(No Model.) 2 Sheets—Sheet 1.

H. F. KEIL.

ELECTRIC DOOR OPENER.

No. 522,733. Patented July 10, 1894.

Fig. 1.

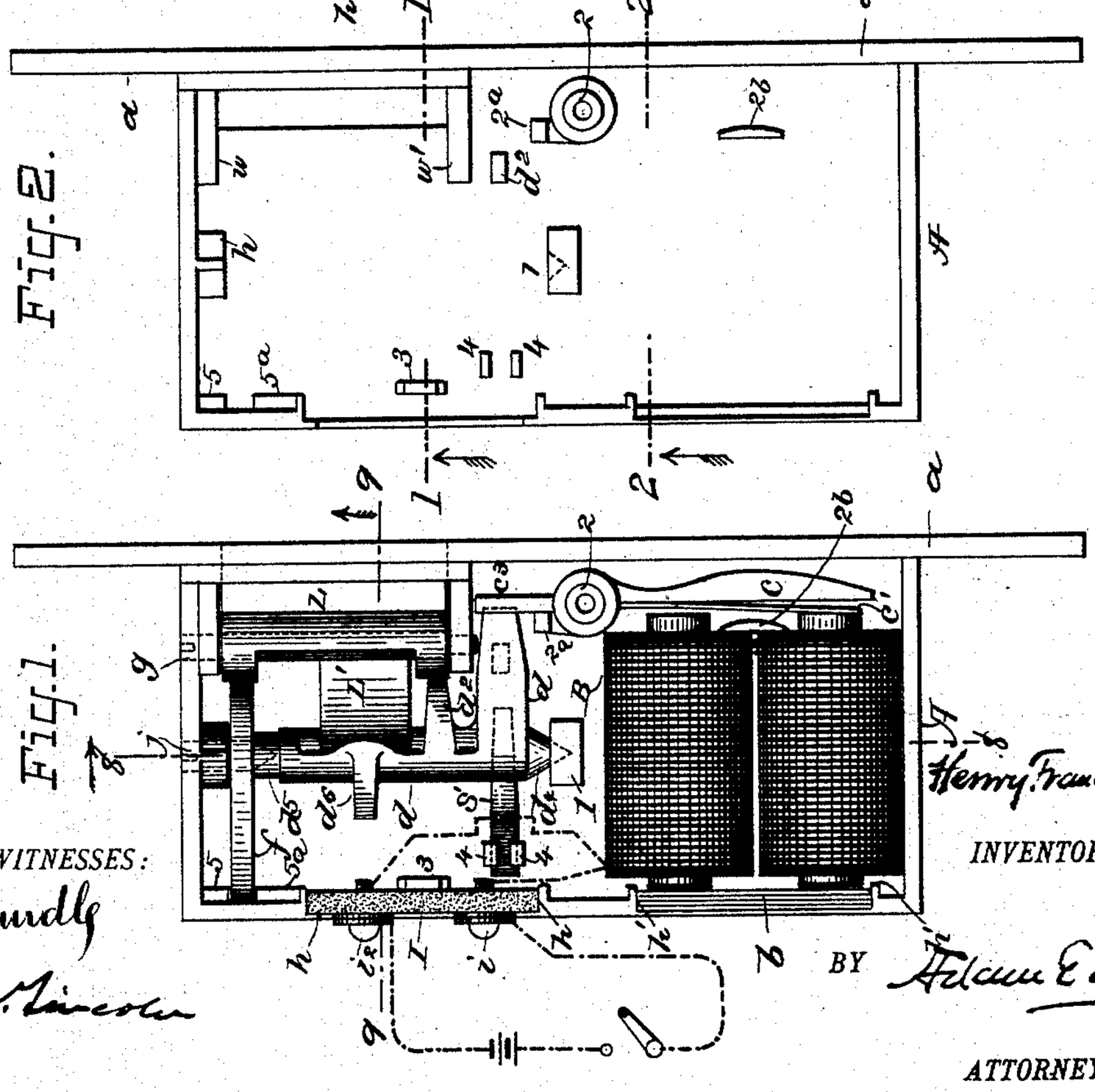


Fig. 2.

Fig. 3.

