E. STOCKWELL.

COMBINED TIME AND COMBINATION LOCK.

No. 182,868. Patented Oct. 3, 1876.

Fig 1

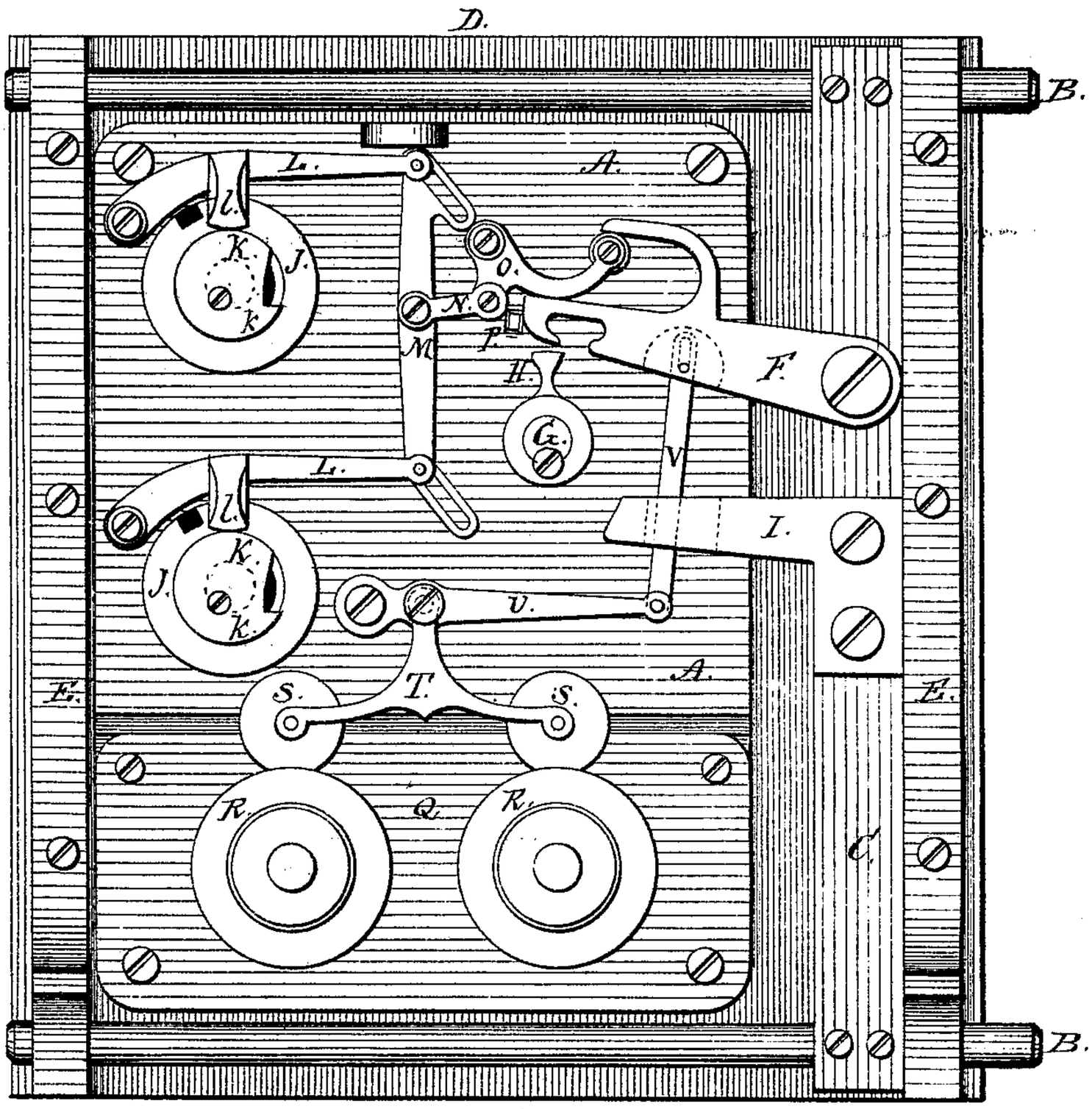
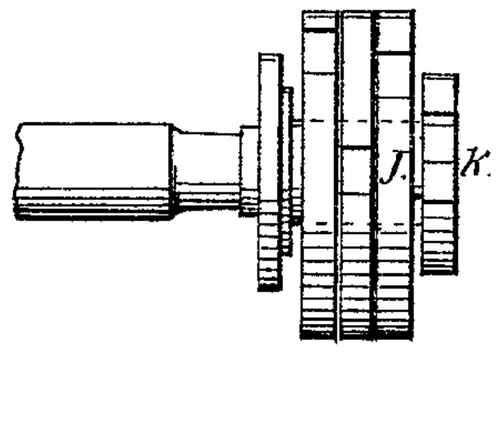
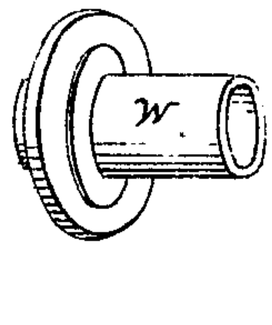


