

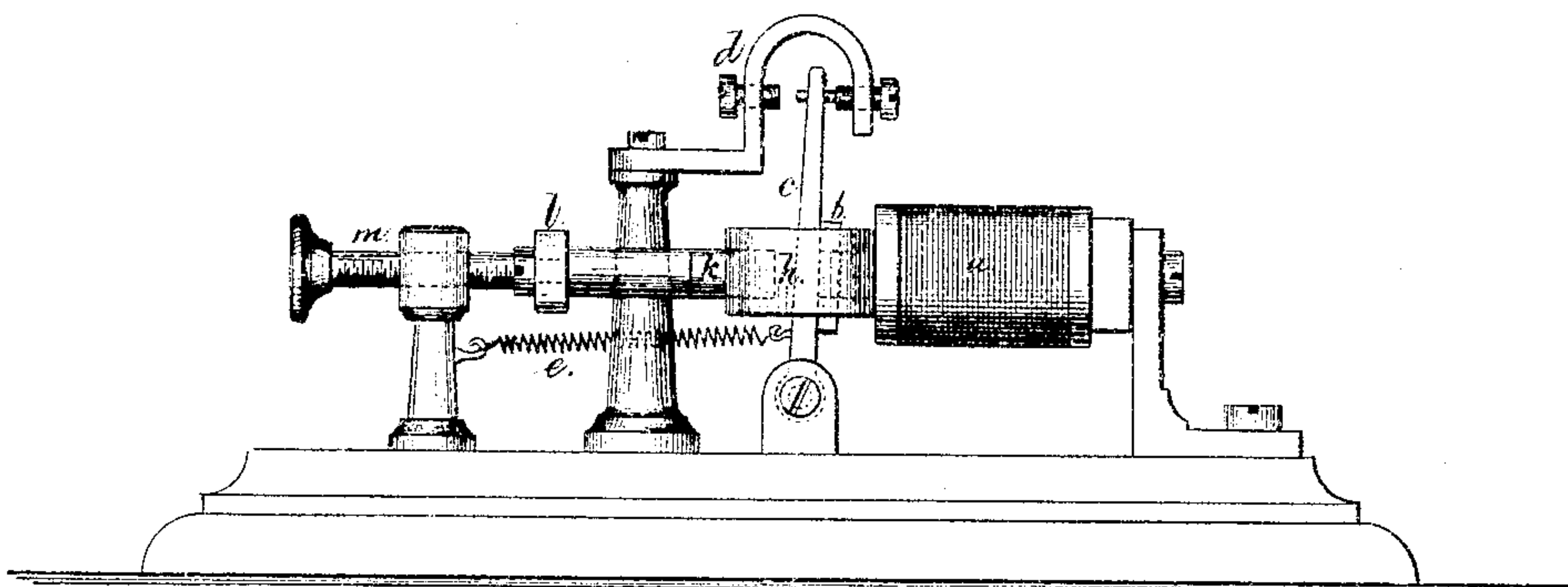
T. A. EDISON.

Improvement in Electro-Magnets.

