

G. LITTLE.
Transmitters and Receivers for Automatic
Telegraphs.

No. 142,484.

Patented September 2, 1873.

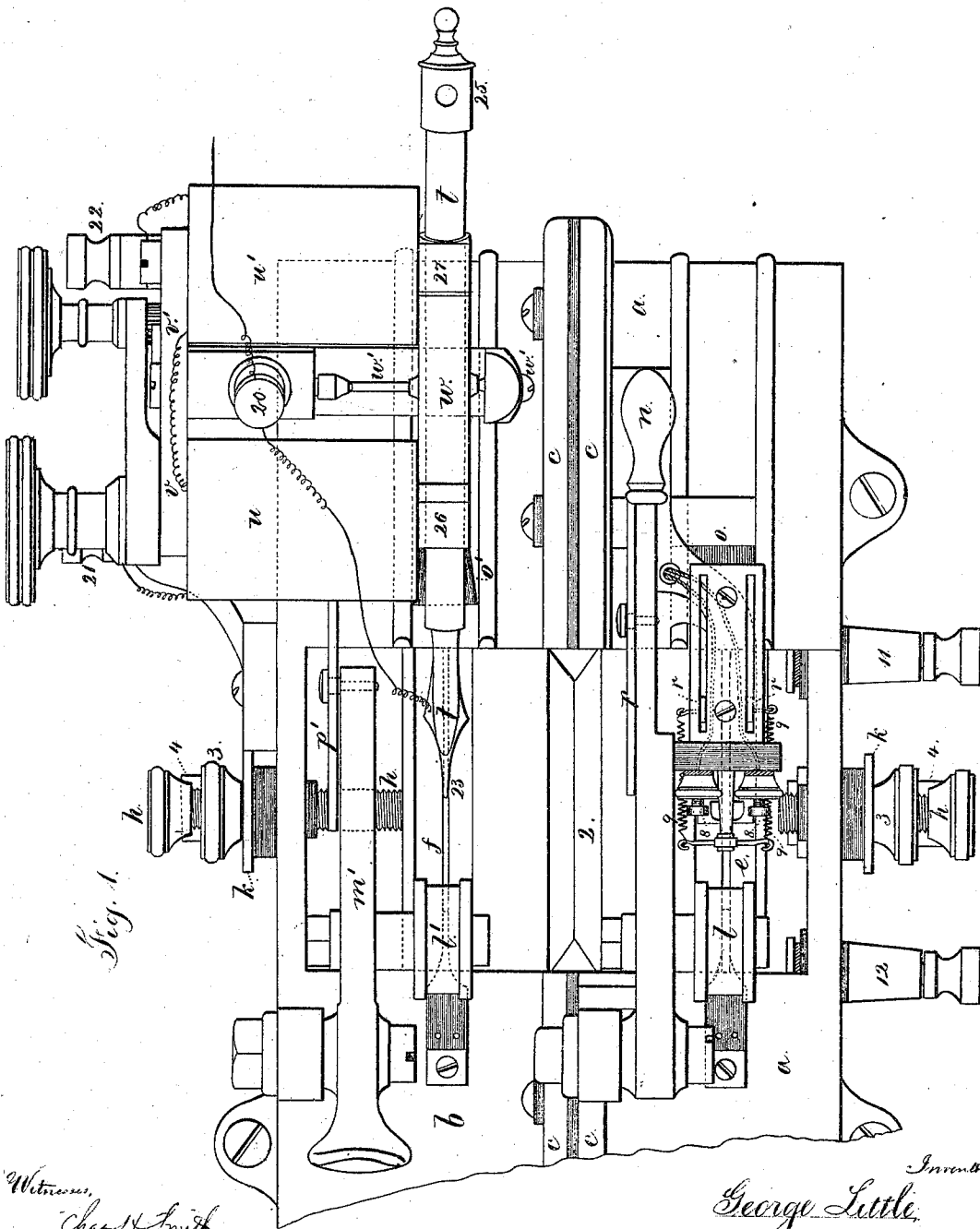


Fig. 1.

