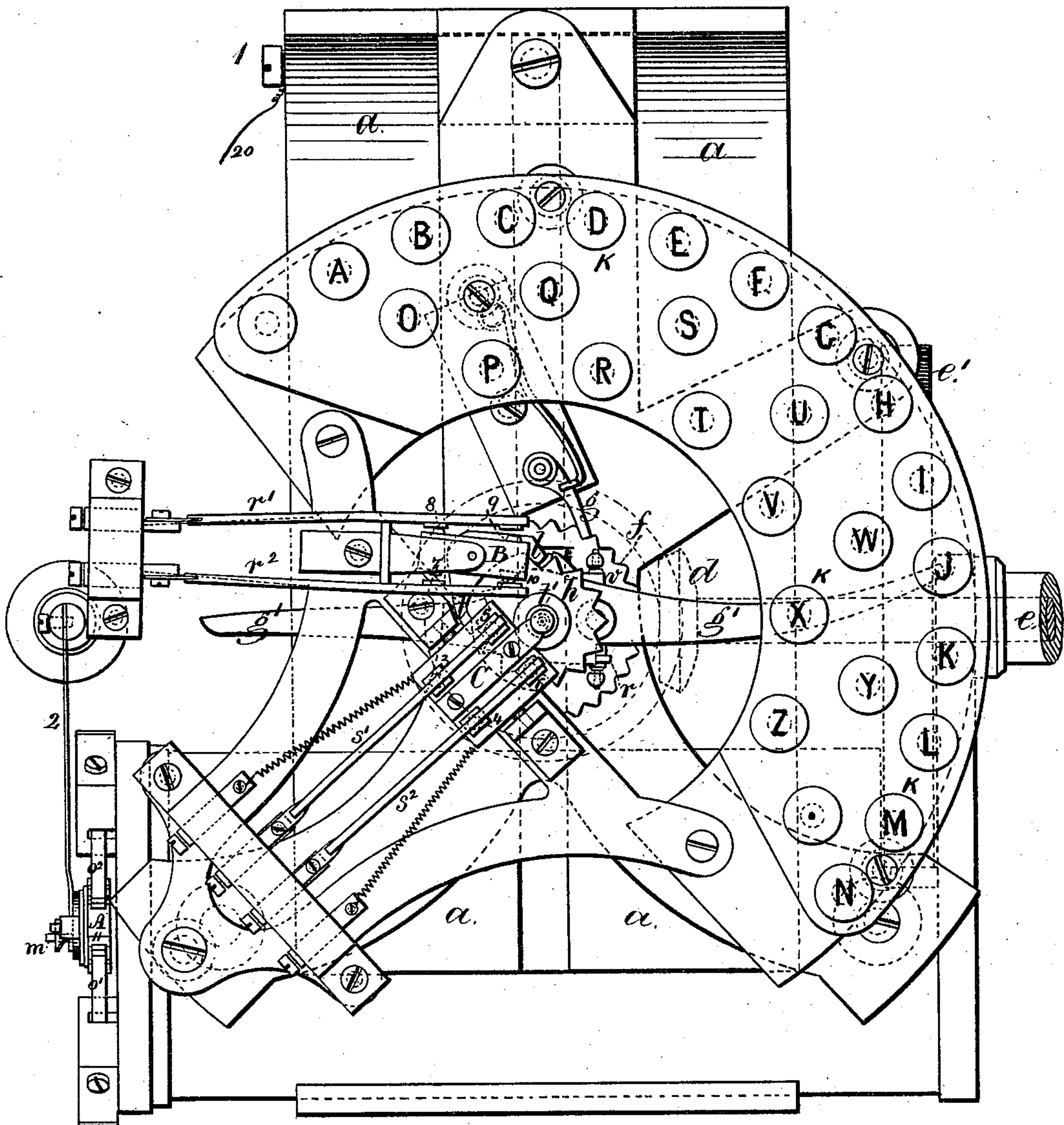


G. M. PHELPS.
MAGNETO-ELECTRIC TRANSMITTERS FOR PRINTING TELEGRAPHS.

No. 195,162.

Patented Sept. 11, 1877.

Fig. 1.



