

No. 741,115.

PATENTED OCT. 13, 1903.

W. W. DEAN.
RELAY.

APPLICATION FILED JAN. 14, 1902.

NO MODEL.

Fig. 1.

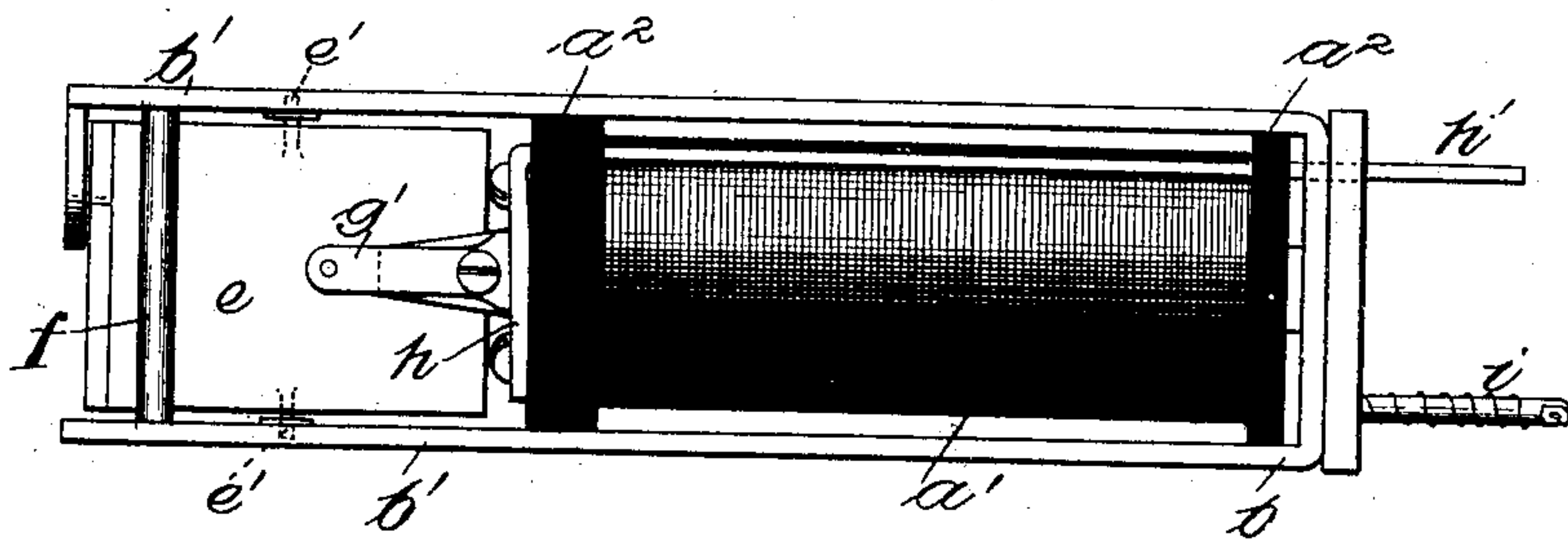


Fig. 2.

