

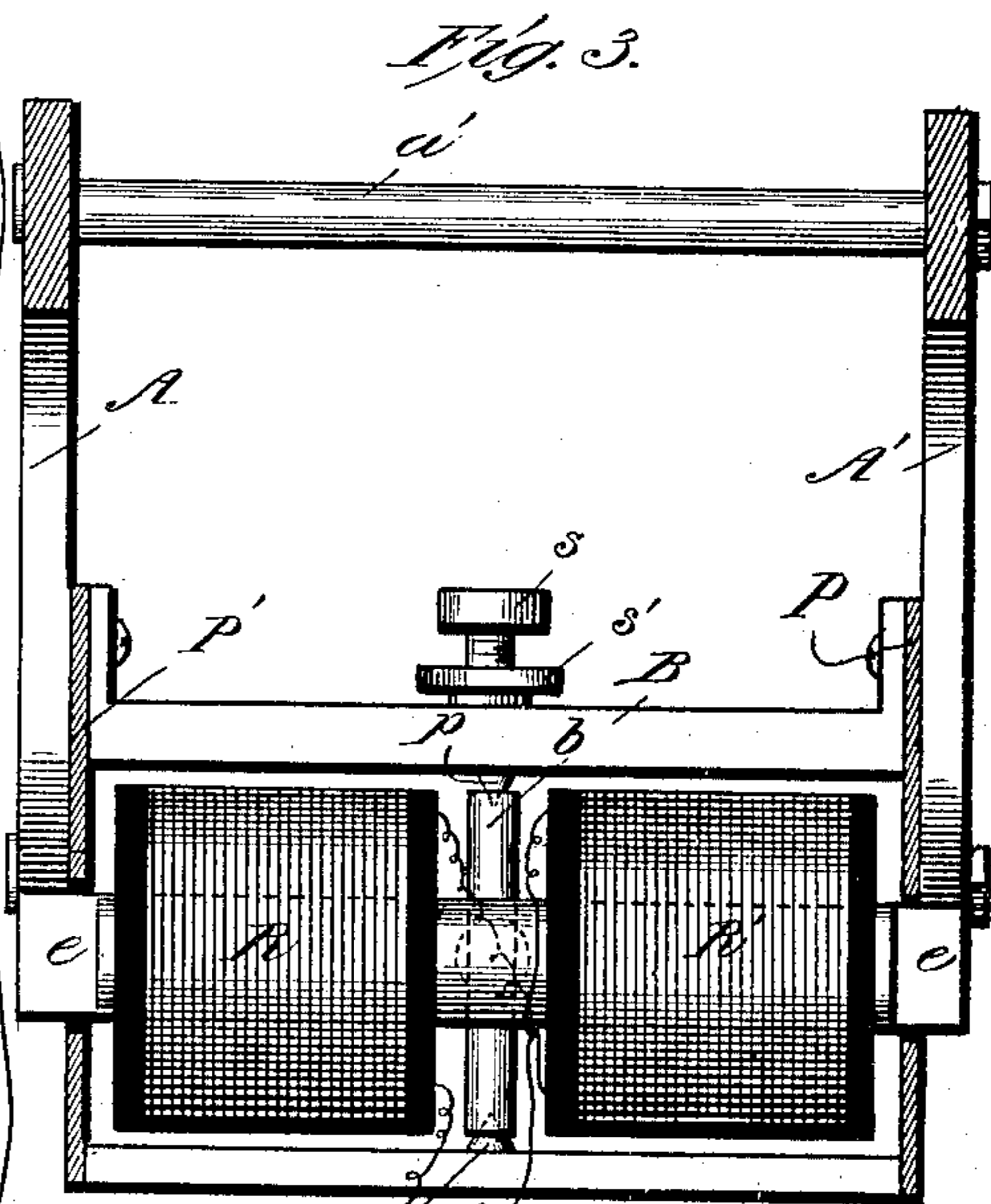
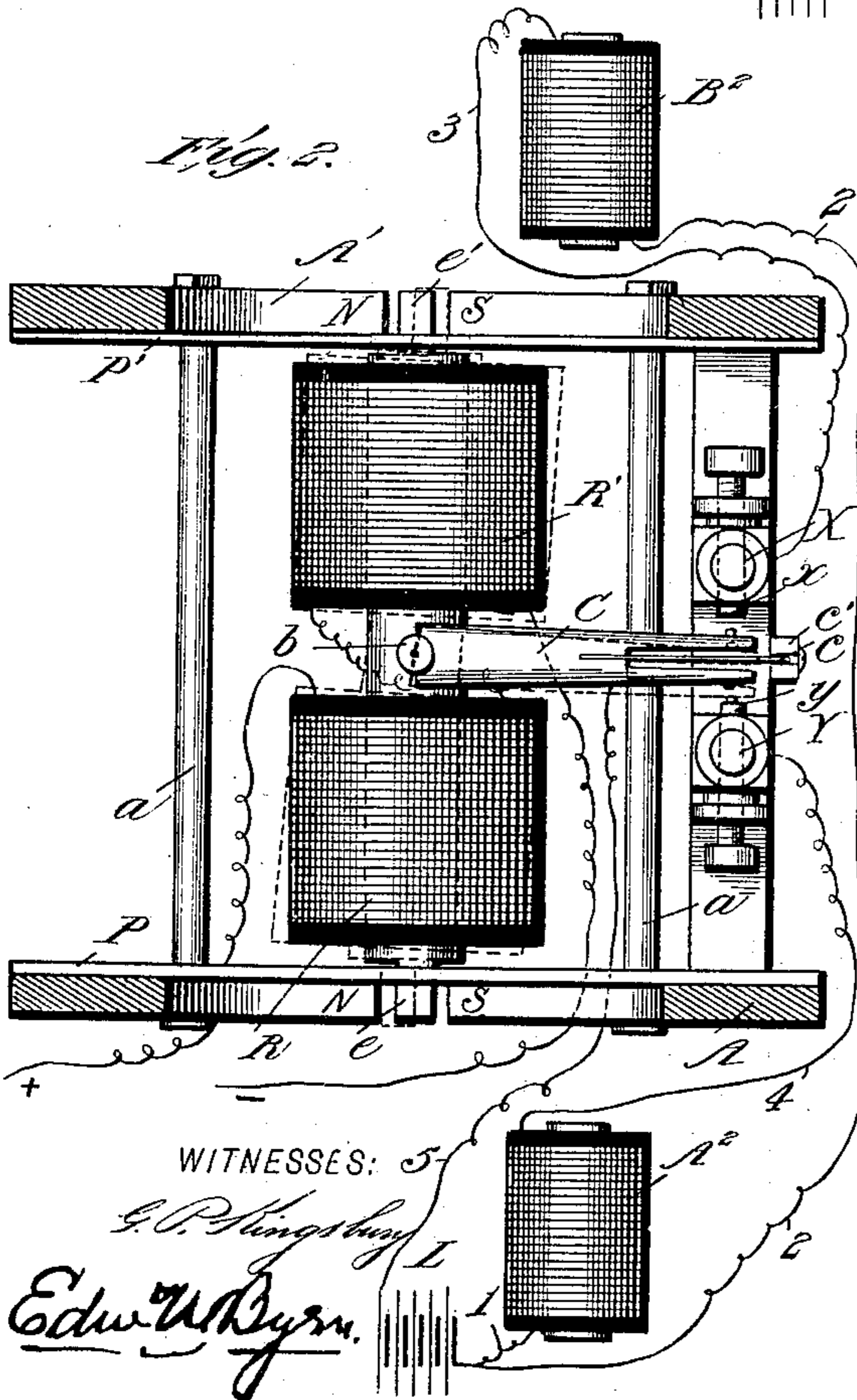