Fig. 3

Fig. 2.





WITNESSES

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EMORY STOCKWELL, OF STAMFORD, CONNECTICUT, ASSIGNOR TO THE YALE LOCK MANUFACTURING COMPANY, OF SAME PLACE.

IMPROVEMENT IN COMBINED TIME AND COMBINATION LOCKS.

Specification forming part of Letters Patent No. **182,868**, dated October 3, 1876; application filed March 3, 1876.

To all whom it may concern:

Be it known that I, EMORY STOCKWELL, of Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Chronometric and other Locking Mechanism, of which the following is a specification:

My invention comprises a novel combination of devices for securing the doors of safes and vaults, so that when locked all communication is severed between the spindle for operating the bolt-work and such bolt-work.

Referring to the accompanying drawings, Figure 1 is an elevation, showing the inside of a safe-door with my inventions applied to it. Fig. 2 is a perspective view of the tubular stump or bearing of the permutation-tumblers. Fig. 3 is a view of the tumblers on their bearing, and of a section of the spindle entering the bearing.

The several parts are represented by letters, as follows, namely: A, case of lock; B B, bolts of door; C, connecting-piece or string-bar; D, door of safe; E E, frames, through which the bolts slide; F, connection for uniting spindle to bolt-work; G, operating shaft or spindle, passing through door; H, cam of latter for engaging with connection F; I, spur on bolt-work, on which cam H acts, &c.; J J, two sets of ordinary permutation wheels or tumblers of combination-locks; K K, shafts for operating and setting latter; L L, fence-levers or dogs resting on tumblers; M, coupling-yoke, uniting levers L L; N, link, uniting yoke M and crank O; O, bell-crank, acting on connection F; P, stump, against which connection F is stopped when locked; Q, a time mechanism; R R, operating dials of time mechanism, each operated by independent movement; S S, rollers, traveling on dials; T, yoke, carrying rollers and pivoted to U; U, lever; V, support; W, tubular stump or bearing.

The construction and operation of the lock are substantially as follows: The main bolts B B are attached to the safe-door, and guided in the usual manner. They are united by the string-bar C, and pivoted to this is the connection F for uniting the bolt-work to its operating spindle G, which passes through the door, and is operated by a T-handle on the outside thereof. The inner end of the spindle G carries a cam, H, which, when the connection F is dropped, engages with its talon and enables the bolt-work to be operated. The spur I is rigidly secured to the bolt-work, and its purpose is to enable the cam H, by acting upon it, to liberate the connection F from contact with the stump P, which might, perhaps, prevent the falling of the connection F by gravity, in the event of the bolt-work being forced backward, so as to cause close contact between the end of the connection F and the stump P. J J are two sets of permutation wheels or tumblers, such as are used in ordinary combination-locks, each of them operated by its spindle K, which passes through the door, and has attached to its outer end the ordinary graduated dial, whereby the wheels may be set to their respective combinations.

