(No Model.)

A. E. COLGATE.

GALVANOMETER.

No. 428,746. Patented May 27, 1890.

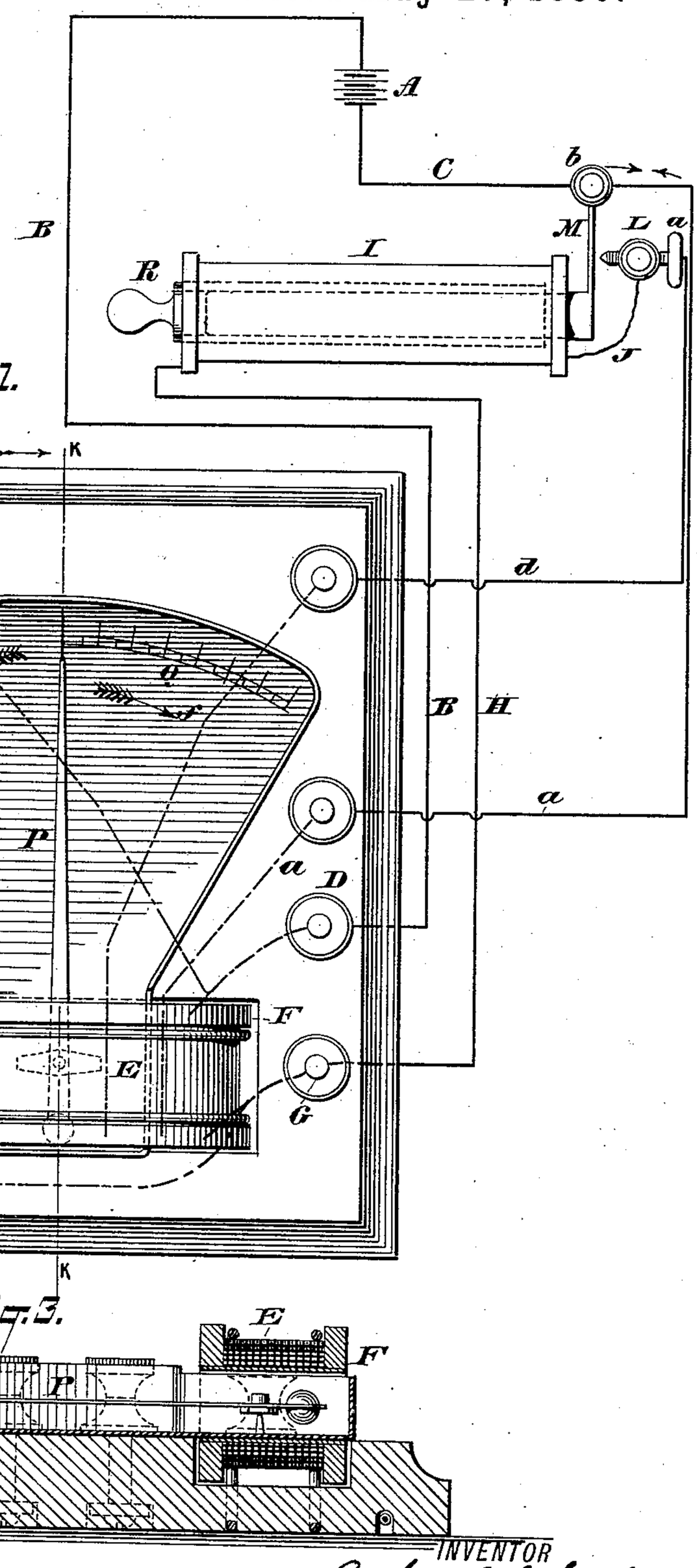

Fig. 2.

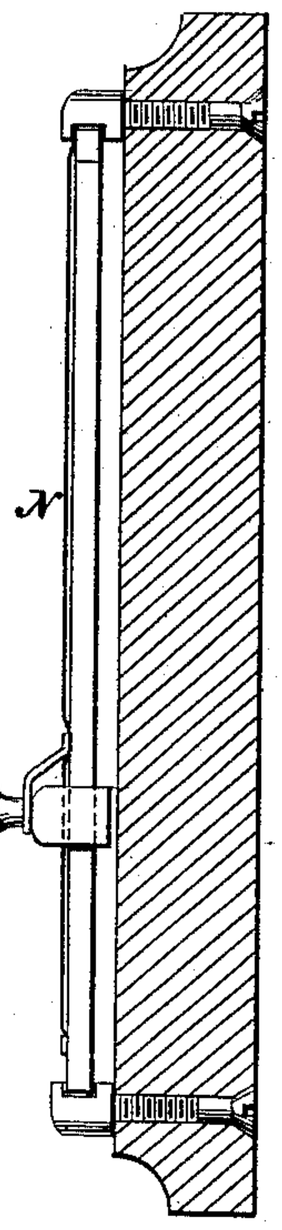

Fig. 1.

