(No Model.) 2 Sheets—Sheet 1.

F. SEDGWICK.

ELECTRIC SAFE LOCK AND BOLT MOVING MECHANISM.

No. 347,071. Patented Aug. 10, 1886.

Fig. 1.

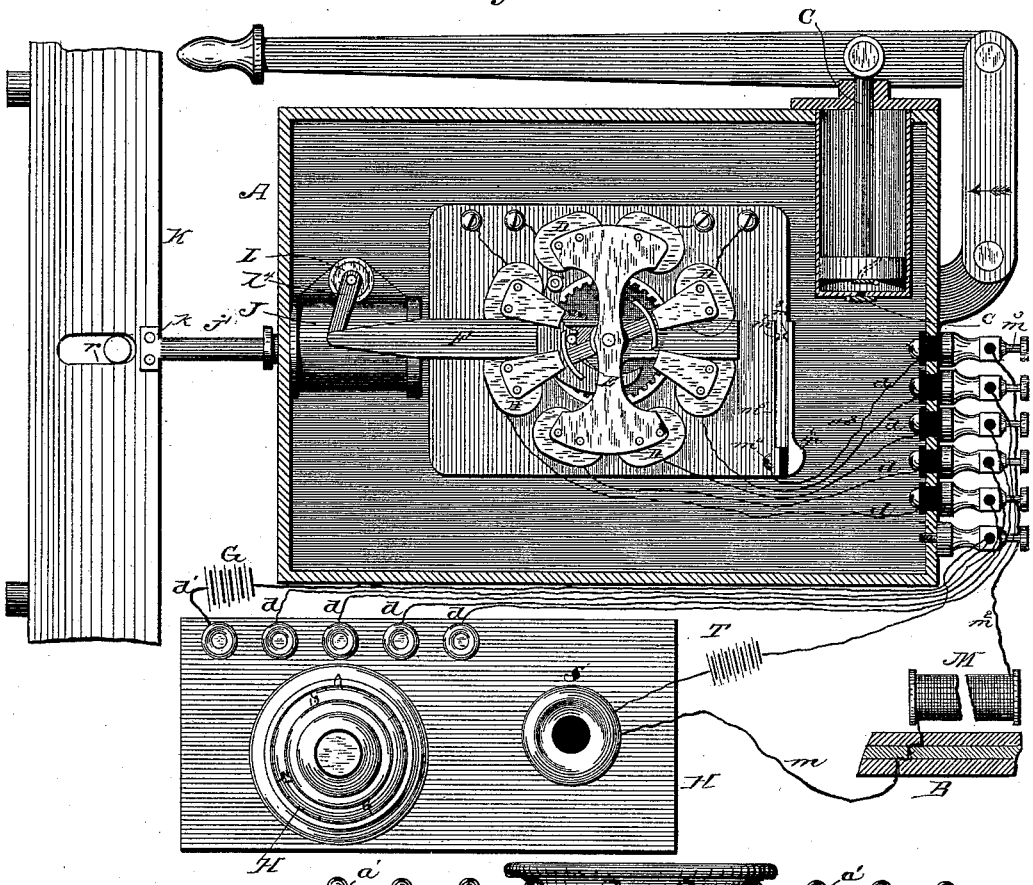
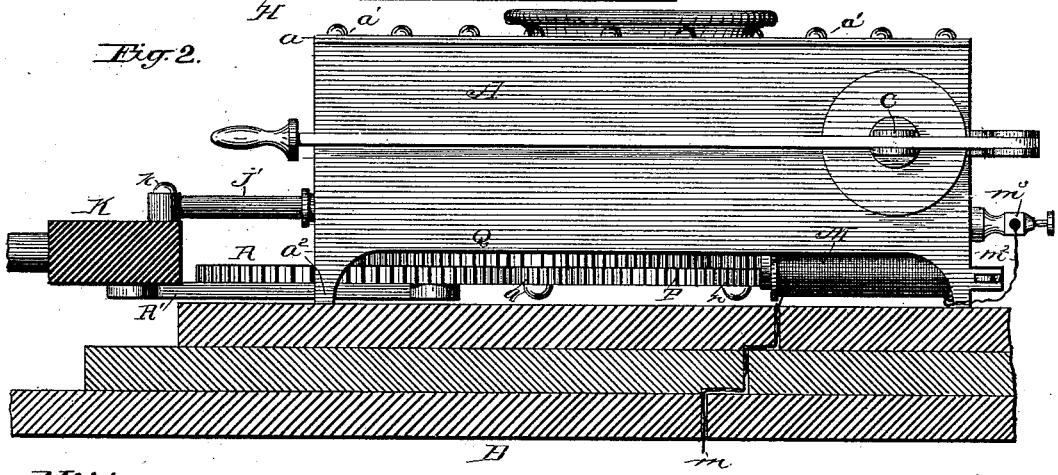