Witnesses,

Chas. H. Smith
Geo. T. Pinckney

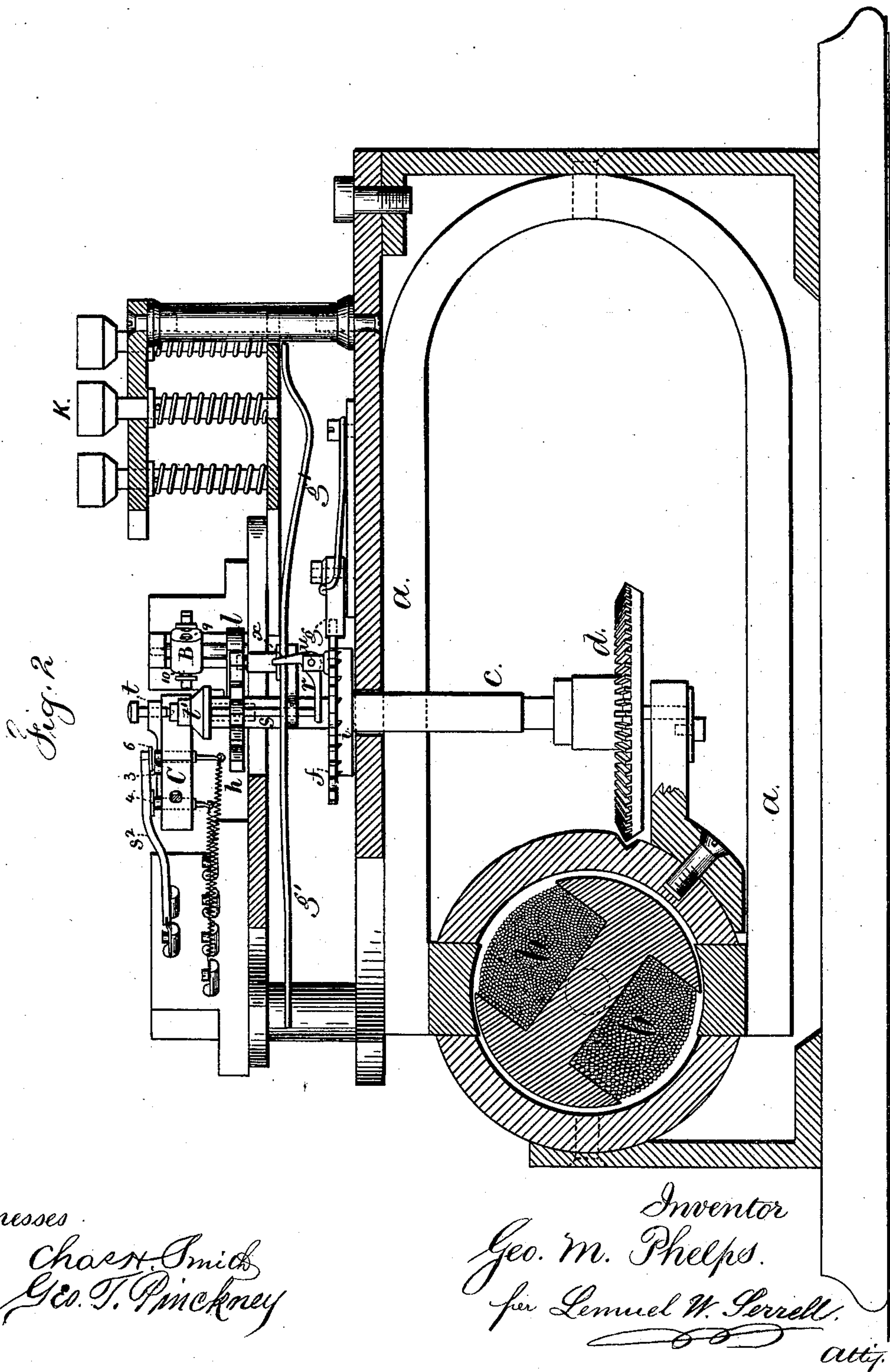
Inventor

Geo. M. Phelps.
per Lemuel W. Perrell atty

G. M. PHELPS.