Fig. 3.

WITNESSES:

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GALVANOMETER.

SPECIFICATION forming part of Letters Patent No. 428,746, dated May 27, 1890.

Application filed March 5, 1890. Serial No. 342,684. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR E. COLGATE, a resident of New York city, county and State of New York, have invented an Improved Galvanometer, of which the following is a specification, reference being had to the accompanying drawings, forming part hereof, wherein—

Figure 1 is a face view of my improved galvanometer; Fig. 2, a vertical section on the line *c c*, Fig. 1; and Fig. 3, a vertical section on the line *k k*, Fig. 1.

This invention relates to a new apparatus for measuring for medicinal purposes the strength of an induced current.

The invention consists, mainly, in combining a balanced needle with a core wound with two wires, one coarse and the other fine, the coarse wire connecting with the battery and with the induction-coil, the fine wire connecting with the battery and the hammer-post of the induction-coil, all as hereinafter more fully described.

In the drawings, the letter A represents a suitable battery, from which extend the conductors B and C. The conductor B passes to the binding-post D, and thence to the coil E, which surrounds the tubular core F. From this coil, which is the coarse coil, the battery-conductor passes to the binding-post G, and thence by the conductor H to the induction-coil I, from which extends the conductor J, to the hammer-post L, M being the hammer of the induction-coil. A branch of the coarse-wire coil extends to a shunt N, of well-known construction, by means of which the resistance through this conductor can be varied at will. The coil E is also wound with a finer coil of wire, of which one end extends by the conductor *a* to the binding-post *b* of the hammer M, while the other end of the fine coil goes by the conductor *d* to the hammer-post L.

P is a needle pivoted at such a distance from the doubly-wound core F that it shall be exposed to the influence of the currents passing around and through said core. It is not necessary that the needle P shall be pivoted within the core, as in the drawings. Its pivot may be outside of the same. Nor is it necessary that the needle shall extend into the core, as shown. The point of the needle is adapted to travel over a graduated scale Q.

The coarse coil on the core F is wound in opposite direction to the fine coil, the effect being that when the needle is under the influence of the current passing through the coarse coil it will be moved in the direction of the arrow *e*, while if it is under the influence of the current passing through the fine coil it will be moved in the direction of the arrow *f*. When the circuit is first completed—that is, when the battery starts in operation—the current passes through the coarse coil of the galvanometer-core F, and through the primary of the induction-coil I, and through the circuit-breaker J L M and conductor C back to the battery. This current has a tendency to swing the needle in the direction *e*. As the current passes through the coil I, the iron core of that coil becomes magnetized and attracts the hammer M, as in Fig. 1, thereby bringing the circuit at M L, as in Fig. 1, said figure showing the circuit of the coarse wire thus broken. Upon breaking this circuit the iron core of the induction-coil I becomes instantly demagnetized and causes a current in the opposite direction to flow through the primary coil in I and through the conductors J L *d* to the fine coil of the galvanometer and back through the conductor *a*. This current is of higher voltage than the current passing through the coarser coil, but of less ampèrage. Therefore it has to make more turns around the core F to get the same number of ampère feet to effect the balance of the needle. Upon withdrawing the brass tube R more or less from the induction-coil I this current becomes stronger and throws the needle out of balance toward F. Thus by adjusting the shunt N and the brass tube R the desired balance of the needle can at any time be obtained, and prior to the completion of such adjustment the needle will show how much more either the one or the other current must be modified.

Having now described my invention, what I claim is—

1. The galvanometer consisting of the core F, wound with a coarse coil and in an opposite direction with a fine coil, in combination

by suitable conductors with the induction-coil I, its circuit-breaker L M, and battery A, substantially as described.

2. The galvanometer consisting of the core F, wound with a coarse coil and in an opposite direction with a fine coil, in combination by suitable conductors with the induction-coil I, its circuit-breaker L M, shunt N, and needle P, substantially as described.

3. The galvanometer-core F, wound in opposite directions with a coarse and a fine coil, combined with the shunt D, for regulating the current through the coarse coil, with the induction-coil I, having a movable brass tube R, for regulating the strength of the current through the fine coil, and with the circuit-breaker L M and battery A, as and for the purpose described.

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Witnesses:

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