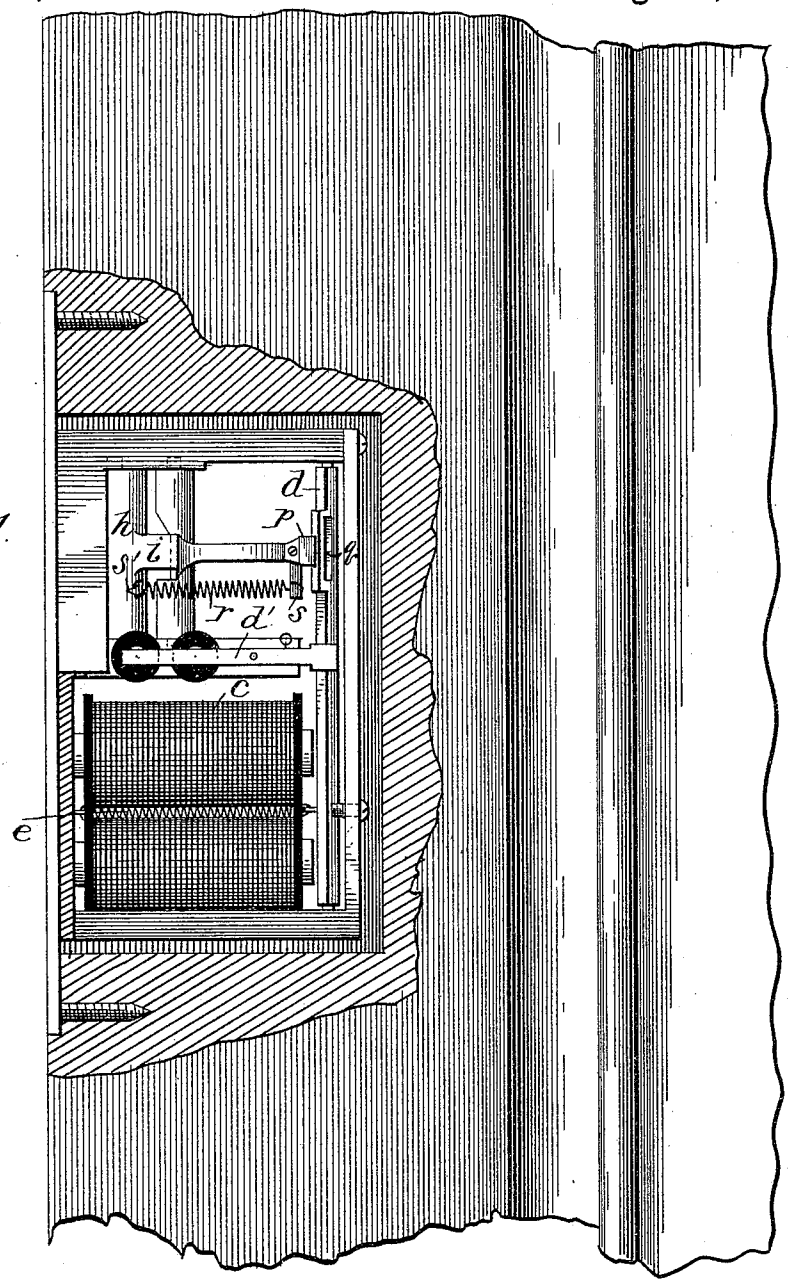
(No Model.) 2 Sheets—Sheet 1.

R. J. WARD.

ELECTRIC DOOR OPENER.

No. 457,906. Patented Aug. 18, 1891.

Fig. 1.