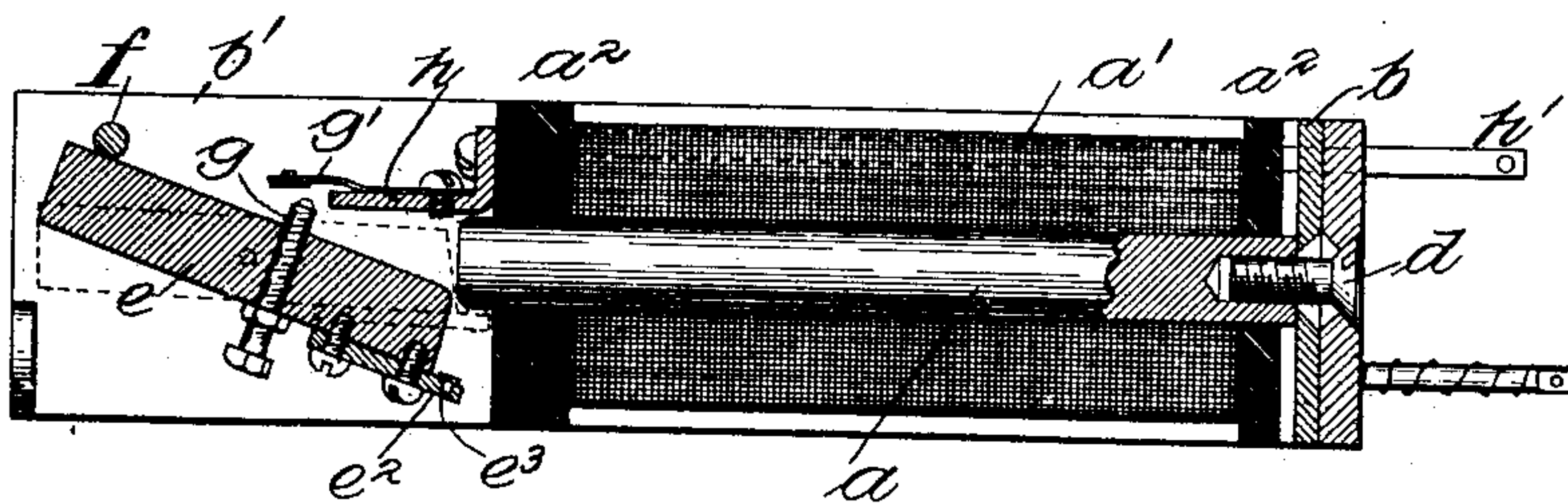
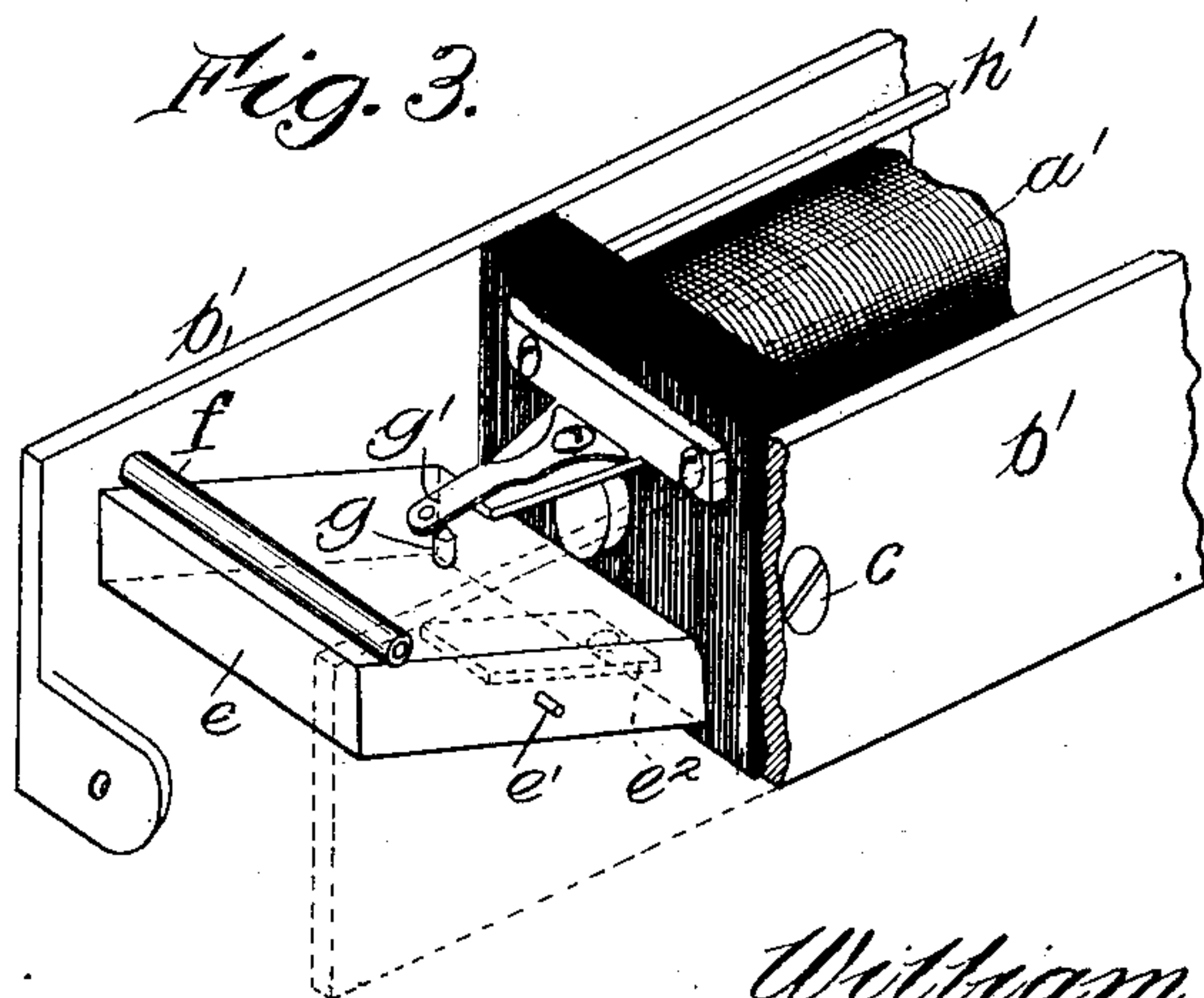