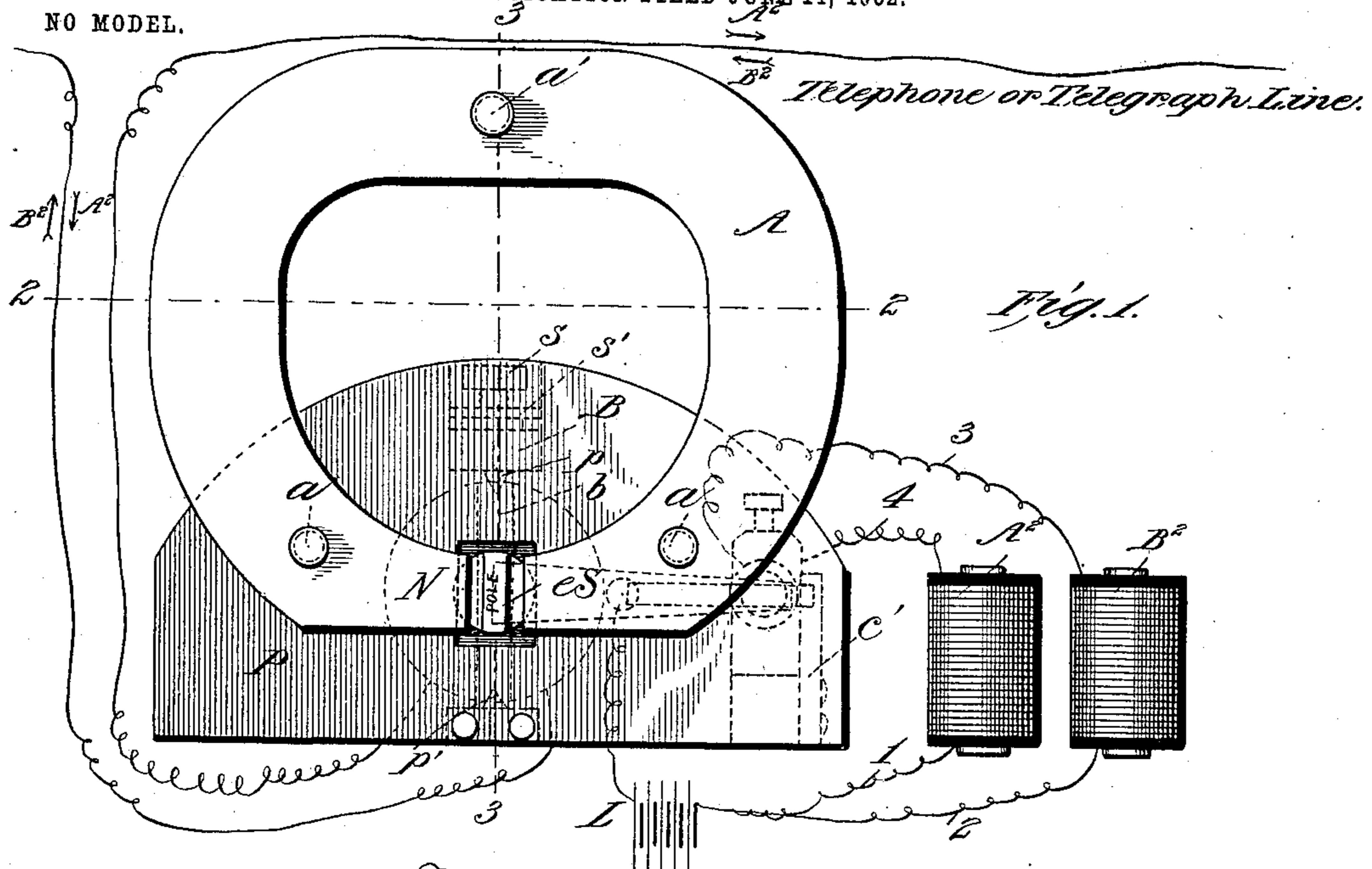
No. 757,341.

