(No Model.) 2 Sheets—Sheet 1.

H. S. L. VERLEY.

RELAY.

No. 502,449. Patented Aug. 1, 1893.

Fig. 1.

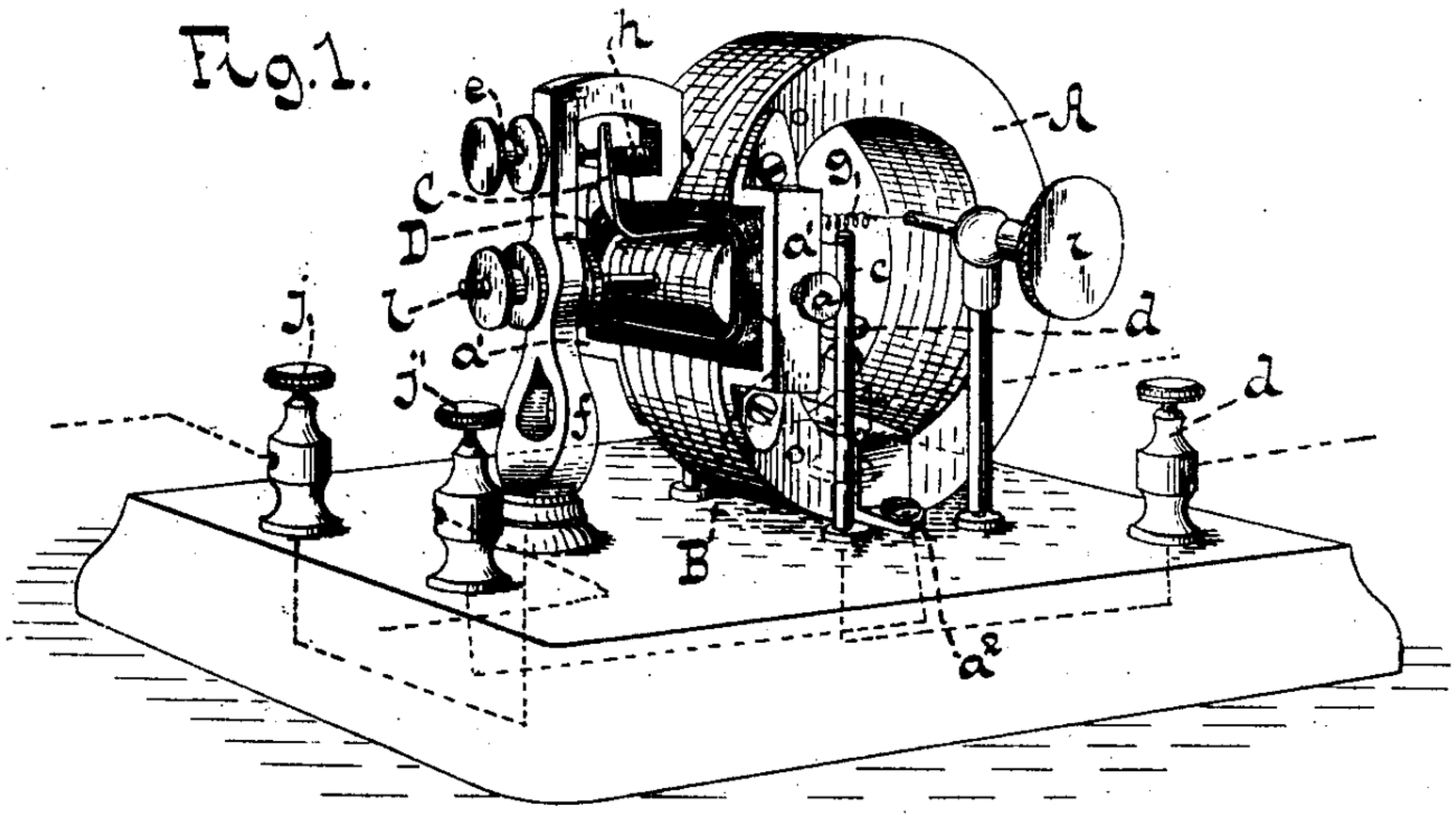


Fig. 2.

