G. LITTLE.

Telegraph Apparatus.

No. 142,486. Patented September 2, 1873.

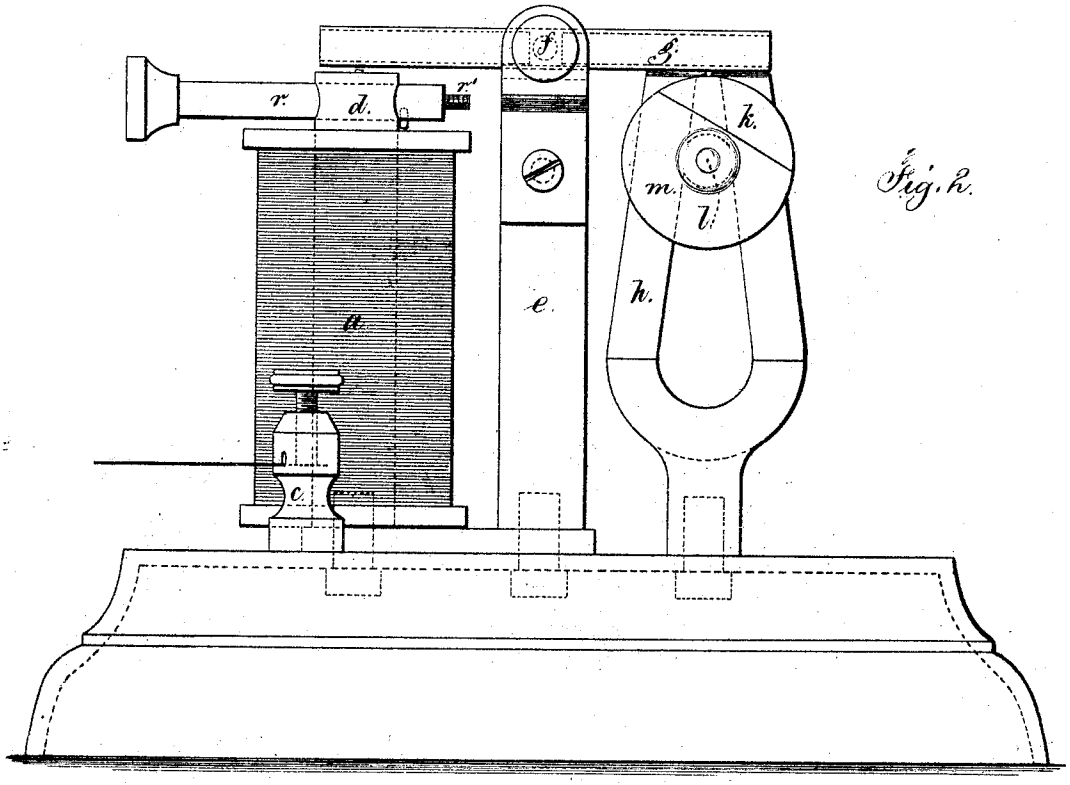

Fig. 2.

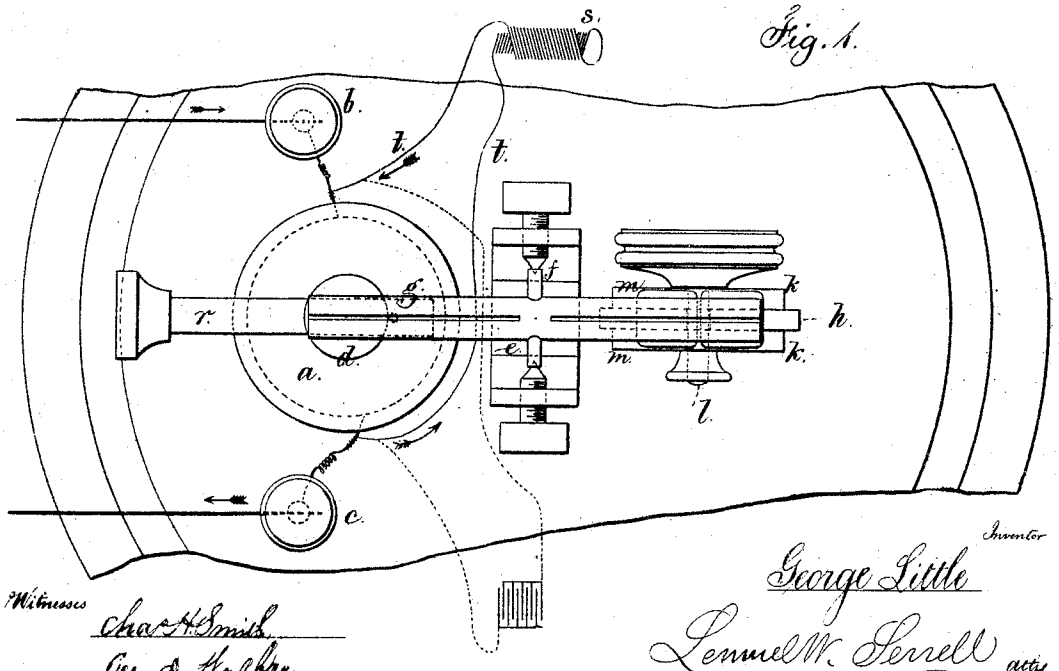

Fig. 1.