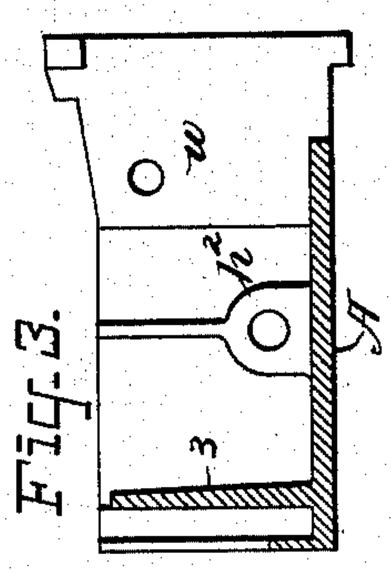


Fig. 4.

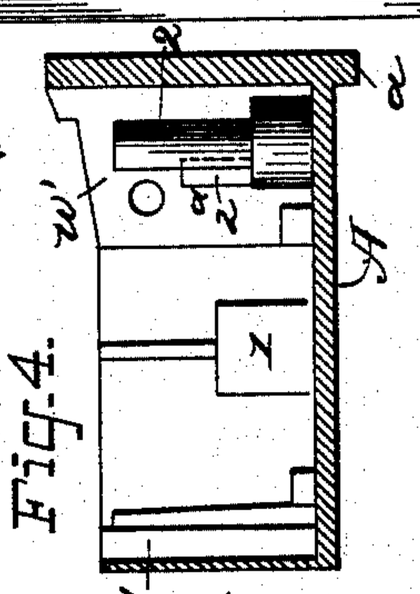


Fig. 5.

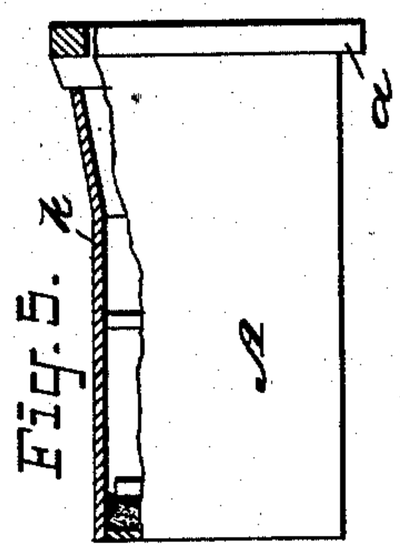


Fig. 6.

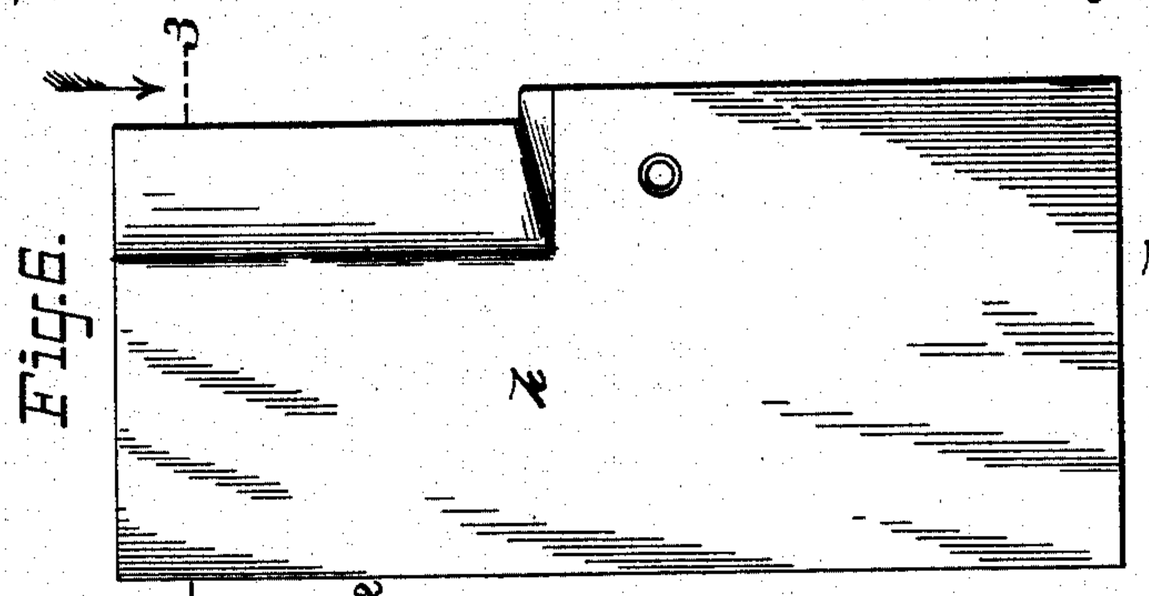
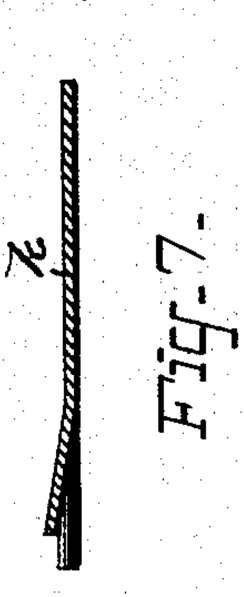