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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ELECTRIC SAFE LOCK AND BOLT MOVING MECHANISM.

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Fig. 3.

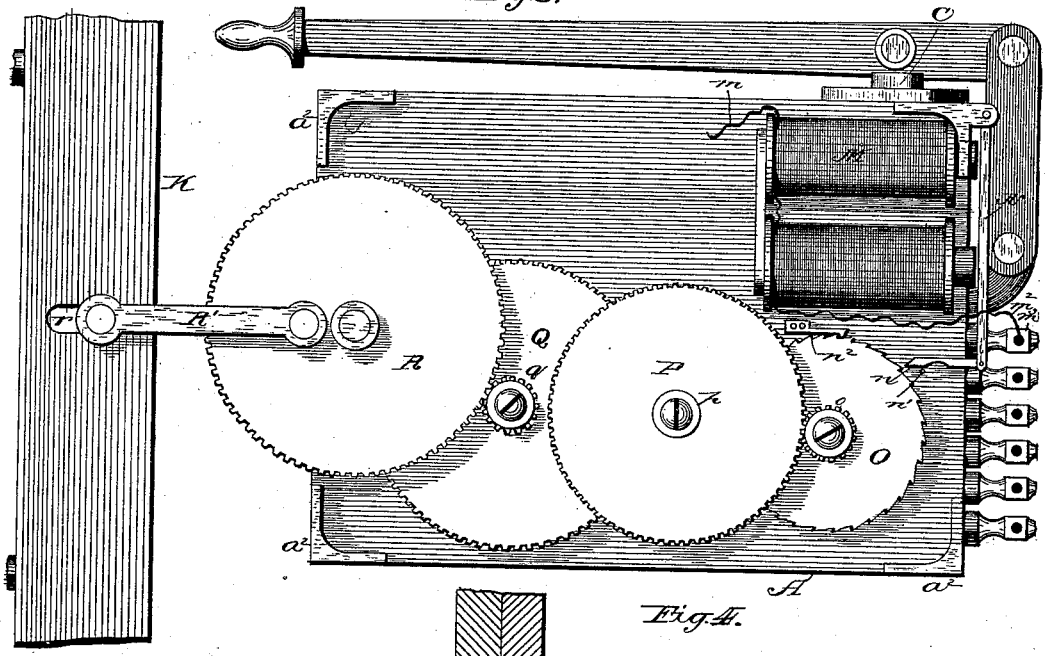

Fig. 4.