Witnesses

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Nellie L. Pope

Inventor

Richard J. Ward

By his Attorney

Edward P. Thompson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

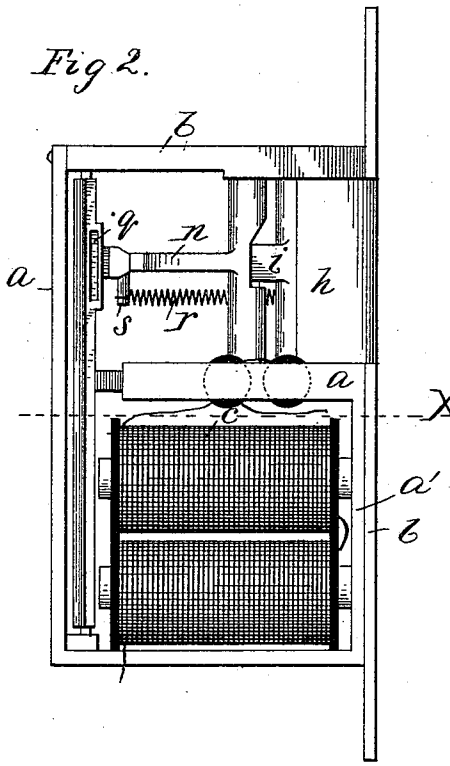
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Fig. 2.



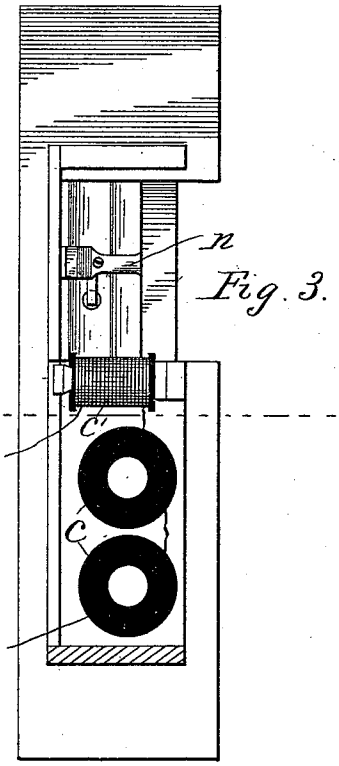


Fig. 3.

Fig. 4.

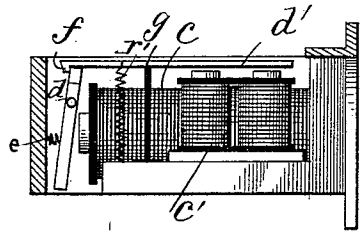


Fig. 5.

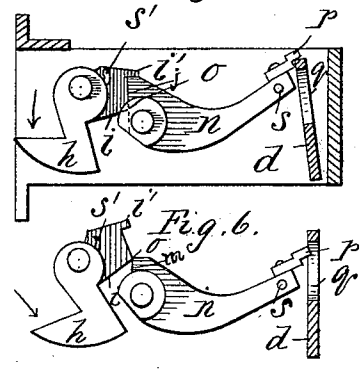


Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

RICHARD J. WARD, OF BROOKLYN, NEW YORK.

ELECTRIC DOOR-OPENER.

SPECIFICATION forming part of Letters Patent No. 457,906, dated August 18, 1891.

Application filed September 15, 1890. Serial No. 365,080. (No model.)

To all whom it may concern:

Be it known that I, RICHARD J. WARD, a citizen of the United States, and a resident of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Electric Door-Openers, of which the following is a specification.

The object of the invention is to provide simplicity of mechanical construction and greater efficiency of operation.

The invention relates, principally, to two features, the one being the electro-magnetic releasing device and the other a safety retaining mechanism. In locks in present use an expert can so shake the door as to vibrate the delicately-movable armature in such a manner as to release the latch. By the second part of my invention this difficulty is removed.

The invention is described in every detail by reference to the accompanying drawings.

Figure 1 is a partially-sectional view of a door-frame provided with the electric door-opener, which is shown also partially in section. Fig. 2 is a view of the opposite side from that shown in Fig. 1. Fig. 3 is a side or rectangular view of Fig. 2 or Fig. 1. Fig. 4 is a cross-section of Fig. 2 or Fig. 3 at the line X. Fig. 5 is a view of a portion of the lock by itself, showing plainly certain features not prominently shown in the other figures, said figure being a view of the lock as seen from below. Fig. 6 shows the parts of Fig. 5 in a position during operation.