Fig. 7.



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(No Model.) 2 Sheets—Sheet 2.

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ELECTRIC DOOR OPENER.

No. 522,733. Patented July 10, 1894.

Fig. 8.

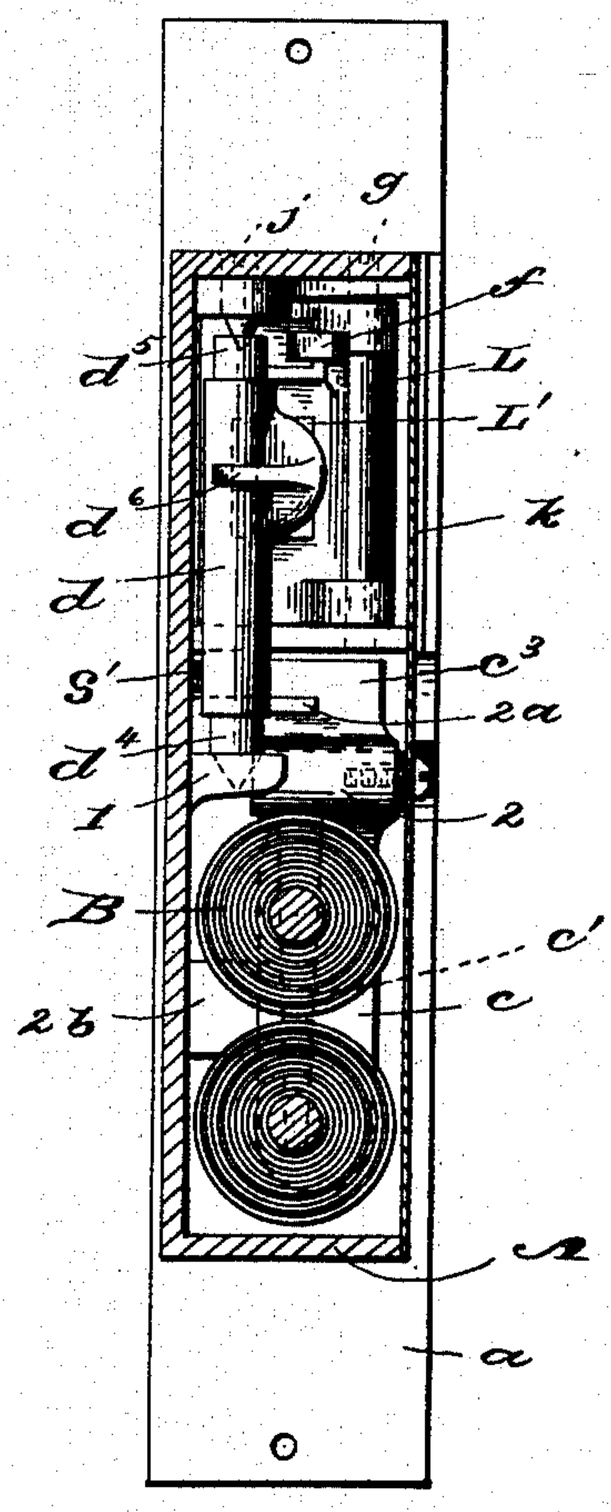
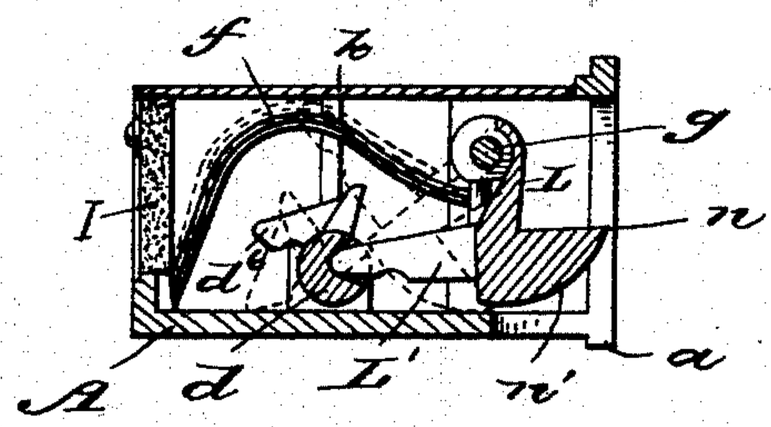