The inner ends of the spindles K K are provided with cams *k k*, by which, when the permutation-tumblers are properly set, the fence-levers or dogs L L may be allowed to fall for the purpose of unlocking, and may be raised again for the purpose of locking. The outer ends of the levers L L carry pins, engaging diagonal slots in a vertical coupling-yoke, M, and this, in turn, is connected at its center with a link, N, the other end of which is attached to one arm of the bell-crank O. The other arm of the bell-crank O is provided with a roller, which acts upon a suitable jaw on the connection F, and, assuming the lock to be in the locked position, as shown on the drawing, the unlocking of either of the two sets of permutation-wheels would allow its fence-lever L to fall, and that, in so doing, the outer end of this lever, acting in the diagonal slot of the coupling-yoke M, would draw the latter backward toward the left, and that this motion of the yoke M would be imparted through the link N to the bell-crank O, the motion of which latter would permit the inner or free end of the connection F to fall, provided there were no other impediments to prevent its so doing.

It will be seen, however, in the drawing, that the falling of the connection F is pre-

vented by the direct support V, which is supported by the lever U, and which latter is in turn supported by the yoke T, the ends of which carry the rollers S S, which are supported by the operating dials R R of the time mechanism. Q represents a time mechanism, for this purpose, such as is shown in my patent of September 21, 1875, and the several parts S, T, and U, just alluded to, are substantially the same as shown and described in the said patent.

In the drawing the time mechanism and these parts are represented in the locked position, and acting through the support V. They then support the connection F, and prevent its falling, even though the combination-wheels J J should be unlocked. If, however, these latter are unlocked, and at the same time or subsequently one or both of the dials R R should be rotated so as to permit the yoke T to fall, the motion of the latter, acting through the lever U, would lower the support V, the upper end of which is slotted, and thus entirely release the connection F, and permit its inner or free end to fall.

As shown in the drawings, the inner end of the connection F is in the locked position, and is raised beyond the reach of the cam H on the operating-spindle G, which latter can rotate freely without engaging with the connection F. If, however, the connection F is allowed to fall through the concurrent unlocking action of either or both of the combination-wheels J J, and either or both of the operating dials R R of the time mechanism, its inner end will then come within reach of the cam H, which will engage in the talon provided for it in the connection F, and a connection will thus be formed between the spindle G and the bolt-work C B, by which the latter can be locked and unlocked from the outside of the door through the spindle G.

As my invention is intended to be used, its action will be as follows: The door being closed, while the bolt-work is in the unlocked position, the latter will be thrown forward, thus bolting the door, and the two sets of combination-wheels, if they were both unlocked, would then be locked, thus raising the connection F out of reach of the cam H, and preventing the unlocking of the door until one or more of the sets of combination-wheels should again be unlocked. Prior to closing the door, however, the time mechanism would be wound and put in motion, and set, so that by the rotation of the operating-dials R R, as fully explained in my patent of September 21, 1875, the yoke T would be raised to its locked position at a period of time subsequent to the closing of the door. The lifting of the yoke T would raise the lever U, and this in turn would raise the support V to the position shown in the drawing, in which position its slotted end engages with a pin in the connection F, so as to support the latter independently of the bell-crank O.

It will thus be seen that when both sets of the combination-wheels and the time mechanism are locked, the connection F is supported simultaneously by the bell-crank O, and the support V, so that it cannot fall until both of these devices are moved, so as to permit its falling, and the bolt-work is thus disconnected from its operating-spindle G, and protected from any external application of force by both of these devices.

The dials R R, as explained in my patent of September 21, 1875, are provided with devices by which the hours of locking and unlocking may be regulated at will, and these having been properly set prior to the time of closing the door, the continued rotation of these dials will, at a predeterminate hour, permit the yoke T to again fall, and, acting through the lever U, it will thus drop the support V into such position as to release the connection F, and permit of its falling, so far as the time mechanism is concerned. All that is now needed to enable the bolts to be operated is to unlock either set of the combination-wheels J J, thus retracting the bell-crank O, and permitting the connection F to fall, and again come within reach of the cam H on the operating-spindle G.

It will be seen that the stumps on which the two sets of permutation-tumblers J J are carried, are not an integral part of the case of my improved locking mechanism, but consist of separate pieces set into said case. The object of this arrangement is to protect the time-movements and other mechanism of the lock from derangement and injury in the event of the shafts or spindles K K being driven through the safe-door in an attempt to force the lock.