Witnesses,
Chas. H. Smith
Geo. D. Hacker

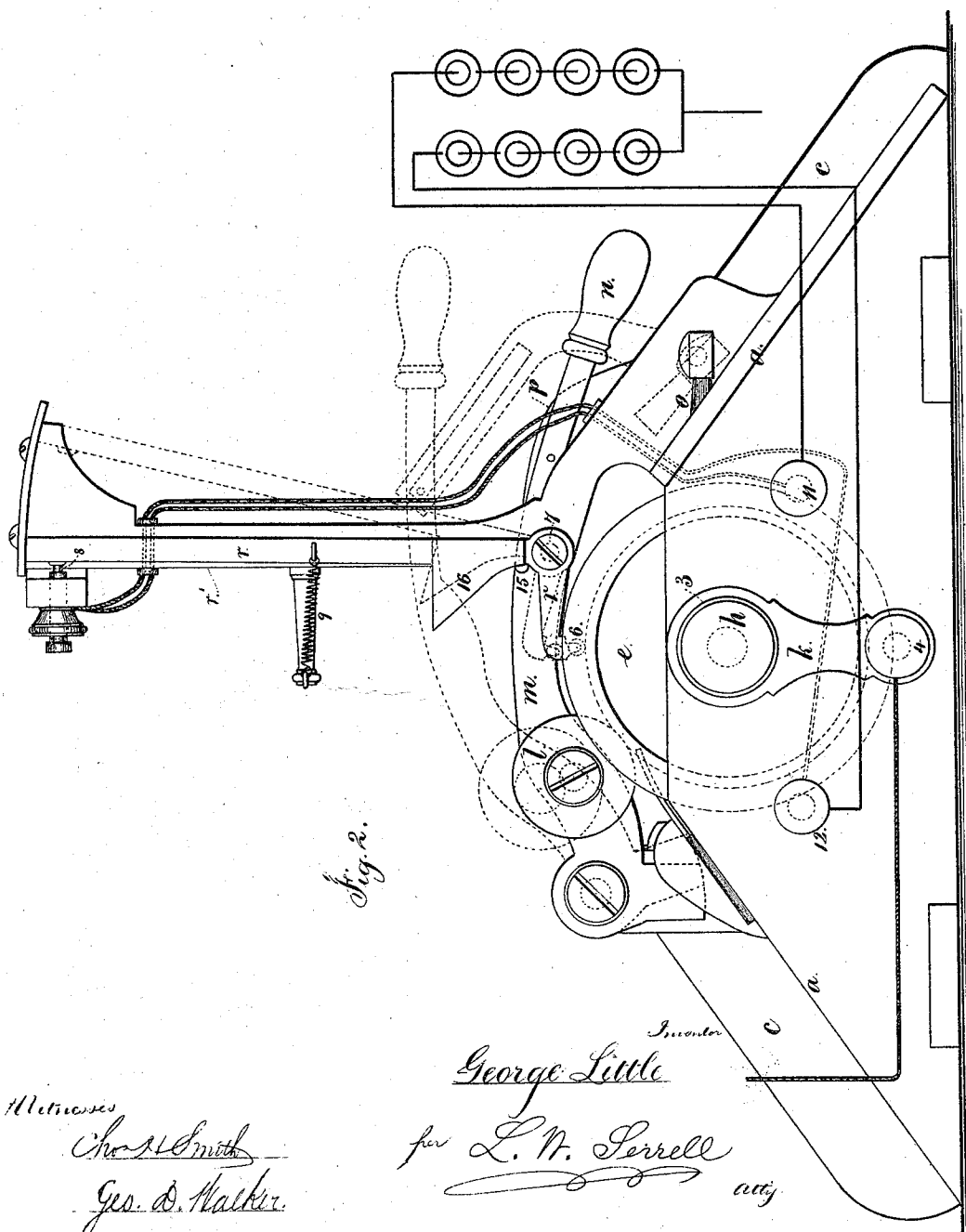
Inventor
George Little
per L. W. Perrell atty

