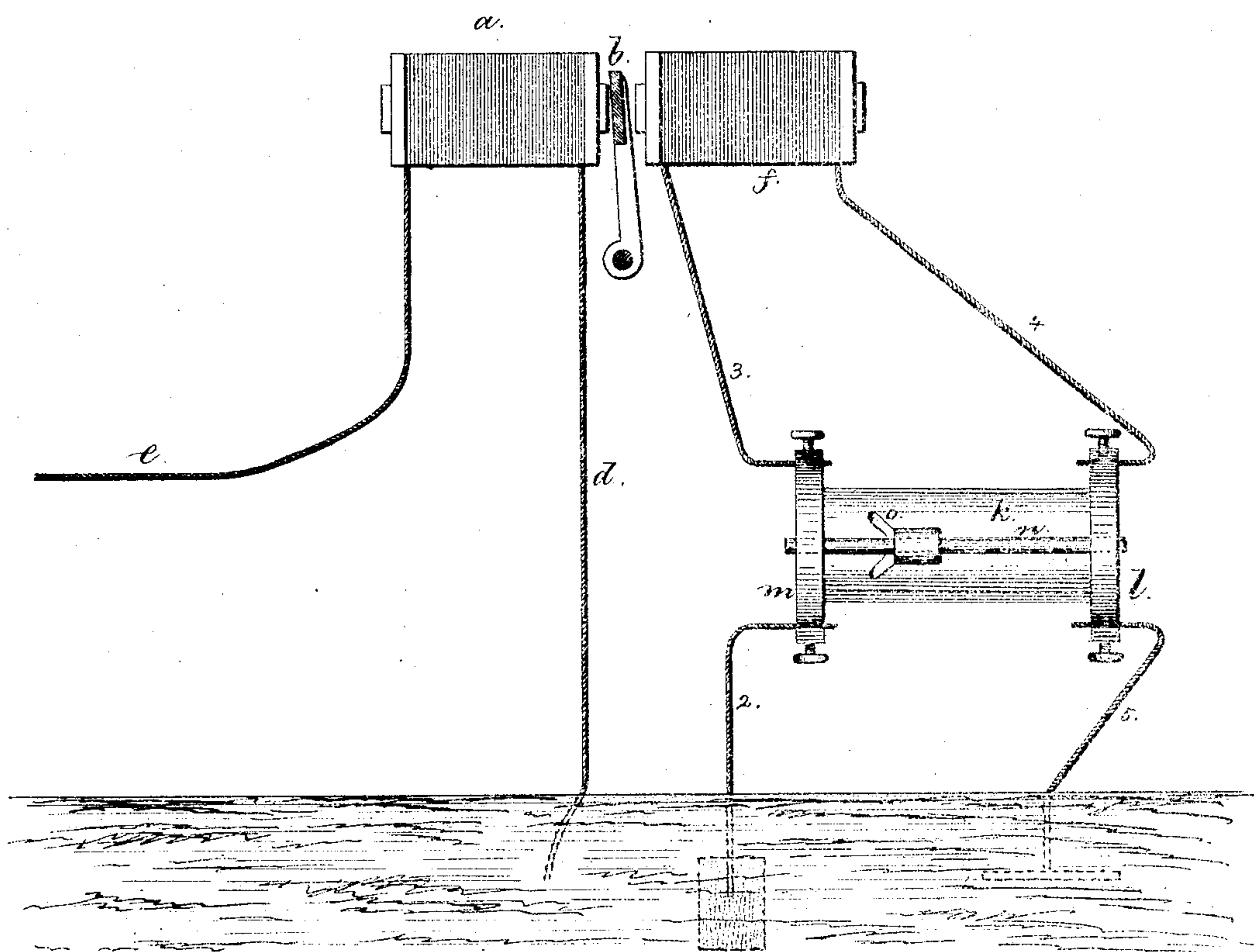


GEORGE LITTLE.

Improvement in Telegraphic Apparatus.

No. 120,290.

Patented Oct. 24, 1871.



Witnesses,

*Charles Smith*  
*Geo. P. Pickney*

*George Little,*  
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*Atty.*

# UNITED STATES PATENT OFFICE.

GEORGE LITTLE, OF RUTHERFORD PARK, NEW JERSEY.

## IMPROVEMENT IN TELEGRAPH APPARATUS.

Specification forming part of Letters Patent No. 120,290, dated October 24, 1871.

*To all whom it may concern:*

Be it known that I, GEORGE LITTLE, of Rutherford Park, in the county of Bergen and State of New Jersey, have invented an Improvement in Telegraph Apparatus; and the following is declared to be a correct description thereof.

In telegraph apparatus electro-magnets are employed for various operations and fitted with armatures that are drawn back by springs; and I have heretofore employed an adjustable permanent magnet for the same purpose. My present invention is for employing an electrical current in a retractile electro-magnet and an adjustable resistance or rheostat for regulating the power of the electro-magnet, so that it may only be sufficient to draw back the armature or armatures of an electro-magnet or magnets, thereby rendering a retractile spring unnecessary and causing greater rapidity in the movement of the armature, as the connections to the retractile magnet can be such as more rapidly clear the armature of induced magnetism.

In the annexed drawing the diagram illustrates the present invention. *a* is an electro-magnet in the circuit *d e*, which may be part of the main line and earth connections, or part of a local or branch circuit. *b* is the armature of the electro-magnet *a*, the same being employed for any desired movement in telegraph or other operations. The retractile electro-magnet *f* is in a local or earth circuit. I have shown the same as connected to the earth, in which case coke and zinc or other sources of positive and negative electricity are buried. The electro-magnetism in *f* may, by the earth circuit, be only sufficient to draw back the armature *b*, in which case a resistance in the circuit of *f* will be unnecessary. It is preferable, for avoiding too great force in the retractile mag-

net *f*, to make use of the resistance-coil or rheostat, which is adapted to divide the electrical current, sending a portion through a shunt or a branch circuit to the magnet *f*, and returning the surplus to the negative pole. The coil of fine wire *k* is connected with the metallic heads *l* and *m*, and between these is a rod, *n*, insulated at the head *m*; and between said rod *n* and the coil *k* is a sliding-spring conductor, *o*, that varies the resistance according to the position of said conductor *o* on the coil *k*, so that electricity, reaching the head *m* through the wire 2, is divided, a part going, by the wire 3, to the retractile magnet *f*, and, by the wire 4, to the head *l* and negative wire 5, and another portion passing through the coil *k*, conductor *o*, and bar *n* to the head *l* and negative wire 5; and, by adjusting the position of the conductor *o*, the proper resistance will be obtained to divert through the shunt or branch circuit 3 *f* 4 only the amount required for drawing back the armature *b*; and this adjustment can be made with greater accuracy than by retractile springs applied in the usual manner.

I claim as my invention—

1. An electro-magnet operated by earth currents and combined with an electro-magnet and armature, for the purposes specified.

2. An adjustable resistance or rheostat, combined with a retractile electro-magnet for the armature of an electro-magnet, and with the branch-circuit connections, substantially as and for the purposes set forth.

Dated August 4, 1871.

GEORGE LITTLE.

Witnesses:

GEO. D. WALKER,  
GEO. T. PINCKNEY.

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