Witnesses
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GEORGE LITTLE, OF RUTHERFORD PARK, NEW JERSEY.

IMPROVEMENT IN TELEGRAPH APPARATUS.

Specification forming part of Letters Patent No. **142,486**, dated September 2, 1873; application filed October 3, 1872.

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 Telegraphic Apparatus, of which the following is a specification:

The electro-magnet employed in telegraphic apparatus acts to attract the armature; but to withdraw the same from the core of the electro-magnet a retractile spring has been most generally employed. Sometimes, however, an electro-magnet or a permanent magnet has been employed to retract the armature, as seen in my patents Nos. 130,812, 120,290, and 115,967.

The first part of my present invention relates to a peculiar construction of permanent retractile magnet, by means of which the force exerted upon the armature can be adjusted. The second part of my invention relates to a means for preventing the pulsations of electricity in a main line becoming attenuated or indistinct, when passing through the helix of an electro-magnet, in consequence of the extra current, energized by induced magnetism, following upon the main-line current, and, in rapid automatic telegraphy, rendering the marks on the chemical paper either indistinct or running into each other.

These devices are set forth in my English patent No. 1,207, of April 22, 1872.

In the drawing, Figure 1 is a plan, and Fig. 2 an elevation, of my improved apparatus.

The electro-magnet is of any usual character; and through the helix *a* the pulsations in the electric circuit pass from the binding-screws *b c* and connections. The core *d* and the pole *e* are connected together; and this pole *e* receives the fulcrum *f* of the armature *g*. *h* is the permanent magnet, suitably supported to act upon the armature in the opposite direction to the electro-magnet *a*. It is preferable to employ two pieces of tinned sheet-iron upon the poles of the permanent magnet *h* to prevent the armature adhering to the same, and to enable me to obtain a more delicate adjustment. The keeper *k* is made of soft iron, and connected to the support *l* so as to be adjusted; and the keeper is preferably made in two parts, one on each side of the poles of the magnet *h*, and soldered to the brass, copper, or non-magnetic segment *m*, so that they form disks; and the support *l* is an axis passing through a block between the poles of the magnet, so as to be easily turned to move the keepers *k* across, and more or less into contact with, both poles of the magnet *h*, and thus regulate the effective force of the same upon the armature, for when the keeper is in contact with only one pole of the magnet its power will be greatest. A disk of felt or other yielding material serves to press the keepers into contact with the sides of the permanent magnet. This keeper may be applied to the cores of an electro-magnet for the same purpose, the electro-magnet being connected constantly to a battery.

The aforesaid device allows for adjusting the power of the permanent or retractile magnet, so as to vary the same according to the strength of the electro-magnet, and allow for rapidity of action.

To adjust the electro-magnet *a* I employ the rod *r*, sliding through the core *d*, and coming into contact with the pole *e;* and it is preferable to employ a screw, *r'*, at the end of this rod *r* to enter a hole in the pole *e*, and thereby insure more or less intimate contact, and a greater or less rapidity in the discharge or equalization of the magnetism of the core, and the consequent power thereof, in acting upon the armature. This rod *r* may be employed with any electro-magnet.

The armature may be of any kind, and mounted in whatever manner will effect the desired object. If the armature is to be a sounder, it may be partially or entirely hollow and split, or of sheet metal, as in my patent No. 128,894; and the armature may actuate a pen, stylus, circuit-closer, or any other desired device.

When there are several electro-magnets in the main line, in automatic telegraphing, the extra current developed on breaking the circuit prolongs the effect of the main-line current, and, following each main-line pulsation with a false or attenuated pulsation, the message at the receiving-station upon the chemical paper is blurred and indistinct during rapid transmission. I rectify this difficulty by connecting to the main-line wires *t t*, one on each side of the electro-magnet, and pass the same

to a coil, *s*, of very fine wire, preferably wound back upon the first coil in the opposite direction; or, preferably, to a condenser of thin metallic sheets and intervening non-conducting material, as shown by dotted lines, Fig. 1.

The main-line pulsations do not pass through the coil or condenser direct; but the coil or condenser absorbs the extra current, or tends to produce a reverse current upon the main line as the main-line pulsation ceases, as indicated by the arrows, thus neutralizing the direct action of the extra current.

The core *d* may be split by a longitudinal groove; or it may be made of lengths of insulated or covered rods of iron.

A rheostat may be employed, with connections to the main line at opposite sides of the magnet, to cause a division of the current, part passing through the electro-magnet, part through the rheostat, and part entering the coil or condenser; and this rheostat may be adjustable, or of the required resistance. This connection of a condenser in the main line causes the electro-magnet to discharge more rapidly, even when only one such electro-magnet is employed in the main line.

I claim as my invention—

1. The adjustable keeper *k*, made of soft iron, and mounted upon the support or axis *l* between the poles of the magnet *h*, in combination with the armature and electro-magnet, substantially as and for the purposes set forth.

2. A condenser or helix connected to the main line upon both sides of the electro-magnet, substantially as and for the purposes set forth.

Signed by me this first day of October, A. D. 1872.

GEORGE LITTLE.

Witnesses:

GEO. T. PINCKNEY,

CHAS. H. SMITH.