No. 791,113. PATENTED MAY 30, 1905.

F. STAEHLE.

ELECTRIC DOOR OPENING DEVICE.

APPLICATION FILED FEB. 10, 1904.

2 SHEETS—SHEET 1.

Fig. 2

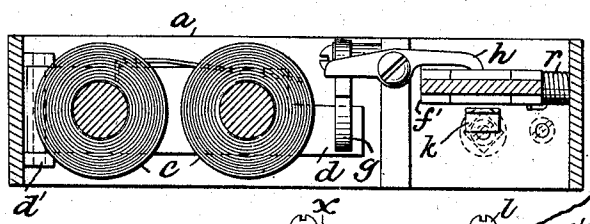


Fig. 1.

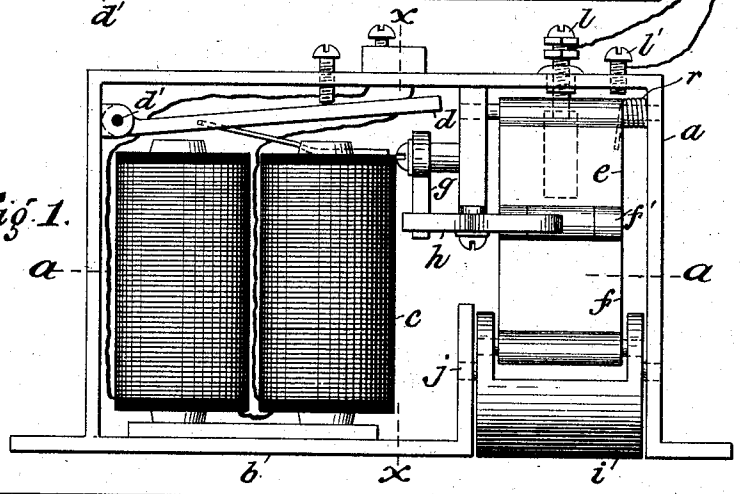
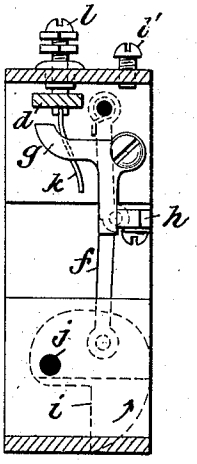


Fig. 3.



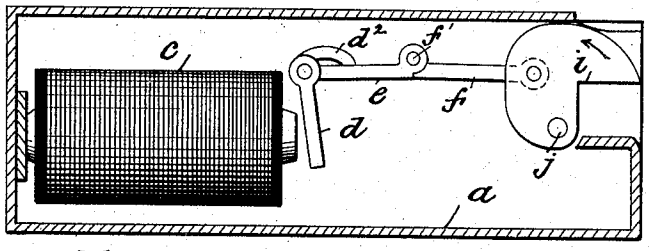


Fig. 4.

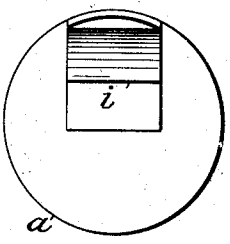
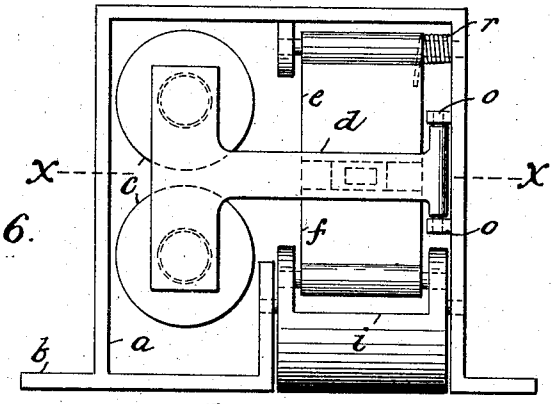


Fig. 5.

Fig. 6.



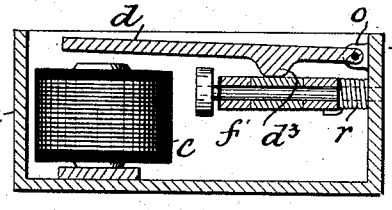


Fig. 7.

WITNESSES:

Albert Dick

F. Trowbridge

INVENTOR

Frank Staehle

BY

Fischer and Sanders,

ATTORNEYS

PHOTO-LITHOGRAPHED BY SACKETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 791,113. PATENTED MAY 30, 1905.

