C. E. CHINNOCK.

Electro-Magnetic Time-Locks.

No. 197,826. Patented Dec. 4, 1877.

Fig. 2.

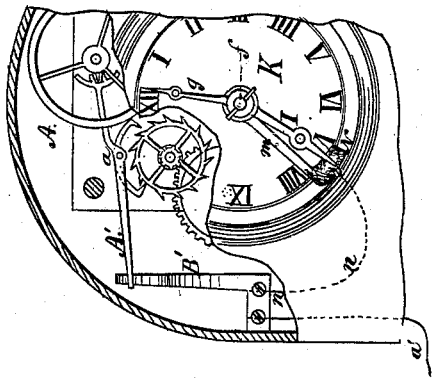
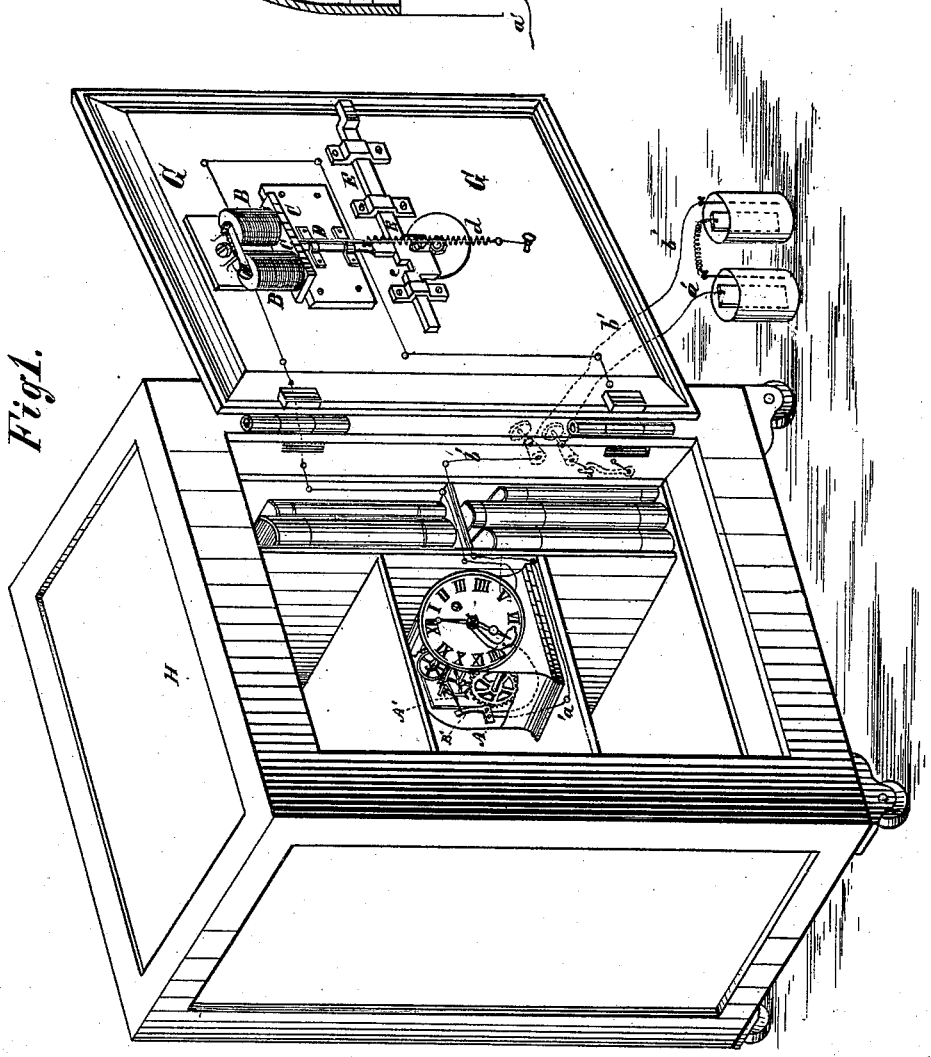


Fig. 1.



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CHARLES E. CHINNOCK, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN ELECTRO-MAGNETIC TIME-LOCKS.

Specification forming part of Letters Patent No. **197,826**, dated December 4, 1877; application filed April 20, 1876.

To all whom it may concern:

Be it known that I, CHARLES E. CHINNOCK, of Brooklyn, in the county of Kings and State of New York, have invented a certain Improvement in Time-Locks, of which the following is a specification:

In time-locks for vaults, safes, &c., hitherto made, the time-piece actuating the lock has ordinarily been placed upon the door or door-frame of the vault or safe, and in such position has been liable to derangement and stoppage from blows and jarring inflicted upon the said door or door-frame, and the result has been that such time-pieces have frequently stopped, thereby retaining the time-locking devices in position to hold the ordinary safe-locks closed against all efforts to open the same by ordinary or normal means. This, of course, necessitates the forcing of the vault or safe door in order to get access to its interior.