The device embodying my invention consists of the combination of a casing formed of two parts—the angle-piece *a*, of iron, and the angle-piece *b*, of brass—a magnet *c*, whose yoke *a'* is formed of a part of the angle-piece *a*, an armature *d* for said magnet, pivoted at its ends and within inductive distance of said magnet, the axis of the armature lying in a plane perpendicular to the plane of the axes of the limbs of said magnet, a retractile spring *e*, tending to oppose the attractive force of said magnet, a second magnet *c'*, whose armature *d'* has a hook *f*, which retains the armature *d* in its normal condition until the current is passed through the magnets, the said armature *d'* being pivoted at a point *g*, which is between the armature *d* and the magnet *c'*, a latch *h*, against which the nose of the door presses in the direction of the arrow, a projection *i* on one side of said latch and provided with a surface *j*, which is in a plane approximately parallel to the plane of said latch, a projection *i'*, projecting beyond said projection *i* at one edge of said surface *j*, a lever *n*, whose axis is parallel to that of the latch *h* and which is provided on its shorter arm with a surface *m*, normally coincident with the surface *j*, which terminates at a line *o* on the surface *m*, said line lying outside of the imaginary line joining the axes of the latch *h* and lever *n*, a steel tip *p*, secured to the longer arm of said lever *n* and pressing upon the edge of the armature *d*, which is provided with a hole *q* for the entrance of the tip *p* when the armature is released, and a retractile spring *r*, joined to the pins *s* and *s'*, respectively, on the longer arm of lever *n* and on the latch *h*.

The projection *i* rests at right angles to the surfaces *j* and *m* upon the shorter arm of the lever *n*. The spring *r* retains the surfaces *j* and *m* normally in contact with each other. The force of the nose tends to rotate the lever *n*, which resists until the armature *d* is attracted by the magnet *c*, which occurs when the electric current is passed through both magnets. The hook *f* prevents the armature *d* from being shaken in such a manner as to release the tip *p*; but when the current is passed through both magnets the hook *f* releases the armature and the armature releases the lever *n* and latch *h*. The line *o* being so near the plane of the axes of the latch *h* and lever *n*, the leverage of the motive latch is so small as to effect a secure locking of said latch. As the latch is moving, the line *o* gradually moves away from the line joining the said axes, thereby allowing more and more purchase for the force of the nose represented by the arrow.

The magnet *c'* need be but very small compared with the magnet *c*, because only the slightest force is necessary to move the hook *f*. The same shake of the door cannot release both the hook *f* from the armature *d* and the armature *d* from the tip *p*, perhaps because there would have to be two motions simultaneously at right angles to each other, which is impossible. A retractile spring *r'* is provided for the armature *d'*. The magnets *c*

and c' are at right angles to each other, and so are their armatures d and d'.

The longer end of the lever n presses upon the armature d substantially perpendicular to the axes of the latter, whereby the force of the nose against the latch is effectually resisted.

I claim as my invention—

1. The combination, with the armature, electro-magnet, and latch of an electric door-opener, of a lever whose shorter arm has a plane surface normally coincident with a similar surface on said latch and parallel to the planes of the said latch and lever and whose longer arm presses upon said armature in a direction substantially perpendicular to the axis of said armature.

2. An electric door-opener consisting of the combination of a magnet, a pivoted armature therefor provided with a hole q, a pivoted lever whose longer arm presses upon said armature toward said hole, and a latch engaging with the shorter arm of said lever.

3. The combination, with the armature and latch of an electric door-opener, of a lever whose shorter arm has a plane surface normally coincident with a similar surface on said latch and perpendicular to the planes of said latch and lever and whose longer arm presses upon said armature in a direction substantially perpendicular to the axis of said armature, and a second magnet whose armature engages with said first-named armature.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 10th day of September, 1890.

RICHARD J. WARD.

Witnesses:
W. P. JONES,
CHAS. E. LITTELL.