F. STAEHLE.

ELECTRIC DOOR OPENING DEVICE.

APPLICATION FILED FEB. 10, 1904.

2 SHEETS—SHEET 2.

Fig. 8.

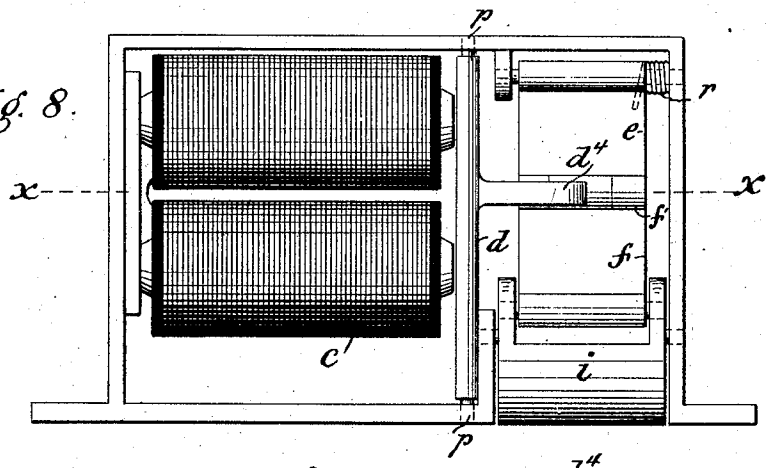


Fig. 9.

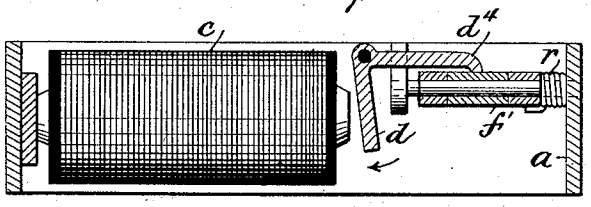


Fig. 10.

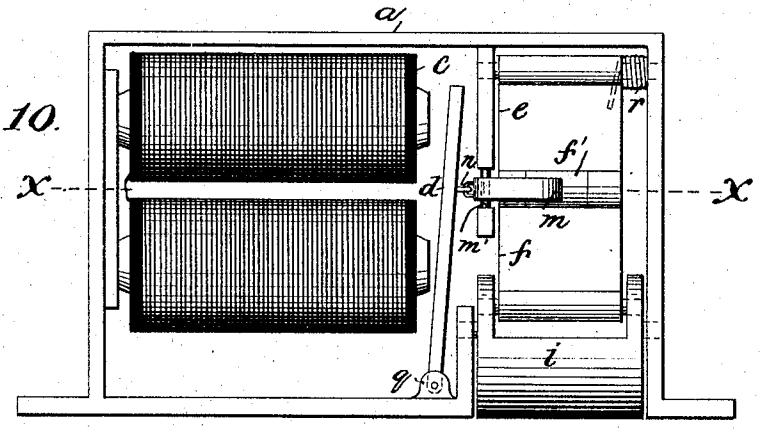
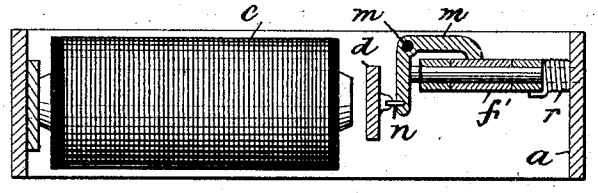


Fig. 11.



WITNESSES:

Alvah Dick

F. Trowbridge

INVENTOR

Frank Staehle

BY Fischer and Sanders.

ATTORNEYS.

PHOTO-LITHOGRAPHED BY HACKETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 791,113. Patented May 30, 1905.

UNITED STATES PATENT OFFICE.

FRANK STAEHLE, OF NEWARK, NEW JERSEY.

ELECTRIC DOOR-OPENING DEVICE.

SPECIFICATION forming part of Letters Patent No. 791,113, dated May 30, 1905.

Application filed February 10, 1904. Serial No. 192,896.

To all whom it may concern:

Be it known that I, FRANK STAEHLE, a citizen of the United States, and a resident of the city of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electrical Door-Opening Devices; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming a part thereof, in which similar letters of reference indicate similar parts throughout.

This invention relates to an improved electrical door-opening device which is designed to be operated from a distant point by an electric circuit, so as to permit the person at the outside of the door to enter.