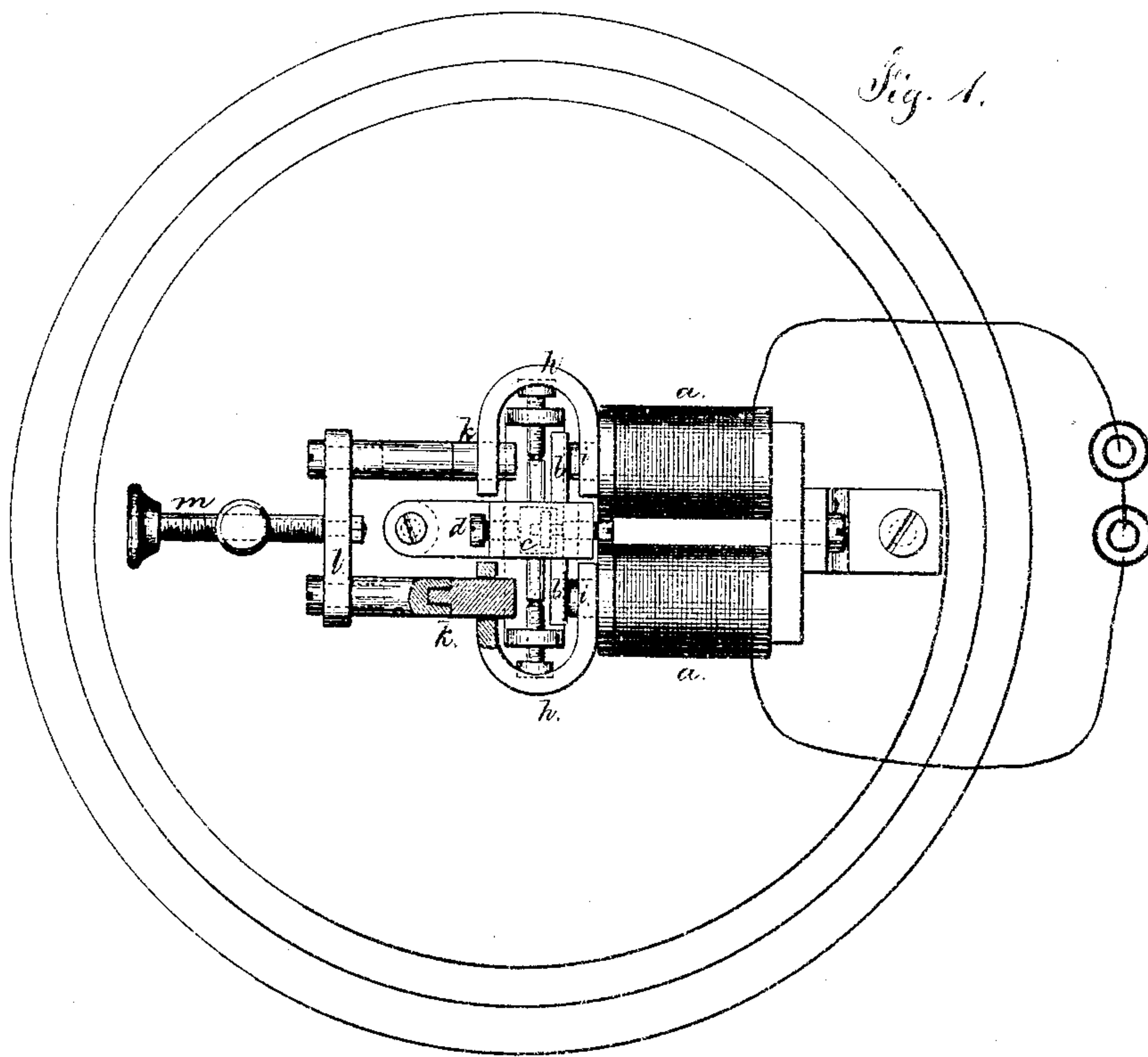
No. 130,795.

Patented Aug. 27, 1872.

*Fig. 2.*



*Fig. 1.*



INVENTOR

*Thomas A. Edison,*

Witnesses.

*Geo. D. Barker*

ATTY.

# UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF NEWARK, NEW JERSEY.

## IMPROVEMENT IN ELECTRO-MAGNETS.

Specification forming part of Letters Patent No. 130,795, dated August 27, 1872.

*To all whom it may concern:*

Be it known that I, THOMAS A. EDISON, of Newark, in the county of Essex and State of New Jersey, have invented an Improvement in Electro-Magnets; and the following is declared to be a correct description of the same.

If two magnets of equal power act in opposite directions and at the same distance from a swinging armature, said armature will not be moved; but by removing one magnet further from the armature the other will be free to exert on that armature a force equal to the difference between the effective force of one magnet and the other. I avail of the foregoing features, and, instead of employing an adjustable spring to draw the armature back, I use a weight or spring of uniform power, and I provide a balancing-pole energized by induced magnetism from the core of the electro-magnet, and use an adjustment, so that the power of the electro-magnet and the induced magnet are balanced in their action on the armature; thus, when the electro-magnet is energized by a powerful current the induced magnetic pole will act with a proportionate power in the opposite direction, or may be adjusted so as to leave only sufficient surplus of force in the electro-magnet to overcome the spring or weight; hence the armature will respond very rapidly, because the opposing forces neutralize each other instantly upon the circuit through the electro-magnet being broken.

In the drawing, Figure 1 is a plan, and Fig. 2 is a side view, of this improvement as applied to a relay-magnet.

The electro-magnet *a* is of usual character. The armature *b* is shown as on the swinging

lever *c* that opens and closes the local circuit at *d*, and a spring or weight at *e* acts to draw back the armature. These parts are to be of any usual or desired character, according to the work for which the instrument is to be employed. The iron yokes *h* are connected with the cores *i i* of the electro-magnets, and they extend around to the balancing-poles *k k* that pass through these yokes, and are made of iron, and hence are magnetized with the same polarity as the cores *i i* by induction. These poles *k* are to be adjusted to stand at the proper distance from the back of the armature, and for this purpose any suitable means may be employed—such as the cross-bar *l* and screw *m*—which must not be of iron, or the proper polarity of the poles *k* would be interfered with.

It will be apparent that the attraction of the poles *k* is acting up the armature *b* in the opposite direction to that of the cores *i*, hence that the relative distance of the poles from the armature must be such that the proper force will be exerted to move the armature when the electro-magnet is energized. If the current is powerful the poles *k* should be closer to the armature, and if feeble the poles should be further removed.

I claim as my invention—

The balancing-poles *k*, energized by induced magnetism from the cores *i* of the electro-magnet, and acting in opposite direction to such electro magnet, substantially as set forth.

Signed by me this 9th day of May, 1872.

T. A. EDISON.

Witnesses:

GEO. T. PINCKNEY,  
CHAS. H. SMITH.