PATENTED APR. 12, 1904.

W. PALMER, JR.  
RELAY MAGNET.

APPLICATION FILED JUNE 14, 1902.

NO MODEL.



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# UNITED STATES PATENT OFFICE.

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## RELAY-MAGNET.

SPECIFICATION forming part of Letters Patent No. 757,341, dated April 12, 1904.

Application filed June 14, 1902. Serial No. 111,693. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM PALMER, JR., of Rincon, in the county of Donna Ana, Territory of New Mexico, have invented a new and useful Improvement in Relay-Magnets, of which the following is a specification.

The object of my invention is to provide a simple and practical relay-magnet of a kind designed to enable the current from a local battery to be directed at will through either one of two electromagnets by merely reversing the polarity of the current on the main line at a remote point; and it consists in the novel construction and arrangement of parts, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a side elevation of the instrument shown in connection with a diagram of circuits. Fig. 2 is a horizontal section on line 2 2 of Fig. 1, showing the same diagram of circuits; and Fig. 3 is a vertical section on line 3 3 of Fig. 1.

In the drawings, A and A' are two horseshoe permanent magnets, which are disposed in vertical parallel planes several inches apart, the poles of each magnet being at the lower edges and being brought close together, as seen at N and S. These horseshoe-magnets are secured to the outer sides of two parallel plates P P', and these plates and horseshoe-magnets are connected together into a permanent and rigid frame structure by through-rods *a a* near the poles of the horseshoe-magnets and another, *a'*, at the top. At points between the poles of the horseshoe-magnet the plates P and P' are cut away, and through these openings project the flattened ends *e e'* of the core of an elongated and double-helix relay R R'. This core is at right angles to the plane of the horseshoe-magnets, and the opposite ends of the core lie, respectively, between the two poles of each horseshoe-magnet. On this core between the two horseshoe-magnets are wound two helices. The two helices are wound as one, except that the sections R and R' are separated far enough to permit a vertical pivot-bar *b* to pass through the center of the core and be held between an upper and lower pivot-point *p* and *p'*, of which *p* is formed on the lower end of an adjustable

screw *s*, tapped through a cross-bar B, connecting the two plates P P' and fixed in position by a jam-nut *s'*. Between the two sections R R' of the helix there is rigidly attached to the core, or to the helices themselves, or to the pivot-bar a horizontally-projecting arm C, extending at right angles to the polar axis of the relay. This arm is slotted at its outer end and has rigidly fixed in the inner end of this slot a flat spring *c*, whose outer end rests in a seat in a short vertical post *c'* and is restrained thereby. On the opposite sides of the end of the arm C there are disposed the back-stop contacts *x* and *y*, formed on the ends of horizontal adjusting-screws tapped in the binding-posts X and Y. The purpose of the spring *c* is to hold the arm C midway between the two contacts *x* and *y* without touching either and to allow the arm to be deflected to contact with either point and to restore said arm to the middle position again.