The object of this invention is to provide an electrical door-opening device having a compact arrangement, one which shall be durable and efficient, simple in construction, and comparatively inexpensive; and it consists of a device provided with an electromagnet and its armature, a toggle-joint pivotally secured to the keeper, and suitable actuating mechanism interposed between the armature and toggle-joint whereby the keeper is moved when the magnet is energized.

Figure 1 is a plan view of a door-opening device embodying my invention with the side plates of the inclosing case removed. Figs. 2 and 3 are sectional elevations taken, respectively, on lines *a a* and *x x* in Fig. 1. Fig. 4 is a modified form of my improved device arranged in a cylindrical inclosing case. Fig. 5 is an end elevation of the same. Fig. 6 is a plan view of another modified form of my improved device. Fig. 7 is a sectional side elevation taken on lines *x x* in Fig. 6. Figs. 8 and 10 represent additional modified forms of my improved device; and Figs. 9 and 11 represent sectional side elevations taken, respectively, on lines *x x* and *x x* in Figs. 8 and 10.

In the drawings, *a* designates an inclosing case of the ordinary type provided with a face or striker plate *b*. The electromagnet *c* of common form is secured in the case in any well-known manner, and *d* is the armature of the said electromagnet. The toggle-links are conveniently pivoted in the inclosing case in close proximity to the electromagnet and consist, essentially, of two members, lettered, respectively, *e* and *f*. The inner ends of said members are pivoted and form a common rule-joint, as indicated at *f'*, so as to offer the greatest resistance possible should an attempt be made to break said links or joint other than for the express purpose of opening the door by means of the electrical circuit from the interior of the building.

In Fig. 1, *g* represents a pivoted bell-crank, arranged in any well-known manner and engaging with one end of the pivoted lever *h*, while the other end of said pivoted lever *h* bears against the rule-joint *f'* of the toggle-links. The armature *d* of the magnet is pivoted at *d'*, and some space is between the end of the armature and the end of the pivoted bell-crank *g*, so that when the magnet is energized the armature will strike the adjacent end of the bell-crank *g* a sharp blow, causing the other arm of the bell-crank to raise the end of the pivoted lever *h* (see Figs. 2 and 3) and lower the other end, which bears against the rule-joint *f'*, thereby breaking said joint and permitting the keeper *i*, which is pivotally secured to the inclosing case at *j* and also pivotally secured to the member *f* of the toggle-joint, to swing inwardly in the direction of the arrow, so that the door can be pushed slightly and opened by a person from the outside. The purpose of the keeper *i* is to form an abutment for the bolt of the lock on the door, it being understood that the case *a* is inserted in the door-jamb adjacent to the lock on the door. *r* designates a spiral spring secured to the case *a* and wound around the stud of the member *e* of the toggle-links, the free end of which bears against the under side of the member *e*, causing the toggle-links to return to their normal position after the rule-joint *f'* has been broken.

Devices of this kind are commonly used in connection with speaking-tubes and call-bells at the different floors of the building occupied by different persons, and when a person desires to enter the proper signal is sounded,

calling the person to the speaking-tube, at which is also located the push-button or circuit-changer by which the magnet *c* is controlled, so that the person in the building by operating such push-button will admit the person at the door, who merely has to turn the usual door-knob and open the door. It is very desirable that the person at the push-button should know when the door has been opened, and this I accomplish by means of a contact-spring *k*, secured in any well-known manner to the contact-screw *l*, which is secured to the inclosing case *a* and properly insulated therefrom. One end of the circuit-wire is secured to the contact-screw *l* and the other end of said wire is secured to the contact-screw *l'*, which is tapped into the inclosing case *a* at any convenient point. The circuit-wires are connected with an alarm-bell and any suitable source of electricity. It will thus be seen that when the magnet *c* is energized and the armature *d* strikes the bell-crank *g* a hard blow, causing the pivoted lever *h* to break the rule-joint *f'* of the toggle-links, the member *e* of the toggle-links in its downward movement will contact with the contact-spring *k*, thereby closing the circuit and causing the bell located in said circuit to be sounded and indicating that the keeper *i* has been properly tripped and that the person outside of the door can enter.

In Fig. 4 I have shown a tubular inclosing case *a* and a single magnet *c*, which when energized will cause the armature *d*, the construction of which is such that when said armature *d* is drawn against the magnet the rectangular extension d^2 will bear against the member *e* of the toggle-links, thereby causing the joint *f'* to be broken and permitting the keeper *i* to swing on the pivot *j* in the direction indicated by the arrow.