Fig. 7.



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UNITED STATES PATENT OFFICE.

HENRY FRANCIS KEIL, OF NEW YORK, N. Y.

ELECTRIC DOOR-OPENER.

SPECIFICATION forming part of Letters Patent No. 522,733, dated July 10, 1894.

Application filed January 30, 1894. Serial No. 498,515. (No model.)

To all whom it may concern:

Be it known that I, HENRY FRANCIS KEIL, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented a certain new and useful Improved Electric Door-Opener, of which the following is a specification.

My invention relates to an improved electric door lock opener, in which the locking jaw is released by the aid of electro-magnets, and the object of my invention is to overcome the many difficulties now experienced in electric door openers in which the mechanism becomes disordered by reason of the complexity of their construction.

One of the chief objects attained by my construction is simplicity of construction and consequent cheapness of manufacture and durability of the parts and non-liability to get out of order.

One of the main features of my construction lies in the manner of assembling the parts without screwing them together. The boring of holes and threading them to receive screws is one of the chief items of cost of construction.

Another important feature is the construction of the latch bar, by means of which, by simply setting a screw, I am enabled to center the same and thus prevent the looseness that results by wear and by reason of which the door openers generally constructed heretofore soon become loose or the locking dog inoperative.

Another very important feature is the novel construction of spring to throw the latch.

Heretofore spiral springs have usually been wound around the latch shaft. It is well known that the setting of these springs is tedious and expensive and entails much labor, and they cannot be replaced easily. In my construction I use a bow spring, made of a blade of spring steel, and I can use one or more according to the strength and force desired. Should this spring become lame, I can replace the same instantly.

In constructing my frame, I have provided a number of fixed studs and recesses wherein the magnets and insulated parts are simply set and are held in place by pressure, thus dispensing with the necessity of screws. I have also so constructed the frame-work that I can readily cast the frame A and bring out a very clean casting, thus avoiding the necessity of filing off the ridges. Then I cut away the siding of that part of the frame wherein the latch of the lock to be held in place sits. Heretofore, the frame has generally been cast with such opening, which made it difficult to avoid the casting and necessitated much filing. It is necessary to prevent objects being thrown into the lock through such opening, and in my construction this part is cut away and every part so shaped that I can draw the cast frame after it is cooled without raising rough parts. To provide a covering for the lock recess, I stamp or cast a metal cover with the part that is intended to fit over the recess inclined upward to fit snugly, and thus form a wall for the recess.

In the accompanying drawings, in which similar reference letters and numerals designate like parts, Figure 1 is a plan view of the entire frame and mechanism, with the cover removed. Fig. 2 is a similar view of the frame or casting. Fig. 3 is a section on line 1—1, of Fig. 2. Fig. 4 is a section on line 2—2 of Fig. 2. Fig. 5 is an end elevation of the frame, partly broken away, and showing the cover in section. Fig. 6 is a plan view of the cover. Fig. 7 is a section on line 3—3 of Fig. 6, looking in the direction of the arrow. Fig. 8 is a section on line 8—8 of Fig. 1, looking in the direction of the arrow. Fig. 9 is a section on line 9—9 of Fig. 1.

A represents the frame having the front wall *a* extended at the ends, as usual, and having the several studs and projections appearing in Fig. 2, all formed of a single casting. A space is formed in the back wall and at each end of this space is formed an angle or cover *h*, while a stud 3 projects upward about opposite the middle of the space. A plate I of insulating material is fitted to the space and crowded between the corners *h*, *h*, and stud 3, and carries the binding screws *i*, i^2, for the circuit wires.

