he cannot open it alone until the proper hour arrives; yet after that hour he can open without help. This may be done for years without calling on the president. But should the clock-work stop at any time, or should it become necessary to enter the safe at any unseasonable hour, the cashier has only to summon the president, who, using his combination in conjunction with that of the cashier, can open the lock. Neither can open at such time alone.

The essential features of the invention are: Two latches opening on two divisions of one set of tumblers on the same spindle; the method of releasing the bolt from a hook by means of a latch and tumblers; the method of setting a portion of the tumblers on a spindle with others, without disturbing the others. This is secured by inserting a plate between the tumblers, into which the end of the setting-key fits without passing through all.

As an improvement to the common combination-locks, taking out all the clock-works, the hook being left, and the pin which secures the bolt or gate in those locks which use a gate instead of a bolt, a lock is secured which the cashier can never open alone, as he locks himself out by means of the hook when he turns the bolt, and cannot unlock till the party arrives having the other combination. He cannot, therefore, be compelled to unlock by burglars. There are only four tumblers represented in the example. More could be added, thereby increasing the number of combinations and the number of persons necessary to be present to open the lock.

Figure 1 is a front elevation of my improved lock. Fig. 2 is an elevation of the inside, the case being sectioned. Fig. 3 is a top view of the lock and horizontal section of the case.

Fig. 4 is a sectional elevation taken on the line *x x* of Fig. 5. Fig. 5 is a transverse sectional elevation taken on line *y y* of Fig. 2.

Similar letters of reference indicate corresponding parts.

A is the spindle; B, the stationary tube, on which the tumblers turn; C, one division, and D the other division, of the set of tumblers; E, the disk on the spindle for separating the two divisions of tumblers; F, the driving-wheel for turning the tumblers; G, the latch to tumblers C; H, the latch to tumblers D; I, the lever for releasing the bolt J, said lever being connected to the latch G. K is a dog on the spindle for working the bolt-lever I; L, the arm on the bolt for being engaged by the hook M to be released by the pin N on wheel O of the chronometer movement to allow the bolt to be turned by dog K, and lever I. P is an arm on the hook M with a pin attached, on which the latch H acts through its stud Q to detach the hook M from the arm L before the release of it by the chronometer-movement in case of need, or in case the chronometer-movement is not used. This latch H and the tumblers D are supposed to be under the control of the president of the bank, who holds the combination to be used only when the lock is to be opened out of the time for which the chronometer-movement is set; or, when the chronometer-movement is not used, to be used in connection with the cashier's combinations, so that one person cannot alone be compelled to open the lock. R represents holes in the rims of the tumblers C, for setting them by a key extending through them into a plate, S, so that the rims will remain at rest while the other combination is used alone. My invention can also be applied to locks using a gate, instead of a bolt.

The tumblers C thus consist of a disk revolving within a rim. When the setting-key is inserted in the square holes R, and turned one-quarter round, it loosens the rim and leaves the inner disk free to rotate, while the rim itself is held stationary by the key. Each inner disk has a pin which, in turning, comes against a similar pin in the next tumbler, and sets its disk in motion. When the rim is not loosened by the inserted key the pins move rim and disk together. Between the pairs of tumblers is a disk, E, which is simply the inner disk of a tumbler without the rim, and has pins like the other disks for the purpose of communicating motion from one pair of tumblers to the other. The setting-key is inserted through the rims, with its end supported in the plate S to steady it, the key being turned one-quarter revolution, so as to loosen the rim from the disk, when the knob of the lock can be freely turned in either direction. Thus the disks are made to revolve, while the rims remain stationary.

In Fig. 4 of the drawings the lock-bolt and door-bolts are shown in the locked position, the lock-bolt closing the opening in the lock-case, so that the tongue A′ of the door-bolts cannot enter the lock and permit the retraction of the door-bolts.

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

1. The combination of two independent latches with two divisions of a set of tumblers arranged on the same spindle, substantially as specified.

2. The combination of the revolving disk E with two divisions of a set of tumblers on the same shaft, substantially as specified.

3. The combination of tumblers D and a latch, H, with a chronometer-movement, hook M, latch G, and tumblers C, of a lock, substantially as specified.

4. The combination of the two divisions of tumblers C D, latches G H, hook M, and the arm L of the bolt, substantially as specified.

5. In a lock having two divisions of tumblers and latches, one of said divisions having holes R for a setting-key in combination with a holding-plate, S, for the key, substantially as specified.

FRANKLIN McDUFFEE.

Witnesses:
FRANK S. BROWN,
GEORGE McDUFFEE.