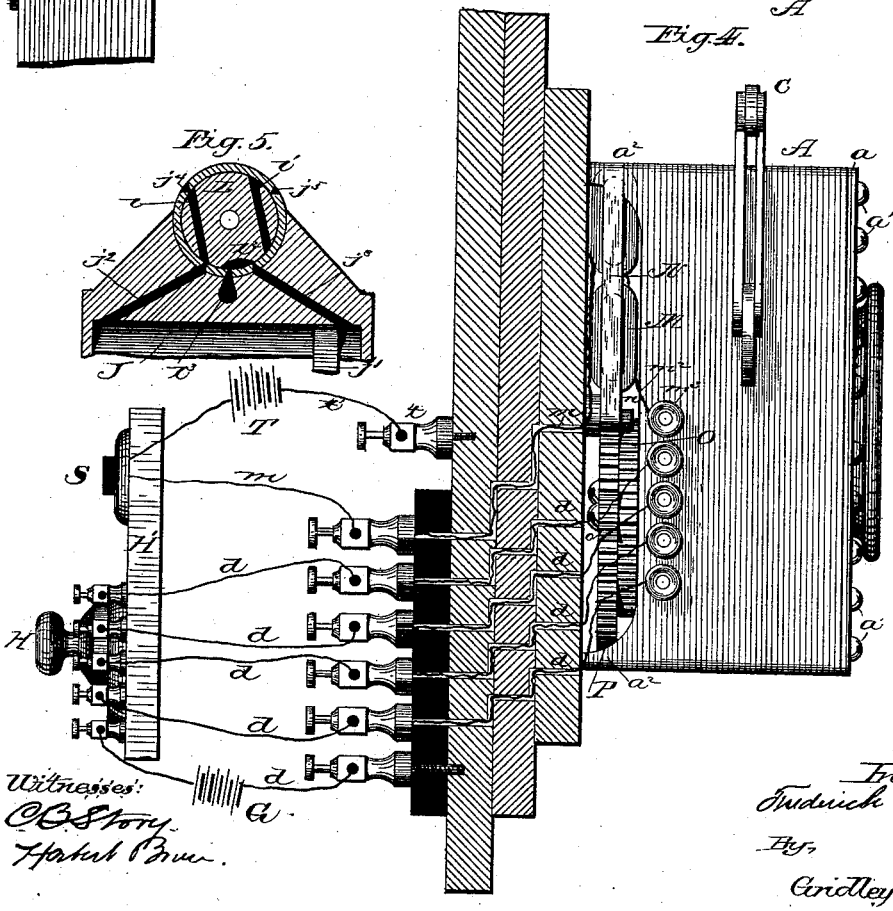

Fig. 5.

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UNITED STATES PATENT OFFICE.

FREDERICK SEDGWICK, OF CHICAGO, ILLINOIS.

ELECTRIC SAFE-LOCK AND BOLT-MOVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 347,071, dated August 10, 1886.

Application filed March 10, 1885. Serial No. 158,310. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK SEDGWICK, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Safe-Lock and Bolt-Moving Mechanism, of which the following is a description, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of an air chamber or case, showing the lock mechanism therein as viewed from the inside of the safe, and connected with the bolt-work, together with a front view of a dial for operating the same. Fig. 2 is a plan view of said lock and bolt-moving mechanism, showing a horizontal section of the door to which the same is attached. Fig. 3 is a back view of said case, showing the auxiliary mechanism attached thereto for retracting the bolt-work. Fig. 4 is a vertical sectional view of said door and an end view of said case as seen in the direction indicated by the arrow shown in Fig. 1; and Fig. 5 is a central vertical sectional view, in detail, of a portion of the cylinder, showing the construction of the valve and ports.

Like letters in the different figures indicate like parts.

In an application herewith filed by me for Letters Patent for an improved electric lock and bolt-moving mechanism I have shown an electric permutation-lock the bolt of which is attached to a suitable valve, and is adapted by its movement to release a volume of compressed air to act upon a piston, and thus actuate the bolt-work.

The object of my invention herein is to connect with said lock and bolt-moving device an auxiliary mechanism which may be employed by electrical means from without the safe to retract the bolt-work in the event of the failure of said compressed air to effect the desired result, said auxiliary mechanism being rendered inoperative by blocking the same or breaking the circuit therewith at all times except when the lock-bolt is retracted, which said combined mechanism is hereinafter more particularly described and claimed.