By the use of two sets of permutation-wheels, J J, I guard against the accidental derangement of a single set and the difficulties arising therefrom; and by the use of two independent time mechanisms, each having its own operating dial, I guard against the danger arising from an accidental stoppage of a single time mechanism.

It will be seen that there is really no bolt in the whole apparatus covered by my invention, and that the function of the two sets of permutation-wheels is simply to connect and disconnect the bolt-work of the door and its operating spindle which passes through the door, the time mechanism enabling the duration of this connection to be predetermined and arranged at will prior to the closing of the door.

Locks have been heretofore constructed so that the bolt-work of a safe-door could be guarded by the ordinary combination-lock, and that the unlocking of the latter could be prevented by suitable time mechanism, until the arrival of a predeterminate time.

Another plan in use consists of combining, with the bolt-work of a safe-door, a combination or key lock, and a time-lock, each acting independently on such bolt-work. In both of

these cases a rigid connection is maintained between the bolt-work of the door and its operating spindle, so that pressure or violence can be at all times applied through the latter to the former.

Bolt-work and spindles have been heretofore made, which, by the locking of the combination-lock, or by other devices, were detached from connection with the bolt-work of the door, thus guarding against the difficulty just alluded to; but these devices were dependent for their proper operation upon the security or strength of a combination-lock, or its equivalent. In the present invention, however, the breaking of the connection between the bolt-work of the door and its operating-spindle is controlled, not only by a combination-lock, but also by time mechanism, so that by means of the latter a disconnection can be maintained at will, and in spite of any resort to violence, until the arrival of a predeterminate time.

It will thus be seen that I accomplish new and desirable results by my invention. In all previous modes of construction, as above explained, even where provision was made for severing the connection between the bolt-work and its operating spindle, the breaking of this connection was accomplished by means of devices operated outside of the door by means of a spindle or other connection passing through the door; and while I prefer to avail myself of this arrangement, the chief merit of my invention consists in adding thereto a time mechanism, so constructed as to automatically break the connection between the bolt-work and its operating spindle by devices operated by such time mechanism, and wholly inaccessible and uncontrollable from the exterior of the door when closed.

By means of my invention the security of both the combination-lock and of a time-lock is combined to protect the bolt-work of the safe door against unauthorized opening; at the same time the time mechanism is removed absolutely beyond the reach of violence from the exterior of the door, and the bolt-work of the door is itself guarded against the application of any violence through its operating spindle.

I do not confine myself to the specific details of construction here shown, as in some respects it will be obvious to those skilled in the art that modifications of such details may be made without departing from the spirit of my invention. I do not, however, claim the combination of a time-lock, a non time-lock, and the bolt-work of a safe-door, the two locks so applied as to be capable of being used independently or in conjunction to dog the bolt-work.

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

1. The combination of the bolt-work, the spindle for operating the same, one or more time mechanisms, and suitable connecting mechanism operated by the time mechanism, whereby the spindle and bolt-work may be automatically connected and disconnected, substantially as hereinbefore set forth.

2. The combination, with the bolt-work, of a safe-door, and with its operating spindle passing through such door, of two independent sets of permutation wheels or tumblers, relatively so constructed and combined by means of suitable intermediate connecting mechanism as that, by the concurrent locking of both said sets of tumblers the connection between said bolt-work and said spindle may be severed, and that, by the unlocking of either or both of said sets of permutation-tumblers the connection may be restored between said bolt-work and said spindle.

3. In combination with the bolt-work of a safe-door and with its operating spindle passing through such door, one or more sets of permutation wheels or tumblers, and one or more time mechanisms provided with suitable connecting devices, whereby the connection between said bolt-work and said spindle is controlled at will by either or all of said sets of permutation-tumblers, or by either or all of said time mechanisms.

4. In combination with the bolt-work of a safe-door, and with the operating-spindle thereof passing through such door, and a movable connection for connecting the bolt-work and spindle, a support, V, or its equivalent, operated through suitable connecting devices by one or more time mechanisms.

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Witnesses:

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