The magnets B are held in the frame by the plate *b* which unites the two spools fitting in angles *h'*, *h'*, formed in the back wall of the frame, and an upright or stud 2^b which presses against the edges of the spool heads.

The armature *c* is pivoted to upright 2 and

has an arm c^3, which acts as a detent, as hereinafter described. To the armature c I fix a throw-off spring c' which has the double function of throwing off the armature c when the same is in a normal position, and acts as an electric cut-off.

The frame A is provided with the latch lock chamber walls w, w, into which the lock latch L is fixed by means of a rod g, which passes through the end wall of the frame and through the shoulders of the lock latch and is fixed in the wall w'; the frame has the upright h^2 cast to the end wall; this upright is enlarged at the bottom so as to be large enough to receive the set screw j, by means of which the lock latch shaft d is held in a pivotal position; in the corner of the frame is cast a projection 5 and very near it on the back wall is cast projection 5^a; these projections are provided to hold the spring f in place; the small studs 4, 4, are provided to hold the spring s', which is placed between the studs, and they are pressed or hammered down and hold the spring s' firmly in place; stud 1 is provided with a conical boring to receive the point d^4 of the lock latch shaft d.

The shaft d is pivoted on the point d^5 of screw j, and by its point d^4 entering the conical recess in stud 1, and has the locking dog or arm d' which normally lies under the armature detent c^3. The shaft also has two studs d^2, d^6, to prevent it from rocking too far in either direction.

The upright 2 is centrally screw threaded at its top to receive a screw by means of which the cover k may be held in place. The upright 2, or the frame near it, is provided with a stud 2^a, which serves to prevent the armature from being thrown back too far; the upright 2^b is provided to hold the magnets in place without the aid of screws.

B, B, are magnets to which are fixed the electric wires which are connected with a battery and push button, not shown, and by means of which the magnets are energized.

The lock latch L has a nose n and the rounded back n', as usual, and the stop or detent L', the end of which fits a recess in shaft d, and consequently until shaft d is released so that it may be turned the lock latch L cannot turn on its rod g.

The spring f has one end fitted to a recess n^2 in the lock latch and serves to restore the latter to its normal position after it has been swung by the door spring.

When the parts are all properly assembled as shown, and the magnets are energized by the electric current, the armature is drawn to the cores of the magnets and thereby the detent c^3 of the armature is drawn from the end of the lock dog d' and the same is released. The moment the lock dog is released the spring f comes into play and the nose of the lock latch is forced back by the latch of the door lock and the door will open. It may be here stated that all doors which are provided with an electric opener have a spring fixed between the door and jam, and thus the door always has a tendency to open, and the moment the lock latch of the door opener is released the door is thrown open.

It is obvious that I may use a spiral spring in place of the flat spring f, since it will not become lame so quickly.

It is obvious that as soon as the current of electricity which energizes the magnets is cut off by removing the pressure from the button, the armature is released and thrown back by the armature spring c', and the detent c^3 is thrown over the end of the lock dog d', and the opener is again in a normal condition; the pressure of the door latch having been removed from the nose of latch lock, the same is forced into its normal condition by the spring f.

Having now described my invention, what I claim is—

1. In an electric door opener, comprising in its construction a cast frame A having the space in the back wall with the shoulders h, h; the shoulders h', h', to receive the magnet plate; the stud 1; the stud 2; the stud 2^a; the stud 2^b; the stud 3; the studs 4, 4; the studs 5, 5^a; the stud d^2; the walls w, w, and the stud h, all arranged as and for the purpose set forth.

2. In an electric door opener, the combination of the magnets B, B, the stud 2^b, and the recess h', h' for holding said magnets; the armature c having the spring c' and the detent c^3 and the insulating plate I having the posts i, i^2, and the circuit wires, all arranged substantially as set forth.

3. The combination of the magnets, the insulating plate, the armature, the locking dog shaft having one end conically bored and the other tapered and held in place as described, and the lock latch having the spring f, all as described.

Signed at New York, in the county of New York and State of New York, this 8th day of January, A. D. 1894.

HENRY FRANCIS KEIL.

Witnesses:
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RICHARD LIPES.