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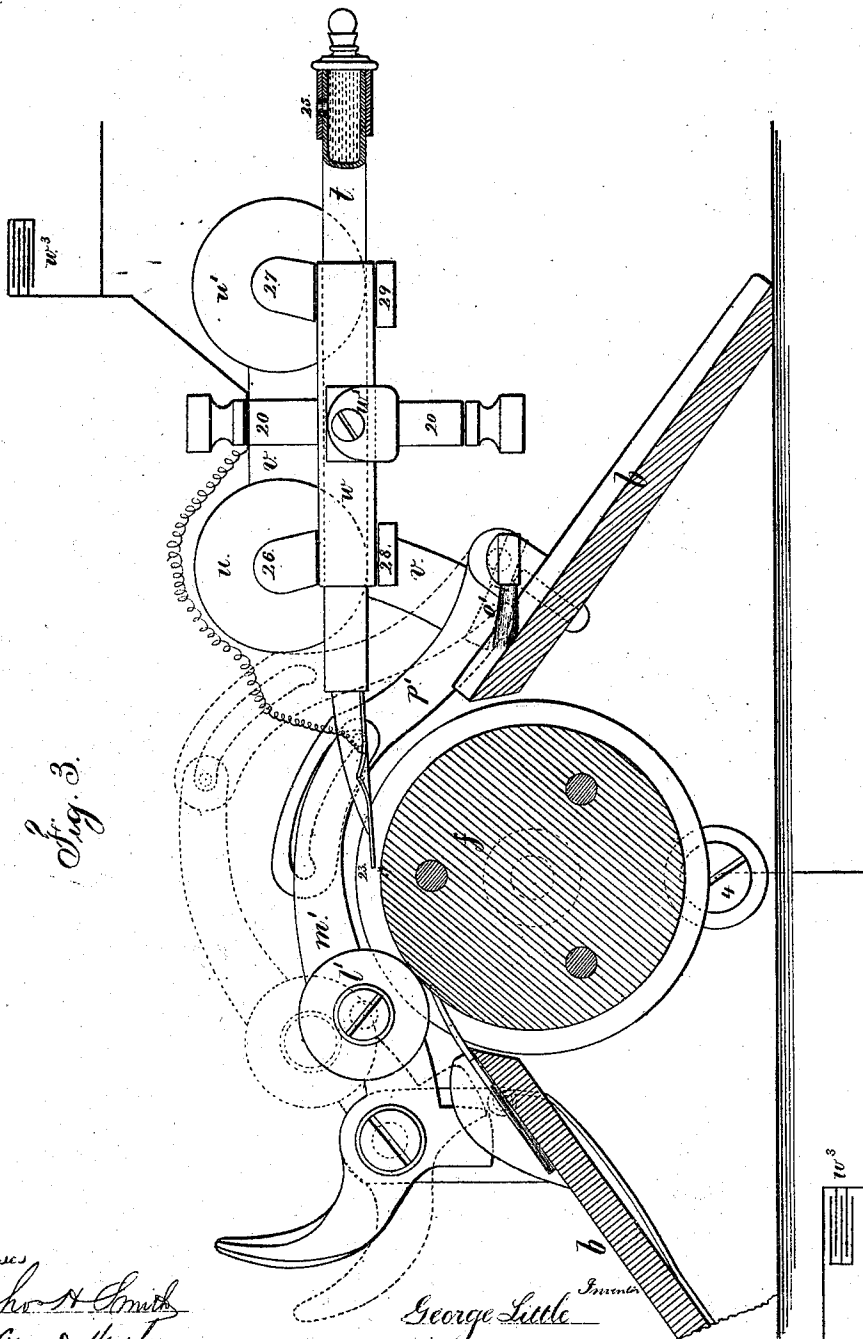


Fig. 3.

Witnesses

Chas. A. Smith
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UNITED STATES PATENT OFFICE.

GEORGE LITTLE, OF RUTHERFORD PARK, NEW JERSEY.

IMPROVEMENT IN TRANSMITTERS AND RECEIVERS FOR AUTOMATIC TELEGRAPHS.

Specification forming part of Letters Patent No. **142,484**, dated September 2, 1873; application filed March 5, 1873.

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 Automatic Telegraph Instruments, of which the following is a specification:

This invention is an improvement upon the transmitting and receiving instruments heretofore patented by me, especially that shown in my Patent No. 133,235.

