PATENTED NOV 8 1870

H. Arden's Electro Magnetic Lock.

108952

Fig: 1.

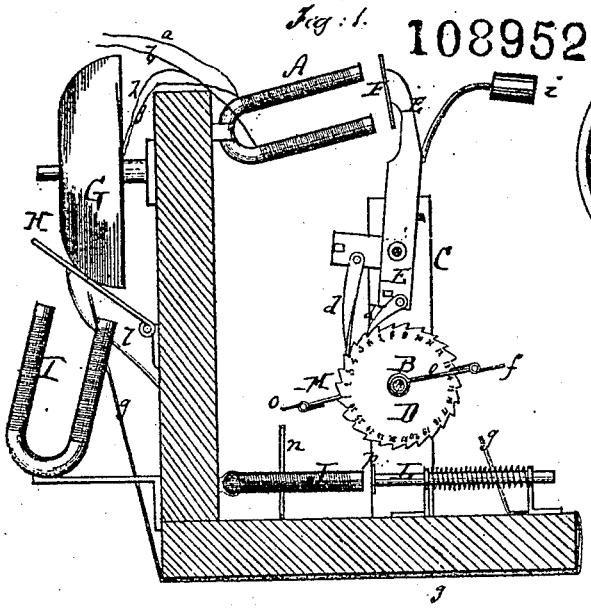


Fig: 2.

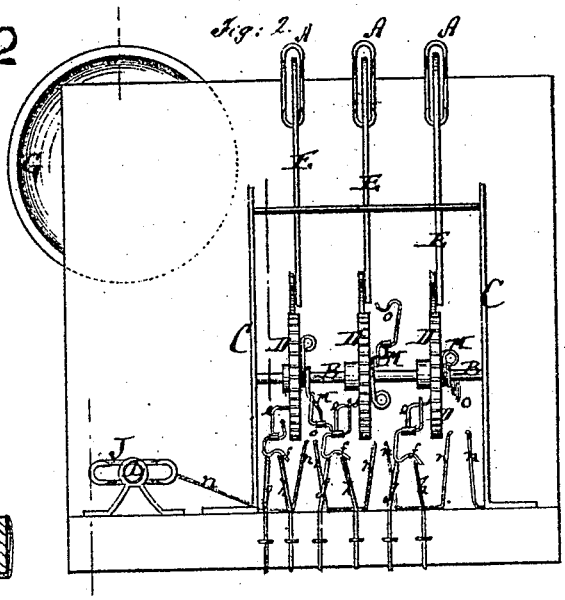


Fig: 3.

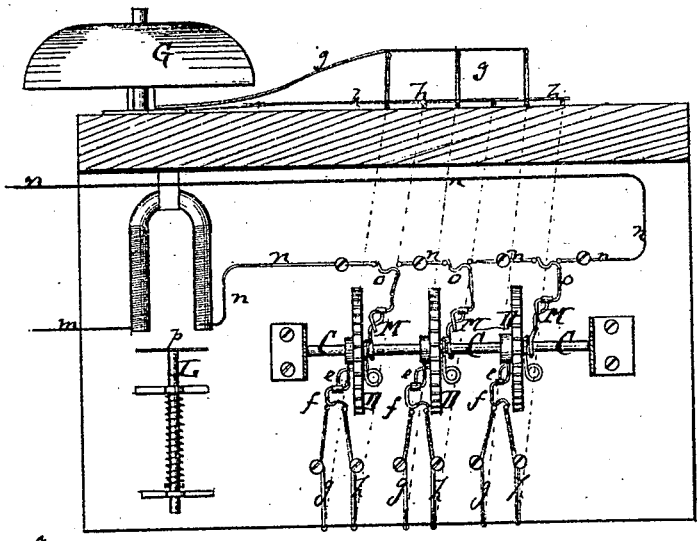
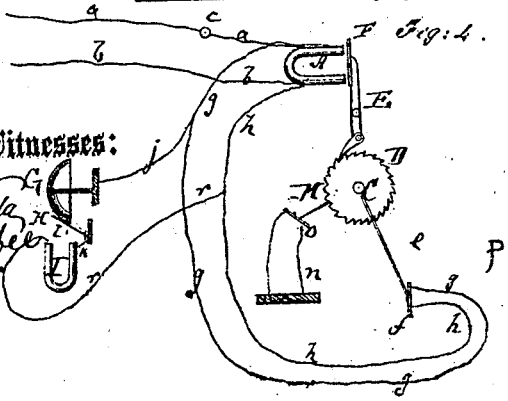


Fig: 4.



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HENRY ARDEN, OF ST. LOUIS, MISSOURI.

Letters Patent No. 108,952, dated November 8, 1870.

IMPROVEMENT IN ELECTRO-MAGNETIC LOCKS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, HENRY ARDEN, of St. Louis, in the county of St. Louis and State of Missouri, have invented a new and improved Electro-Magnetic Lock; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

Figure 1 represents a side view of my improved electro-magnetic lock.

Figure 2 is a face or front view of the same.

Figure 3 is a plan or top view of the same.

Figure 4 is a diagram, showing the general arrangement of conductors.

Similar letters of reference indicate corresponding parts.

My invention has for its object to so construct a lock for safes, vaults, &c., that the same may be operated entirely by electricity, whereby the bolts may be withdrawn.