The principal object of my invention is to obviate this drawback to the practical and inexpensive use of time-locks; and to this end it comprises in a time-lock mechanism for vaults, safes, &c., an actuating time-piece, entirely disconnected and separate from the door or door-frame, in combination with a locking-stop operated through an electric circuit by said time-piece, and provided in suitable connection with the bolt of an ordinary vault or safe lock to restrain the movement of said bolt, except at set times, at which the time-piece is arranged to close the electric circuit in order to move or operate the aforesaid stop, by which means the time-piece is secured from disarrangement or injury, in spite of any violence that may be exerted upon the door or door-frame, at the same time that provision is made for securing the requisite movement of the locking-stop.

The invention further comprises the combination, with the actuating-piece disconnected from the vault, door, or door-frame, and the locking-stop, arranged in suitable relation with the vault or safe lock, of electric-circuit wires and electro-magnets, whereby the closing of the circuit through the aforesaid wires, by the time-piece at said times, is caused to withdraw the locking-stop to permit the normal operation of the lock.

The invention further comprises, in the actuating time-piece, connected with the locking-stop by the electric circuit and electro-magnets, as aforesaid, a circuit breaker and closer, actuated by the time-piece with such rapidity that in the normal operation of the time-piece the circuit is not closed for a sufficient length of time to permit the electro-magnets to withdraw the locking-stop from the lock, as hereinbefore indicated; but when for any reason, as, for example, the running down of the time-piece, the movement of the said time-piece ceases, the breaker and closer will close the circuit continuously, thereby causing the locking-stop to be withdrawn, irrespective of the time for which it was originally set, by which means the stoppage of the time-piece, instead of disabling the entire lock and rendering necessary the breaking open of the vault or safe, simply leaves the ordinary lock without the assistance of the locking-stop, so that the vault or safe may be readily opened by the ordinary means.

The invention further comprises a novel combination, with the dial-plate and hour-hand of the actuating time-piece, of an adjustable circuit-closer, whereby the time-piece may be set to actuate the locking-stop through the electric circuit and the electro-magnets at any set or desired time.

Figure 1 is a perspective view, representing a safe fitted with a time-lock apparatus made according to my invention. Fig. 2 is a detached view, on an enlarged scale, of one portion of said apparatus.

A is the actuating time-piece, which, except in the respects hereinafter specifically set forth, may be of any ordinary or suitable construction for the purpose. Attached to the escapement *a* of this time-piece is a lever, A′, which receives a rapid rocking movement from the normal movement of the escapement. B′ is a metallic bar, made slightly elastic, and of such shape that the vibrating lever A′ momentarily touches the said bar at each vibration. One of the wires, *a′*, of an electric circuit connects with the bar B′, while the other wire, *b′*, connects, through the time-piece, with the vibrating lever A′; consequently the contact of the said lever with the bar B′ produces a momentary closing of the circuit, and it is plain that, should the lever A′ from the stop-

page of the time-piece, be allowed to rest continuously upon the bar B′, the circuit through the wires *a′ b′* would be continuously closed, the purpose of which, when such occurs, will hereinafter appear. The circuit-wires *a′ b′* pass in the usual manner around the electro-magnets B. The armature of these magnets is shown at C. Extending downward from this armature is a locking-stop, D. E is the sliding bolt of an ordinary vault or safe lock, which, being well known, requires no special description here. In this bolt is a rectangular notch or recess, *c*, coincident in shape and size with the lower end of the locking-stop D. When the bolt E is shot to its place in locking the door G of the vault or safe H, the locking-stop D falls with its lower end into the notch *c*, and so long as it remains in said notch prevents any retraction or withdrawal of the bolt E by the safe being thus locked, not only against the normal means of opening the same, but against lock-picks and other extraordinary appliances, applied by burglars and others for illicit purposes. When the electric circuit is closed through the wires *a′* and *b′* the electro-magnets B, by leaving the armature *c*, withdraw the locking-stop D from the notch *c* in the bolt E, thereby enabling the latter to be withdrawn by the usual key or combination, as the case may be.