In the transmitting portion of the instrument the circuit-closing lever and its roller are raised from the drum and perforated paper simultaneously with the brush and the contact-roller, and the connection is made with the insulated axis of the drum by a separate plate and binding-screw, so as not to interfere with the adjustment of the axis when the wires are changed. The transmitting and receiving portions of the instrument are insulated at the frame. The electro-magnet, acting upon the pen or stylus armature, is made with two helices and four poles, so as to operate by reversing the polarity of the current with two lines of perforations in the strip of transmitting-paper.

In the drawing, Figure 1 is a plan. Fig. 2 is an elevation of the transmitting portion of the apparatus, and Fig. 3 is an elevation of the receiving apparatus, the bed being in section.

The bed of the machine is inclined at both ends, as in my Patent No. 133,235, but the bed is divided into the two parts *a* and *b*. These are united by the flanges *cc*, and screws and hard rubber or other non-conducting material intervenes so as to completely insulate one part of the bed from the other, and prevent any current connected with the transmitting portion of the machine reaching the receiving chemical paper or stylus. This divided or duplex bed may be used in an instrument otherwise the same as in said Patent No. 133,235. The drum is made with two metallic grooved ends, *e* and *f*, with insulating material between, in which is the groove 2 for the driving belt or cord. The shafts of the drum are at the ends connected with the respective metallic drums, and supported by the insulated adjusting-screws *h* and clamp-

nuts 3, as in said Patent No. 133,235; but instead of the wires being connected to the screw *h* an arm, *k*, is employed that is provided with a binding-screw, 4, for the line-wire, so that said wire can be applied at either one side or the other of the machine, or removed without risk of disarranging the adjustment of the center-screw supporting the shaft.

In cases where the two drums do not require to be insulated from each other they may be made in one piece with the intermediate band-wheel, or the shaft may pass through both drums.

The contact-roller *l* is upon a lever, *m*, and pressed down by a spring and roller acting upon an arm of the lever, as shown by dotted lines in Fig. 3, and this spring also serves to hold the lever up when raised by the handle *n*. The detaining-brush *o* is upon the axis of a slotted lever, *p*, and this lever is connected to the lever *m* by a screw, so that the brush is raised simultaneously with the contact-roller *l*.

In order to make and break the electric circuit, perforated or embossed paper is employed, and motion is given from that paper to the roller 6 and bent lever *r*, that swings upon the fulcrum-screw 7, and opens and closes the circuit at the insulated contact point 8; and 9 is the spring to cause the roller 6 to press upon the paper.

This device is substantially similar to that shown in my Patent No. 129,839, and where two lines of perforations are employed there are two of these levers, one on each side of the supporting-standard *r'*.

In cases where the line pulsations are of alternate opposite polarity, the respective contact-screws 8 are connected by wires with the binding-screws 11 and 12, and thence to the battery, as illustrated by the diagram in connection with Fig. 2.

The receiving-instrument is connected with the line-wire and the ground according to the character of the pulsations and perforated paper employed. If one line of perforations is used then the stylus or pen should have a direct connection to the line. The instrument shown is especially adapted to receiving from an instrument that transmits pulsations of opposite polarity.

When the receiving portion of the instrument is to be employed, the lever *m* and contact-roller *l* are raised, and a roller or insulated bar, 15, coming into contact with the inclines 16 on the levers *r*, moves them back, raising the rollers 6 and breaking the circuits at the screws 8, so that the transmitting portion of the instrument is thrown out of action.

The spring to press the rollers 6 toward the perforated paper may be attached to the bar 15 instead of employing the spring *g*.

The rollers 6 I remark are preferably made of rubies or other hard stones mounted upon suitable arbors in the levers.

In the receiving portion of the instrument the contact-roller *l'* is upon the lever *m'* and the detaining-brush *o'* is connected with the lever *m'* by the slotted arm or lever *p'*, as before, so that the brush and lever are raised together, and either the ground or line wire is connected with the plate *k* and binding-screw, and the positive wire is connected to the insulated binder 20, and thence a wire is connected to the stylus, as indicated by full lines in Figs. 1 and 3, where the chemical paper is employed for receiving the marks, but where a fountain-pen, *t*, is used containing ink. The line and earth wires are connected to the binders 21 and 22, so that the pulsations pass through the magnets *u u'*.