L is a local battery, one pole of which is connected by branched wires 1 and 2 to the two electromagnets A<sup>2</sup> and B<sup>2</sup>. From these electromagnets other wires 3 and 4 lead, respectively, to the two contact-points *x* and *y*. The other pole of the local battery L is connected by wire 5 with the arm C.

Now when the arm C is deflected to contact with the point *x* the local-battery circuit is made through wire 2, electromagnet B<sup>2</sup>, wire 3, contact *x*, arm C, and wire 5 to the other pole of the battery. When, however, the arm C is deflected to contact with the point *y*, the current from the local battery flows through wire 1, electromagnet A<sup>2</sup>, wire 4, contact-point *y*, arm C, and wire 5 to the other pole of the battery. It will thus be seen that either the electromagnet A<sup>2</sup> or B<sup>2</sup> may be energized, according as the arm C is deflected in one direction or the other.

To control now from a distant point the direction of the deflection of the arm C, a line-wire, such as a telephone or telegraph wire, is connected to the helix of the relay-magnet, as shown, and the current is made to traverse both helix-sections of the relay. Now if a current flowing in the direction indicated by the arrows A<sup>2</sup> A<sup>2</sup> is sent through the relay its pole-pieces lying between the poles of the per-

manent horseshoe-magnets will be deflected in one direction, and the relay and the arm C will accordingly be deflected in the same direction. If, however, the polarity of the actuating-current be reversed, so that it flows in the direction of the arrows B<sup>2</sup> B<sup>2</sup>, then such current, acting in the relay, will produce a contrary effect upon the pole-pieces between the horseshoe-magnets and will deflect this relay and its arm C in the opposite direction. It will therefore be seen that by means of the device described an electric circuit from a local battery may be diverted at will through either one of two electromagnets to produce any desired effect for various uses to which it may be applicable by simply reversing the polarity of the actuating-current from the remote point.

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

1. A relay-magnet comprising two horseshoe-magnets arranged parallel to each other, an electromagnet having the opposite ends of its core extended between the poles of the horseshoe-magnets with the longitudinal axis of the core at right angles to the plane of the horseshoe-magnets and a helix at each end of the core inside the horseshoe-magnets, pivots for the electromagnet arranged between the two helices in an axial line at right angles to the core, an arm connected to the electromagnet and moving therewith on its pivots, and back and front contacts for the arm adapted to connect with two independent circuits substantially as described.

2. A relay-magnet comprising two horseshoe-magnets arranged in vertical planes parallel to each other, an electromagnet made with a single core disposed between the horseshoe-magnets at right angles to the plane of the same and two spaced-apart helices, said core being extended at opposite ends between the poles of the horseshoe-magnets, pivots arranged between the sections of the helices on an axis at right angles to the core, an arm attached to the relay, and front and back contacts for the arm adapted to connect with two

independent circuits substantially as described.

3. A relay-magnet comprising two horseshoe-magnets arranged in vertical planes parallel to each other, two frame-plates connected thereto in parallel positions, cross-bars connecting the two horseshoe-magnets and plates, an electromagnet made with two spaced-apart helices and having an extended core forming pole-pieces extended at opposite ends between the poles of the horseshoe-magnets, pivots mounted in the cross-bars and arranged between the sections of the helices on an axis at right angles to the core, an arm attached to the relay, and front and back contacts for the arm adapted to connect with two independent circuits substantially as described.

4. A relay-magnet comprising two parallel horseshoe-magnets, an electromagnet having the opposite ends of its core extended between the poles of each horseshoe-magnet at right angles to the plane of and between the horseshoe-magnets, pivots for the electromagnet arranged in an axial line at right angles to its core, an arm connected to the electromagnet and moving therewith on its pivots, and back and front contacts for the arm combined with a local battery and two independent electric circuits, one of which connects with and is completed through one of said contacts of the relay-arm, and the other of which is connected with and completed through the other of said contacts, substantially as and for the purpose described.

5. A relay-magnet comprising a horseshoe-magnet, an electromagnet pivoted in its middle and having its core extended between the poles of the horseshoe-magnet, an arm attached to the electromagnet and having its end slotted and provided with a flat spring fixed in the inner end of said slot in middle position therein, a retaining-seat for the outer end of said spring and front and back contacts for the arm substantially as shown and described.

WILLIAM PALMER, JR.

Witnesses:

SOLON C. KEMON,  
J. MIDDLETON.