In the drawings, A represents an air-tight compartment or case, which may be removably attached by means of bolts or screws, or otherwise, to the safe-door B. Said compartment is provided with a removable face-plate, *a*, Figs. 2 and 4, attached thereto by means of screws *a'*, the connecting joint thereof being hermetically sealed. Connected with said compartment, as clearly shown in the drawings, is an air-pump, C, constructed substantially as shown, or in any well-known manner, and having a valve, *c*, Fig. 1, in the bottom of its cylinder, so that upon operating said pump air may be forced or compressed within the chamber A, from which the same can only be released in the manner hereinafter set forth. Within said chamber A, and attached to the case thereof, as shown in Fig. 1, I place an electro-magnetic permutation-lock, consisting of a series of electro-magnets, D, arranged concentrically to a revolving armature, E, connected by suitable gears and other mechanism with a series of tumblers and a lock-bolt, F. Said magnets are connected by means of wires *d d d d* and circuit-wire *d'*, as clearly shown in the drawings, with a suitable battery-cup, G, and a dial or circuit-breaking mechanism, H, outside of the safe, whereby and from whence said magnets may be excited in regular consecutive order, the tumblers manipulated, and the bolt F thrown or retracted at will, all of which mechanism is fully and accurately described in an application for Letters Patent filed by me in the Patent Office on the 20th day of August, A. D. 1884, and to which I herein make no claim. Within said compartment A, I likewise place a cylinder, J, having a suitable piston, *j*, Fig. 5, the rod *j'* of which passes through the case A, and is rigidly connected to the bolt-bar K by rivets or bolts *k*, Fig. 1. Said cylinder is provided with induction-ports j^2 j^3, Fig. 5, communicating with the compartment A, which are opened and closed by means of a two-way cock or valve, L, having ports *l l'*, so placed that a partial revolution of said valve serves to open one port while the other is closed, said ports *l l'* communicating with openings j^4 j^5, Fig. 5, in the outer shell. A notch, l^2, in the plug of said valve serves to alternately connect said ports with an exhaust-pipe, l^3, Fig. 5, leading to the outside of the case A. Rigidly connected with said valve L is a crank, l^4, Fig. 1, which is loosely or pivotally attached to the reciprocating bar F, so that the movement of

the latter back and forth may partially rotate said valve L and open one and close the other of said ports, respectively, thus permitting the compressed air within the case A to flow into said cylinder behind or in front of the piston *j*, and by the movement of the latter throw or retract the bolt-bar K, as described.

The compartment or case A is provided with studs or projections a^2, Figs. 2, 3, and 4, which rest against the door B, thereby leaving a space between said door and case, within which I place an electro-magnet, M, (shown in the figures last named,) in front of the poles of which is loosely pivoted, as shown, a depending armature, N, having a gravity-pawl, *n*, Fig. 3, loosely attached to its lower end, and preferably supported in a horizontal position by means of a stud, *n'*, adapted to engage a ratchet-wheel, O, (better shown in Fig. 3,) which is prevented from moving, except when desired, by a spring-stop, n^2, attached to said case.

Attached to the ratchet-wheel O, and upon the same axis, I provide a pinion, *o*, adapted to engage with one of a series of gears, P, *p*, Q, *q*, and R, the latter of which is connected, preferably by a pitman, R', to the bolt-bar K. The magnet M is connected by an insulated wire, *m*, running through the door B, having a binding-post, *m'*, interposed, to a push-button or circuit-breaker, S, constructed in the usual way, and preferably attached to the plate H', Figs. 1 and 4, to which the dial H is attached. The terminal wire m^2 of said magnet M (better shown in Fig. 1) is carried to a binding-post, m^3, attached to the case A, and insulated therefrom, from whence said wire is connected by a screw, m^4, Fig. 1, to a spring, m^5, insulated from the lock-case by a vulcanite block, m^6. Said spring and lock-case, respectively, are provided with contact-points m^7 m^8, which are normally separated from each other, the spring being so adjusted that when the lock-bolt F is retracted or in the opposite position from that shown in Fig. 1 the spring is bent thereby and the contact-points m^7 m^8 brought together, thus making a metallic or electrical connection from the wire m^2 with the case A, and thence through the safe-door to a binding-post, *t*, Fig. 4, connected by a wire, *t'*, having connection with a battery, T, with the push-button S. Thus it will be seen that so long as the bolt F is thrown, leaving the spring m^5 in its normal position, the circuit is broken with the magnet M, while the reverse movement of said bolt F connects the points m^7 m^8 and enables the magnet M to be excited by means of the button S, the manipulation of which causes the pawl *n* to engage the ratchet-wheel O, and thus actuate the train of wheels described. Said mechanism first above described may be operated as follows: A volume of air is compressed within the compartment A by means of the pump C, after which the door B is closed and the dial H rotated, thereby actuating the bar F, and with it the crank l^4, which opens the port j^2, thus allowing a portion of the compressed air within the compartment A to enter behind the piston *j* and force the same forward, resulting in the movement of the bolt-bar K and the locking of the safe.