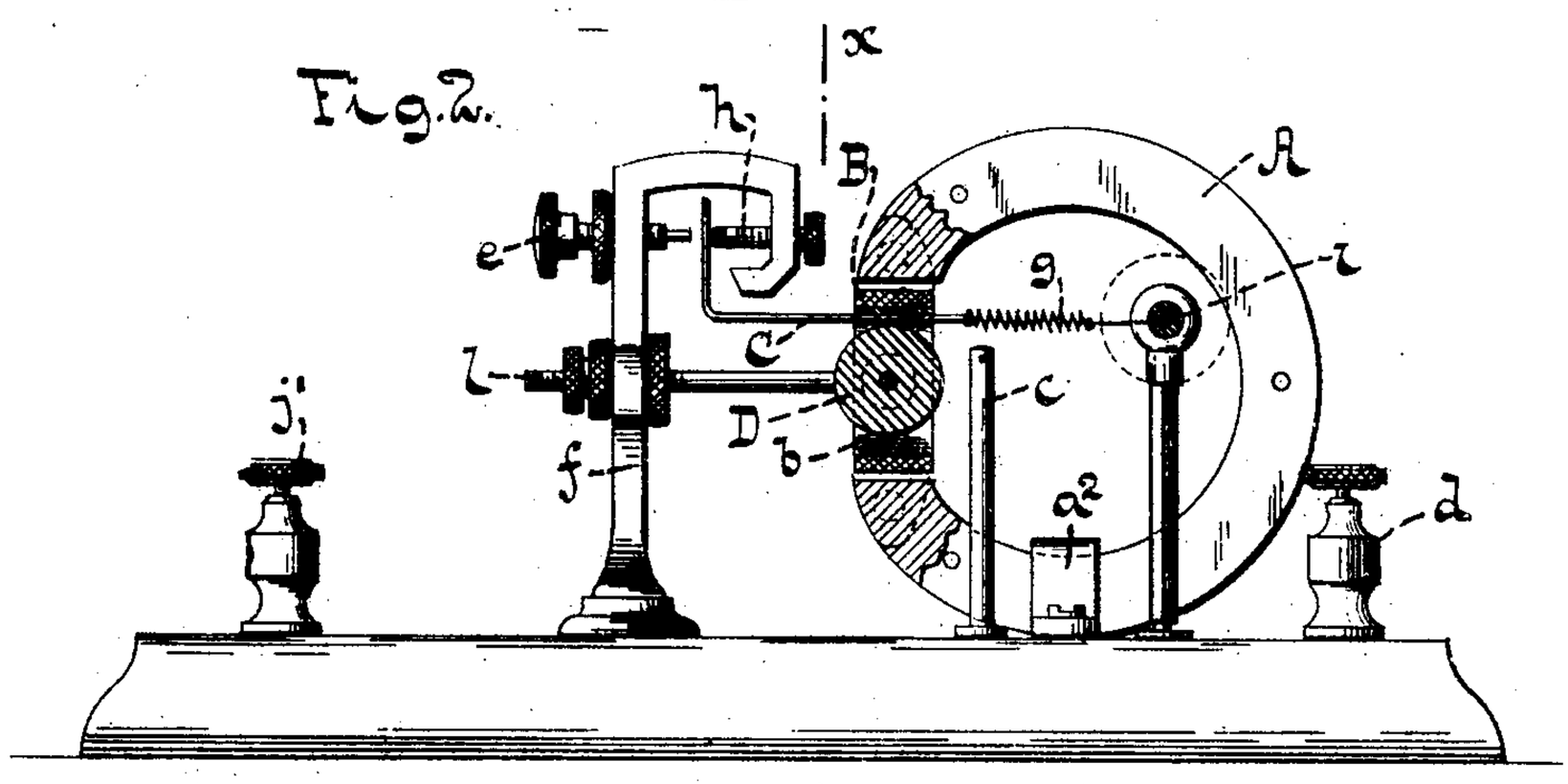
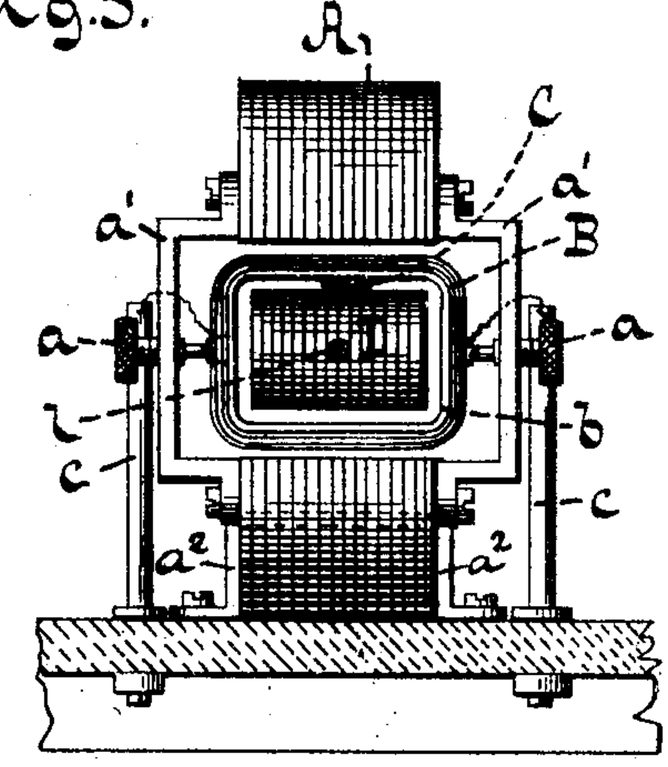


Fig. 3.