The magnets are in a frame or yoke, *v*, that is adjustable by the rack and pinion *v'* to cause the point of the pen 23 to bear properly upon the paper in a manner similar to that shown in my patent No. 125,582, and the pen itself is similar to the one shown in said patent, with the exception that the pen is made of a flat, or nearly flat, plate pointed and slit.

This construction is preferable, as the flat plate yields more easily as the pen is pressed upon the paper without opening the nibs of the pen; hence the marks are more uniform, and the ink is less liable to run from the fountain.

A hole in the upper end of the fountain covered by a turning sleeve, 25, is employed in charging the pen with ink from a small syringe without removing the pen from the armature *w*.

The electro-magnet shown is especially adapted to use in machines where the transmission is by alternate positive and negative currents from a battery controlled by two lines of perforations.

Each electro-magnet has two poles, the poles 26 and 27 being connected and being the cores of the helices *u* and *u'*, while the poles 28 and 29 are also connected to 26 and 27, and occupy a position on the opposite sides of the armature *w*.

This armature oscillates upon its axis or fulcrum *w'*, and is polarized and the helices so wound as to make the poles 26 and 27 the same or S.

If now a positive pulsation is sent 28 and

29 will become polarized N, and 26 and 27 polarized S, and these act by attraction and repulsion upon the polarized armature to bring the pen down upon the paper. A pulsation of opposite polarity in the telegraph-line reverses the polarity of 26 27 and the pen is raised.

In all cases the poles 28 and 29 are the reverse of the poles 26 and 27 and aid in moving the armature.

The perforated transmitting-paper is prepared so as to send reverse pulsations instantly one after the other to produce a dot, and for a dash a slight pause is allowed between one pulsation and the next.

This character of perforated paper is well known, and I remark that by my mode of employing four poles to the magnets and a polarized armature the necessary force for moving the armature is obtained with a much weaker current than heretofore.

Instead of having a pen with nibs, as aforesaid, a very small roller may be mounted between the ends of the plate and revolving by contact with the paper and depositing ink upon the same from the periphery thereof.

When the pen or the stylus rests upon the chemical paper during the reception of the message, and the magnets *u* and *u'* are not in the circuit, then there should be a condenser, *w'*, connected with the main line at each side of the stylus to neutralize any attenuated or false currents and prevent tailing.

The leaden condenser or accumulator known as Plante's condenser or secondary battery is preferable for this purpose, and where the magnet *n* is operated by a direct current and retractile spring, the condenser or accumulator may be connected to the line at both sides thereof, as in my application dated October 1, 1872.

The condenser or accumulator is by preference proportioned so as to have about six times the resistance of the helix of the electro-magnet or magnets with which it is connected, and when leaden plates are used I prefer to employ between the sheets fibrous material saturated with glycerine or glycerine and water.

The troughs in which the chemical paper passes may be made of hard rubber or insulated or non-conducting material to prevent the current passing from the bed to the roller over the paper when damp.

I claim as my invention—

1. The plate *k* connecting the binding-screw 4 with the insulated screw upon which the axis of the drum *e* or *f* turns, as set forth.
2. The roller or bar 15 upon the lever *m*, in combination with the lever *r*, incline 16, roller 6, drum *e*, and circuit-screw 8, substantially as for the purposes set forth.
3. The slotted lever-arm *p* upon the axis of the detaining-brush *o* connected with the lever *m* of the contact-roller, as and for the purposes set forth.

4. The electro-magnets *u* and *w* with the four poles 26, 27, 28, and 29, in combination with the polarized armature *w*, substantially as set forth, to oscillate the same by changing the polarity of the electric pulsations, as set forth.

5. The double inclined bed made of metal, and insulated at the points of connection, substantially as and for the purposes set forth.

6. A pen moved by an armature and electro-magnet, in combination with a condenser

or accumulator introduced in the main line or a branch at either or both sides of the electro-magnet.

Signed by me this 26th day of February,
A. D. 1873.

GEORGE LITTLE.

Witnesses:

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