Upon manipulating the combination by means of the dial H the bar F is retracted, which reverses the movement of the valve L, thus permitting the escape, through the duct or pipe l^2, of the compressed air behind the piston *j*, and allowing an influx in front thereof through the port j^3, which retracts the bolt-work and enables the safe to be again opened.

So long as the compressed-air mechanism first above described is effective, said auxiliary mechanism may remain at rest, a slot, *r*, Figs. 1 and 3, being made in the bolt-bar K, with which the pitman R' is loosely connected, which enables said bar to be thrown and retracted by the piston-rod *j'*, without moving said pitman, to permit which movement the wheel R should be in the position substantially as shown in Fig. 3. Should said compressed air fail to move the bolt-work when the lock-bolt F is retracted, said auxiliary mechanism may then be brought into requisition and operated as follows: Upon pressing the button S the magnet M is excited and attracts the armature N, thus actuating the pawl *n* and moving the ratchet-wheel O one notch. As soon as the circuit is broken by releasing the button, the arm N, by virtue of its own gravity, assumes a vertical position and draws the pawl *n* back in position for a second engagement, so that by manipulating the button S the wheel R is caused to make a half-revolution, thus retracting the bolt-work.

Having described my invention so as to enable others to practice the same, I claim—

1. An electric lock and bolt-moving mechanism consisting of an electro-magnetic permutation-lock arranged within the safe, and having electrical connections with a circuit-breaking mechanism outside thereof and a battery-cup, and an electric bolt-moving device consisting of an electro-magnet within the safe, provided with a movable armature, to which is attached a pawl arranged to actuate a ratchet and train of gears connected with the bolt-work, and electrical connections, in which a battery is interposed, with a circuit-breaking mechanism outside of the safe, substantially as described.

2. An electric lock and bolt-moving mechanism consisting of an electro-magnetic permutation-lock arranged within the safe, and having electrical connections with a circuit-breaking mechanism outside thereof and a battery-cup, and an electric bolt-moving device consisting of an electro-magnet within the safe, provided with a movable armature, to which is attached a pawl arranged to actuate a ratchet and train of gears connected with the bolt-work, and electrical connections, in which a battery is interposed, with a circuit-breaking mechanism outside of the safe, with

means for automatically breaking the circuit within the safe with said bolt-moving device while said lock-bolt is thrown forward, substantially as described.

3. The combination of an electro-magnetic permutation-lock arranged within the safe, and having electrical connections with a circuit-breaking mechanism outside thereof and a battery-cup, with an electric bolt-moving device consisting of an electro-magnet within the safe, provided with a movable armature connected by a pawl-and-ratchet mechanism and intermediate gears with the bolt-work, and electrical connections, in which a battery is interposed, with a circuit-breaker outside of the safe, substantially as and for the purposes specified.

4. The combination of an electro-magnetic permutation-lock arranged within the safe, and having electrical connections with a circuit-breaking mechanism outside thereof and a battery-cup, with an electric bolt-moving device consisting of an electro-magnet within the safe, having a movable armature connected by a pawl-and-ratchet mechanism and intermediate gears with the bolt-work, and electrical connections, in which a battery is interposed, with a circuit-breaker outside of the safe, and spring m^5, with contact-points m^7 m^8, substantially as and for the purposes described.

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