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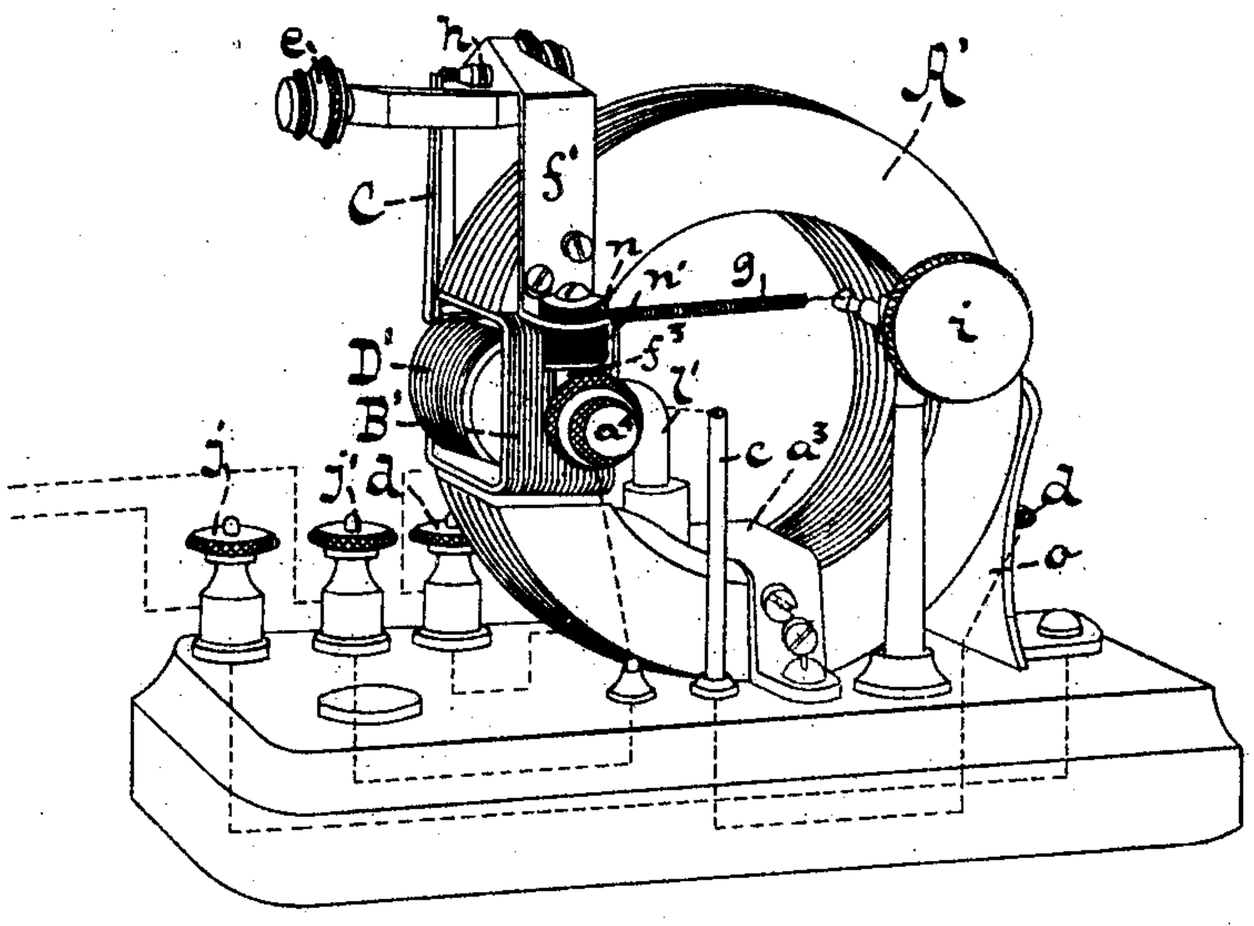
(No Model.) 2 Sheets—Sheet 2.

H. S. L. VERLEY

RELAY.

No. 502,449. Patented Aug. 1, 1893.

Fig. 4.



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UNITED STATES PATENT OFFICE.

HORACE S. L. VERLEY, OF HOBOKEN, NEW JERSEY.

RELAY.

SPECIFICATION forming part of Letters Patent No. 502,449, dated August 1, 1893.

Application filed March 27, 1893. Serial No. 467,896. (No model.)

To all whom it may concern:

Be it known that I, HORACE S. L. VERLEY, a subject of the Queen of Great Britain, and a resident of Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Relays, of which the following is a specification.

My invention has reference to improvements in relays, and has for its object to render instruments of this class sensitive to the weakest currents.