Fig. 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM W. DEAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

RELAY.

SPECIFICATION forming part of Letters Patent No. 741,115, dated October 13, 1903.

Application filed January 14, 1902. Serial No. 89,662. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. DEAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Relays, (Case No. 41,) of which the following is a full, clear, concise, and exact description.

My invention relates to a relay, and has for its object to provide a relay which will be specially adapted for use in connection with telephone-exchange systems to respond to alternating ringing-currents of the kind usually employed in operating call-bells of subscribers' substation instruments. A relay which will act sluggishly but strongly and certainly under the influence of such currents is of use to telephone engineers in many ways.

In accordance with my invention I provide a U-shaped pole-piece for the electromagnet of the relay, the base of said pole-piece being secured to one end of the magnet and the arms of the pole-piece extending forward on either side of the magnet and projecting beyond the front end thereof. An armature, which is preferably in the shape of a comparatively massive rectangular block of iron, is pivoted in the extensions or arms of the pole-piece to swing in a vertical plane. The pivotal line or axis of rotation of the armature is preferably substantially in the plane of the magnet-core and substantially at right angles with the line of said core. The armature normally rests in an angular position with its inner end slightly below the magnet-core, and the magnet when excited is adapted to attract the end of the armature to swing the same from its angular position into a position substantially in alinement with the core—that is, a substantially horizontal position. I preferably provide an extension from the lower inner edge of the armature, which extension is adapted to be attracted by the side of the core which exerts a direct pull thereon as the armature swings into its horizontal position. Said extension also serves as a stop, striking against the side of the core and limiting the arc through which the armature may swing.

My invention also contemplates an im-

proved form of rubbing contact operated by the armature of the relay to control a local circuit.

I will describe my invention more particularly by reference to the accompanying drawings, which illustrate the preferred embodiment thereof, and that which I regard as new will be pointed out in the appended claims.

Figure 1 is a plan view of the relay. Fig. 2 is a vertical section thereof, and Fig. 3 is a perspective.

Similar letters of reference are used to designate the same parts wherever they are shown.

The magnet of the relay comprises a core a and an inclosing helix a' , wound around said core. Square end pieces $a^2 a^2$, of insulating material, are also provided for the magnet. A U-shaped pole-piece b is fastened at its base to the rear end of the magnet, and the arms $b' b'$ of said pole-piece pass forward parallel with the magnet, inclosing the same, said arms extending a considerable distance beyond the forward end of the magnet. Screws $c c$ pass through the arms $b' b'$ into the forward end piece a^2 of the magnet, and a screw d passes through the base of the pole-piece into the rear end of the core to fasten these two parts together. The armature e , which is in the form of a comparatively heavy rectangular prism of soft iron, is provided with trunnions $e' e'$, which are pivoted or journaled in the projecting ends of the arms $b' b'$ of the pole-piece. These trunnions are located in a plane which passes through the center of the magnet-core, and the axial line of the armature formed by said trunnions about which the armature rotates is substantially at right angles with the line of the core. The trunnions are placed approximately in the center of the armature, the stop e^2 and contact-post g making the inner end of the armature the heavier and causing it to rest normally in the angular position shown in Fig. 2. The arc through which the armature swings in one direction is limited by a rod or stop f , which is fastened between the arms $b' b'$ in the upper portion of their forward ends, and the movement of the arms in the other direction is limited by an extension e^2 , which is secured to the under side of the inner end