In Figs. 6 and 7 I have shown a modification which consists in employing two stub-magnets *c* and a pivoted armature *d* in combination with the same type of toggle-links and keeper as above described. In this modification the armature *d* is pivoted in lugs *o*, extending from the inside of the inclosing case *a*. The under side of the armature *d* is provided with an extension or lug d^3, which in its normal position rests on the rule-joint *f'* of the toggle-links and which is designed to break said joint when the magnet is energized.

In Figs. 8 and 9 I illustrate another modification of my improved device, which consists in employing an armature *d*, preferably of rectangular cross-section and pivoted at both ends in the inclosing case *a* at *p*. The rectangular projection d^4 of said armature rests directly above and on the rule-joint *f'* of the aforesaid-described toggle-links, and when the magnet *c* is energized the armature *d* will swing in the direction indicated by the arrow in Fig. 9, thereby causing the rectangular projection d^4 of the armature *d* to break the rule-joint.

A similar modification is illustrated in Figs. 10 and 11, in which I employ an armature *d*, pivoted at one end in the inclosing case at *q*. A bell-crank *m* is conveniently pivoted at *m'*, one end of which is connected, by means of a link *n*, to the armature *d*, while the other end of said bell-crank *m* bears against the rule-joint *f'* of the toggle-links, so that when the magnet *c* is energized the armature will cause the one end of the pivoted bell-crank *m* to break the rule-joint *f'* of the toggle-links, thereby permitting the keeper to swing inward, so that the door can be opened.

It will be noticed that I have omitted the contact-spring *k* and the contact-screw *l* and *l'* from the modifications of my improved device shown in Figs. 4 to 11, inclusive; but I wish it to be understood that in practice all of the different forms are provided with the said contact spring and screws; but for brevity sake and to avoid repetition of description I have omitted them in the above-named figures.

It will be understood that the construction and arrangement and combination of the parts above shown are given only to illustrate the practical embodiments of my invention, and I wish it to be particularly understood that I do not limit myself to the precise details of construction hereinbefore described, and illustrated in the accompanying drawings, but I hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

Having thus described my invention, what I claim is—

1. In an electrical door-opening device, a keeper, toggle-links pivotally connected to said keeper, electromagnetic means for operating said links and keeper and means coöperating with one of the toggle-links designed to indicate at a distance that the said links and keeper have been actuated.

2. In an electrical door-opening device, a keeper, toggle-links pivotally connected to said keeper, an electromagnet, an armature for operating said links and keeper, and indicating means coöperating with one of the toggle-links for indicating that the said links and keeper have been actuated.

3. In an electrical door-opening device, a keeper, toggle-links pivotally connected to said keeper, an electromagnet, a pivoted bell-crank and an armature for operating said links and keeper, and indicating means coöperating with the toggle-links for indicating that the said links and keeper have been actuated.

4. In an electrical door-opening device, a keeper, toggle-links pivotally connected to said keeper, an electromagnet, an armature, a projection on said armature for operating said links and keeper, and means coöperating with one of the toggle-links designed to indi-

cate that the said links and keeper have been actuated.

5. An electrical door-opening device comprising a casing, a keeper pivotally mounted in said casing, toggle-links pivotally connected to said keeper and to said casing, electrical means for operating said toggle-links to unlock said keeper, and an electrical indicator coöperating with one of the links to produce an indication at a distance that said keeper has been unlocked.

6. In a door-opening device, the combination of a pivoted keeper, a pair of rule-jointed toggle-links connecting said keeper with a rigid abutment, a bell-crank pivotally mounted adjacent to said toggle-links for operating the same, an electromagnet and a pivoted armature therefor, said armature designed when actuated to operate said bell-crank, to break said rule-jointed toggle-links, and retract said keeper, and an electrical indicator coöperating with one of said links to produce an indication at a distance that said keeper has been retracted.

7. In a door-opening device the combination of a pivoted keeper, a pair of rule-jointed toggle-links, a spring operating upon said links to maintain the same in normal position with the keeper locked, an electromagnet and an armature therefor, a bell-crank intermediate of said links and armature whereby when said electromagnet is energized said links will be operated to retract said pivoted keeper, and an electrical indicator coöperating with one of said links to produce an indication at a distance that said keeper has been retracted.

This specification signed and witnessed this 5th day of February, 1904.

FRANK STAEHLE.

Witnesses:
FREDK. C. FISCHER,
LOUIS M. SANDERS.