The invention consists chiefly in combining the bolts of the lock with an electro-magnet, which, when charged, will serve to withdraw the bolts so as to unlock the door.

By this arrangement the lock can be arranged within the body of the safe, and need not be attached to the door, except the part that locks from or into the door.

The key-board for directing the currents of the several conductors need not be attached to the safe or door, but may be arranged at any suitable distance from the safe or in a different room or building.

The invention consists also in the construction of the combination-rods, which are pointers projecting from revolving disks, and connecting the broken fragments of a conductor or conductors for working the bolt or other part of the lock.

The invention consists also in the application to such an electric combination lock of an alarm-bell, which is worked by branches from the main conductors.

Finally, the invention consists in the application to the revolving disks of arms that connect the branch conductors which operate the bell.

A A A in the drawing is a series of electro-magnets, connected, by means of wires *a b*, with the poles of a battery.

An ordinary key-board, similar to that used on telegraphic instruments, is connected with one of the wires *a b*, to establish the current through the same whenever desired. The position of the key *c* is indicated in the diagram, fig. 4.

B is a shaft fixed in a frame, C.

Upon it is hung a series of ratchet-wheels, D D, the teeth of each wheel being marked or numbered.

E E is a series of levers pivoted to the frame C, each carrying an armature, F, for one of the electro-magnets A.

To each lever is pivoted, or with it is connected, a single or double pawl or lever, *d*, whereby, during the oscillations of said lever, intermittent rotary motion is imparted to one of the ratchet-wheels D.

Each wheel D has a projecting arm, *e*, with a pivoted or other insulated metallic plate, *f*, which, when it strikes the ends of a pair of wires, *g h*, connects the same. A pair of such wires *g h* is connected with and projects from each pair of wires *a b*.

By means of weights, *i*, or springs, the levers E are held away from the magnets A.

Each wire *g* is, by a branch, *j*, connected with a bell, G, on the key-board, and through the metallic clapper H of said bell, and a small wire, K, or any other equivalent connection with an electro-magnet, I, which is fixed near the bell to withdraw the clapper, the wires *h* having other branches *r* that reach also to the magnet I, while a spring, *l*, serves to counteract the magnet I, *i. e.*, to hold the clapper against the bell.

J is another electro-magnet set opposite to the bolt L, or any other part of the lock, which, when attracted by said magnet, will cause the entire or partial opening of the lock.

The magnet J is, by means of wires *m n*, connected with a battery; one wire, *n*, is set up in fragments between the several wheels D.

Each wheel D has, pivoted or otherwise adjustably applied to it, an arm or lever, M, which can be set at will opposite to any suitable tooth of its wheel. This arm or wheel carries a metallic insulated plate, *o*, which, when it strikes the wire *n*, connects two fragments of the same.

The operation is as follows:

Whenever, by a key, the current through a pair of wires *a b* is established, the armature F opposite the magnet A, pertaining to such wires, is attracted by its magnet, and this motion causes the lever E to turn its wheel D.

When the wheel D has been so far turned as to bring the plate *o* of its lever M in contact with the wire *n*, the next key is worked until all its plates *o* are in contact with the wire *n*, connecting the several sections of the same and establishing a current through the magnet J. Then the armature *p* on the bolt L is attracted to unlock the door. Not until all the plates *o* are in contact with the several sections of the wire *n* will the door be unlocked. As the disks D are, however, concealed within the safe, it will be impossible for any one not knowing the combination to unlock the safe.

The key is furnished by the bell; the current through

its wires is established whenever the plate *f* strikes and connects the wires *g h*. Thus, if the arm *e* on one disk is fixed so that the sections of *n* will be opposite to the figure 1 of said disk, when the plate *f* strikes the wires *g h*, the operator will know that when the bell rings the figure 1 is opposite to *n*. If, furthermore, the arm M is set at 10, the ringing of the bell will indicate that nine more motions of the key will bring the disk and arm M into the desired proper position. As the figures to which the several arms M are set cannot possibly be ascertained from the apparatus, the lock will be absolutely safe. The combination is changed by varying the positions of the arms M on the disks D.

I do not claim or confine myself to any kind of lock or part of lock to which the electro-magnetic apparatus is applied, nor, in fact, to any particular construction, form, or arrangement of mechanism above set forth, as the same may be infinitely varied without departing from the spirit of my invention. Instead of the fragments of the conductor *n*, I can, of course, use cups of mercury or any other equivalent; but

I do claim and desire to secure by Letters Patent—

1. The levers E E, attracted by the fixed magnets A, to impart intermittent rotary motion to the lever M, as set forth.

2. The levers M, arranged within a lock, to connect the fragments of a conductor, *n*, so as to establish a current through such conductor, for moving the bolt as set forth.

3. The ratchet-disks D, combined with the levers M in such manner that the combination of the lock will be varied by varying the positions of said levers on the disks, as specified.

4. The combination of the arms *e* with the levers M, serving to work an alarm, by which the position of each lever M will be indicated as set forth.

5. An electric lock, provided with an alarm-bell or equivalent instrument, whereby the position of the main levers M will be indicated, so that no other register will be required, as set forth.

The above specification of my invention signed by me this 22d day of March, 1870.

HENRY ARDEN.

Witnesses:

JAMES M. CARPENTER,

JOHN O. BROWN.