With this object in view my invention consists essentially in a relay comprising a magnet, and a movable coil electrically connected with the main line and provided with a contact arm adapted to close and break the local circuit; all of which is hereinafter more fully pointed out, reference being had to the annexed drawings, in which—

Figure 1 represents a perspective view of a relay constructed according to my invention. Fig. 2 is a side elevation, partly in section. Fig. 3 is a vertical section in the plane *x x*, Fig. 2. Fig. 4 is a perspective of a modified form.

Similar letters of reference indicate corresponding parts through the several views of the drawings.

In the drawings, referring at present to Figs. 1, 2 and 3, the letter A designates a powerful permanent magnet substantially circular in shape and having its ends or poles brought to face each other and located at a suitable distance apart. The magnet is secured to the base of the relay by a suitable strap a^2. Between the poles of the magnet is located a coil B, which is free to turn or vibrate about an axis determined by the pivots *a a*. The coil consists of a brass or other non magnetic frame *b*, preferably rectangular in form, arranged to turn about the pivot screws *a* secured in the saddles a'; which frame is wound with insulated wire to offer a small resistance, say five to thirty ohms. The ends of the wire are led to suitable posts *c c* placed in connection with the binding posts *d d* of the line wire. To the frame *b* of the coil is secured a light metallic contact arm C, the free end of which is arranged opposite a contact screw *e* secured in the bracket *f*. The coil is held in its normal position by a spring *g* attached at one end to the contact arm C and at the other end through the intervention of a cord or wire to a key *i*. The spring holds the contact arm against an insulated stop *h* and its tension can be regulated by said key *i* to return the coil to its normal position. The bracket *f* is connected to one of the binding posts *j* for the wires from the local battery; the contact arm C is connected through the frame *b*, pivot *a*, saddles a', strap a^2 and a suitable wire with the second binding post j' for said local battery. Within the coil is located an armature D, which may be made either of soft iron, or it may be a permanent magnet. The armature is held stationary by any suitable means, for instance by the rod *l* adjustably secured on the bracket *f*.

It is evident that if a current is passed through the coil, the latter will be deflected or turned about its pivots and the contact arm C thrown into contact with the contact screw *e* thereby closing the local circuit. In practice I have found that currents as low as .001 ampères and even less will cause the coil to deflect sufficiently to close the local circuit.

The electro magnet and armature may be laminated as shown, or the armature may consist of a bunch of soft wires similar to the core of an induction coil.

In the example illustrated in Fig. 4 I have shown the primary elements substantially identical with those shown in the prior figures, the prime difference consisting in the arrangement of the auxiliary parts to render the instrument more compact. The armature in this example is secured to a post l' made integral with or secured to the strap a^3 holding the magnet A′ to the base, and the bracket f' is secured to the upper pole of the magnet. From the lower part of said clamp are suspended bearings f^3 for the pivots a^4 of the coil D′, the same being properly insulated by non-conducting washers *n n′*. An additional support *o* is provided for the magnet A′.

It is evident that an electro-magnet could be substituted for the permanent magnet, or two magnets of either description could be used, between which the coil is arranged to vibrate, and furthermore the several connections and contacts could be arranged or effected in any other known manner.

Instead of arranging the coil to turn about pivots, it could be suspended from or sup-

ported upon a suitable spring arm and also move toward and from the poles. Therefore I do not wish to restrict myself to the specific construction illustrated. I would further add that the principle can be applied to polarized relays with equal advantage.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a relay, the combination of a magnet, a pivoted coil disposed between the poles of the magnet and placed in connection with the line circuit, a contact arm projecting from the coil, a contact arranged on one side of the contact arm and in connection with the local circuit, a stop on the opposite side of said arm and a spring for drawing the arm toward the stop, substantially as described.

2. In a relay, the combination of a magnet, a stationary armature, located between the poles of the magnet, and a pivoted coil arranged about the same and provided with means for closing a circuit, substantially as described.

3. In a relay, the combination of a magnet, a coil arranged to vibrate between the poles of the same, a stationary armature disposed within the coil, a bracket secured to the magnet and provided with a contact, and a contact arm secured to the coil and carried opposite to the bracket contact, substantially as described.

4. In a relay, the combination of a magnet, a stationary supplementary magnet disposed between the poles of the magnet, a pivoted coil arranged about the supplementary magnet and provided with a contact arm arranged opposite a contact point, a spring in connection with the coil and a stop, substantially as described.

5. In a relay the combination of a magnet A, brackets a' secured to opposite sides of the poles thereof, a coil in connection with the line circuit pivoted to said brackets, a contact arm secured to the coil, a contact, a stop and a spring for drawing the arm toward the stop, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 24th day of March, 1893.

HORACE S. L. VERLEY.

Witnesses:
H. W. HELFER,
KLAS H. TERNSTEDT.