of the armature. As the armature swings into a horizontal position this extension strikes the side of the forward end of the magnet-core and besides serving as a stop
 5 also affords means whereby the magnet may exert a direct or tangential pull upon the armature as it approaches the horizontal position. A plug e^3 , of brass or other non-magnetic material, is preferably provided in said
 10 extension to serve as a buffer and prevent the extension from sticking to the end of the magnet-core through the effect of any residual magnetism.

A contact-point g is carried by the armature, preferably consisting of a screw passed through from its underside between the axial line and the inner end and projecting through the armature for a short distance above the upper surface. Coacting with this contact-
 20 piece carried by the armature a contact-spring g' is provided, which is mounted upon a brass plate h , carried by the forward insulating end piece a^2 . The brass plate h has a rearwardly-extending tongue h' formed
 25 thereon to afford means for attaching one of the terminal wires of an electric circuit. The other terminal wire of the circuit, which is to be controlled by the relay, may be soldered to the brass rod i , which is mounted in the
 30 rear portin of the metallic framework of the relay.

It will be seen that as the armature rotates the contact-point g carried thereby will swing in the arc of a circle, and the spring g'
 35 is disposed so that it is substantially tangential to this arc. As the armature swings up into a horizontal position, therefore, a rubbing contact will be effected between the two parts g g' . This rubbing contact is preferable to an ordinary contact, because it is
 40 more effective electrically and keeps itself clean.

Having thus described my invention, I claim as new and desire to secure by Letters
 45 Patent—

1. The combination with an electromagnet, of a U-shaped pole-piece for the magnet, secured to the magnet-core at the rear end, the arms of said pole-piece extending forward on
 50 either side of the magnet and projecting beyond the front end thereof, and an armature pivoted in the arms of said pole-piece and normally resting in an angular position, the end of said armature nearest the magnet-

core being adapted to be attracted thereby, 55 to swing said armature about its pivot into a position substantially in alinement with the magnet-core, as set forth.

2. The combination with an electromagnet, of a rectangular block of iron pivoted in front 60 of said magnet, to swing in a vertical plane, forming an armature for the magnet, the pivotal line or axis of rotation of the armature being substantially in the plane of the magnet-core and substantially at right an- 65 gles with the line of said core, the armature normally resting in an angular position with its inner end slightly below the end of the magnet-core, the magnet, when excited, being adapted to attract the end of the arma- 70 ture to swing the armature into a position substantially in alinement with the core, as set forth.

3. The combination with an electromagnet, of a U-shaped pole-piece for the magnet, se- 75 cured to the magnet-core at the rear end, the arms of said pole-piece extending forward on either side of the magnet and projecting beyond the front end thereof, an armature pivoted in the arms of said pole-piece and nor- 80 mally resting in an angular position, the end of said armature nearest the magnet-core being adapted to be attracted thereby, to swing said armature about its pivot into a position substantially in alinement with the magnet- 85 core, and an extension of the armature adapted to be attracted by the side of the core, which exerts a direct pull thereon, said extension further serving as a stop, striking against the side of the core to limit the arc 90 through which the armature may swing, as set forth.

4. The combination with an armature pivoted to swing in an arc of a circle, of a stationarily-mounted contact-piece g' and a con- 95 tact-piece g carried by the armature and swinging in an arc with the same, the stationary contact-piece being mounted to engage the moving piece substantially tangentially to the arc of its movement, whereby a 100 rubbing contact between the two pieces is effected, as set forth.

In witness whereof I hereunto subscribe my name this 7th day of November, A. D. 1900.

WILLIAM W. DEAN.

Witnesses:

DE WITT C. TANNER,
 W. W. LEACH.