It will be particularly observed that the time-piece A is wholly and entirely disconnected, except by the circuit-wires, from the door of the safe, and also from the door-frame, being, for example, placed either within the safe apart from such door or door-frame, or in any other locality totally distinct from such door or door-frame. By this means violence exerted upon the front of the safe is rendered harmless, so far as concerns its effect upon the working of the time-piece. It is, of course, to be understood, that the electro-magnets B, the armature C, locking-stop D, bolt E, and other adjuncts are placed upon the inner side of the door G. In order to render more quick and certain the descent of the locking-stop D into the notch *c* of the bolt E, the spring *d* is so attached to the locking-stop D as to assist the weight of the said stop in insuring the quick descent of the same. I is the hour-hand of the time-piece A. K is the dial-plate thereof, and *f* indicates the axis of motion both of the hour and of the minute hands of the time-piece.

The minute-hand *g* should be placed farther out from the face of the dial than the hour-hand, in order that it may not come in contact with the adjustable circuit-closer N. This circuit-closer consists of a piece of metal pivoted, by an arm, *m*, at the axis *f* of the dial-plate; and said circuit-closer N is, moreover, connected, by a wire, *n*, with the metallic bar B′. Consequently, when the hour-hand I, by its continued revolution, is brought upon and in contact with the circuit-closer N, (the hour-hand being connected, through the works of the time-piece, with the circuit-wire *b′*,) the circuit is closed, and the electro-magnets B, lifting the armature C, raise the locking-stop D out of the recess *c* in the bolt E, thereby permitting the latter to be worked by the key or combination, as hereinbefore explained.

By adjusting the circuit-closer N at any desired hour indicated at the dial, the time of contact of the hour-hand with the said circuit-closer may be set or definitely arranged beforehand, the said circuit-closer being adjustable around the entire circumference of the dial by reason of its being pivoted at the axis of the said dial. The circuit-closer N is held at any point of said circumference by being pressed against the dial through the elasticity of the arm *m*. When preferred, any suitable means of positively fixing or securing the said circuit-closer N at any desired hour indicated on the dial may be adopted.

The circuit-closer being adjusted at the desired hour indicated on the dial, the door is closed, the bolt E is shot to its place in the usual manner, the locking-stop D descends into the notch *c* in the aforesaid bolt E, and holds the same against withdrawal, as hereinbefore fully explained. This continues until the hour-hand I comes in contact with the circuit-closer N, whereupon the locking-stop is lifted and the bolt E released, as also hereinbefore fully set forth.

In case of the running down of the time-piece, or a stoppage from other causes, the cessation of movement on account of the escapement A will cause the lever A′ to rest upon the bar B′, thereby continuously closing the circuit and effecting the lifting of the locking-stop D from the bolt E, irrespective of the time originally set, the mischief arising from the stoppage of the time-piece being thus limited to the removal of the additional security given to the bolt E by means of the time-lock apparatus, the lock proper of the vault or safe being left in its original integrity, and capable of being opened by the usual or normal means.

It is, of course, to be understood that any other suitable mechanism may be substituted in the time-piece for the locking vibrating lever A′ and the bar B′ which will operate in the same way—that is to say, which, in the running of the time-piece, will open and close the circuit so rapidly as not to effect the armature C and the locking-stop D attached thereto, but which, in case of the stoppage of the time-piece, will provide a continuous closing of the circuit to insure the lifting of the locking-stop, as hereinbefore explained.

What I claim as my invention is—

1. In a time-lock mechanism for vaults, safes, &c., an actuating time-piece wholly disconnected and separate from the door or door-frame of the vault or safe, in combination with an electric circuit connecting the same with the locking-stop D, arranged to lock the bolt E of an ordinary or suitable vault or safe lock, substantially as and for the purpose herein set forth.

2. In a time-lock mechanism, the circuit-

wires a' and b' and the electro-magnets B, in combination with the time-piece A, entirely disconnected and detached from the door or door-frame of the vault or safe, and the locking-stop D, provided to lock the bolt E of an ordinary or suitable vault or safe lock, the whole constructed, combined, and arranged substantially as and for the purpose herein set forth.

3. In a time-lock mechanism, the combination, with the time-piece A, circuit-wires a' b', and the locking-stop D, arranged to lock the bolt E, of the vault or safe lock of a circuit closer and breaker, operating with such rapidity in the running of the time-piece that the closing of the circuit shall not be of sufficient duration to operate the locking-stop, but which, in the event of the stoppage of the time-piece, shall continuously close the circuit to operate the said locking-stop, substantially as herein set forth.

4. The adjustable circuit-closer N, in combination with the dial-plate I of actuating time-piece A, wholly disconnected and detached from the door, the electric-circuit wires, the electro-magnets, the locking-stop, and the bolt E, the whole constructed, combined, and arranged substantially as and for the purpose herein set forth.

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