MAGNETO-ELECTRIC TRANSMITTERS FOR PRINTING TELEGRAPHS

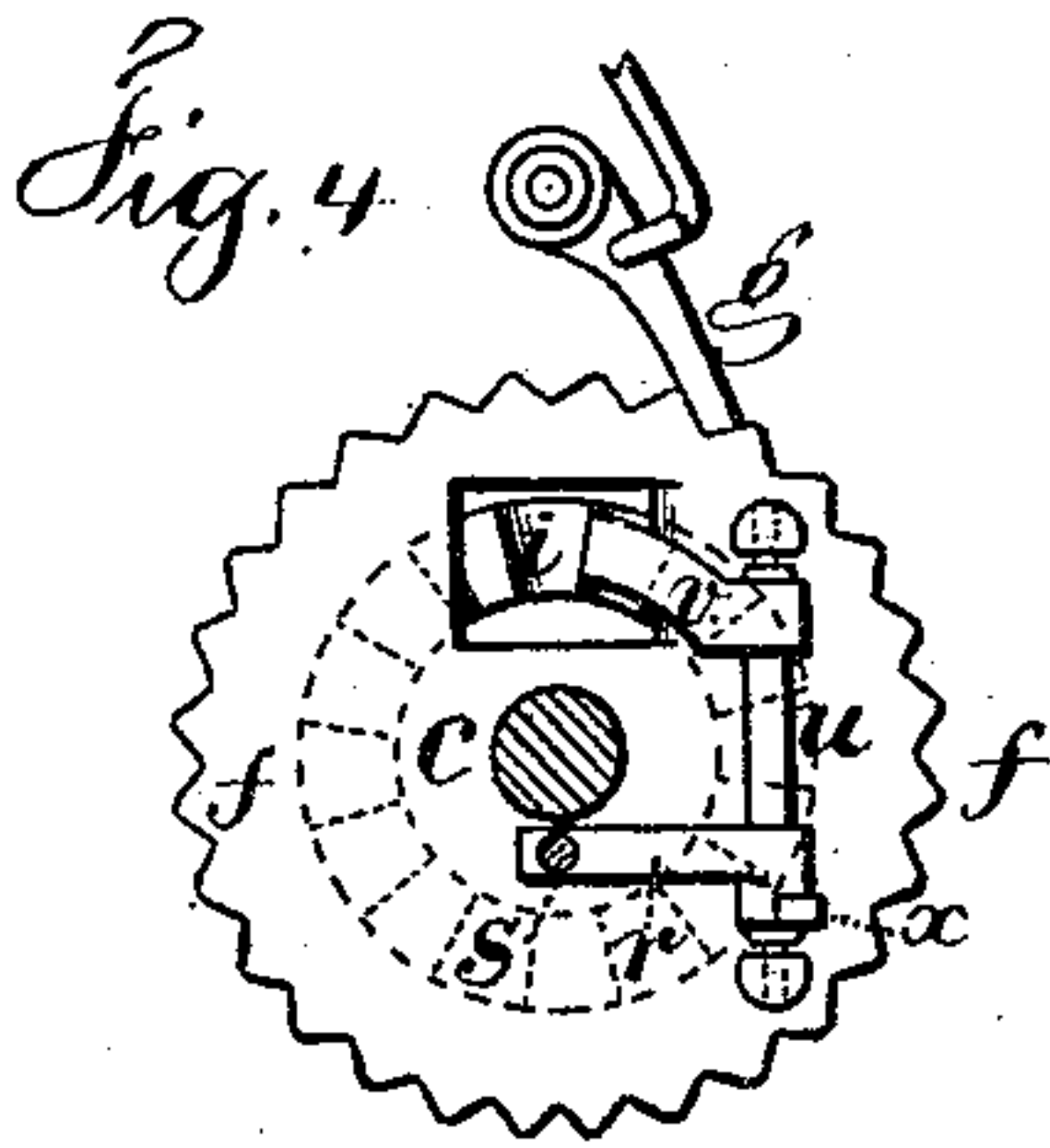
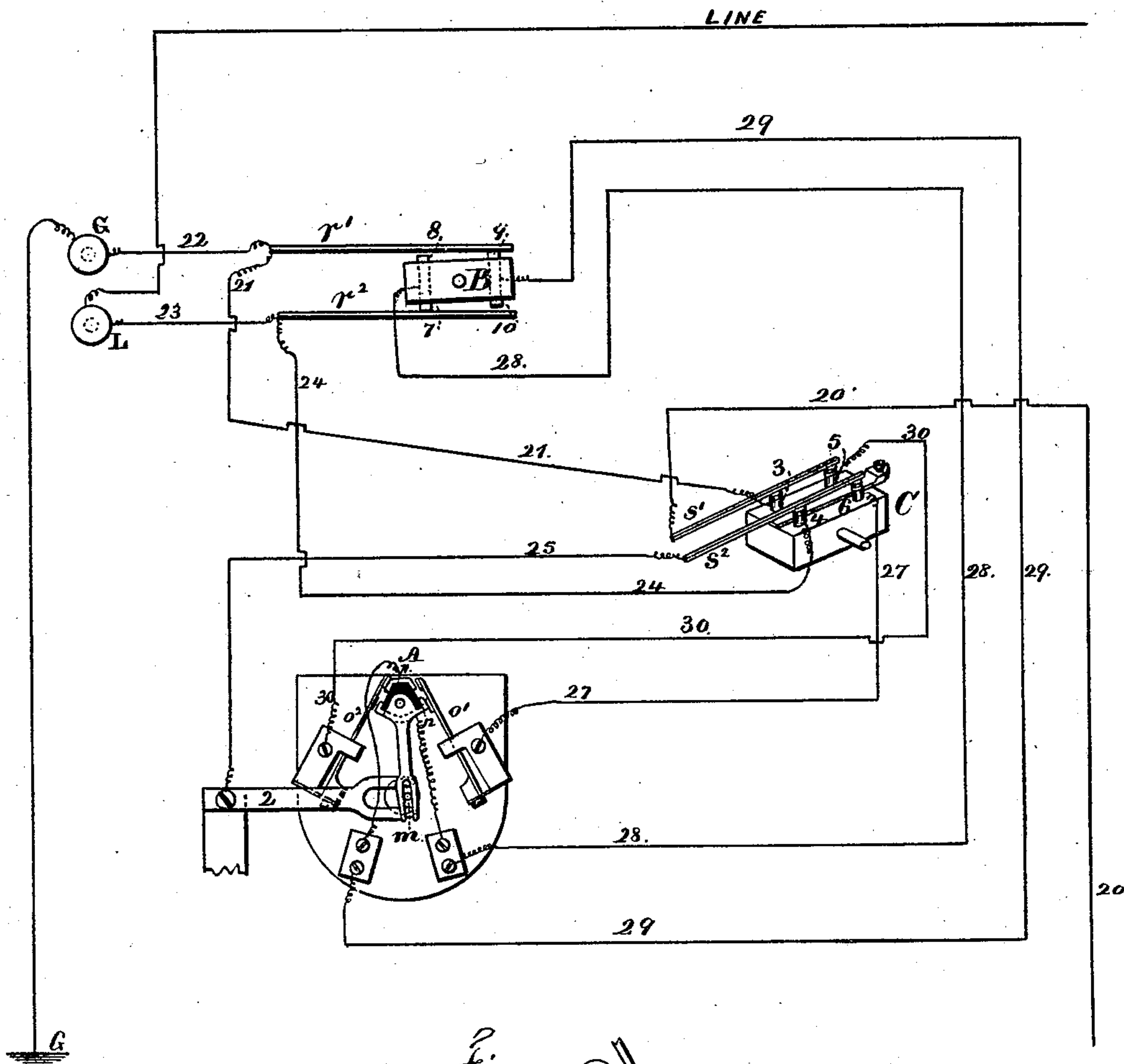
No. 195,162.

Patented Sept. 11, 1877.



G. M. PHELPS.
MAGNETO-ELECTRIC TRANSMITTERS FOR PRINTING TELEGRAPHS
No. 195,162. Patented Sept. 11, 1877.

Fig. 3.



Witnesses
Chas. H. Smith
Geo. T. Pinckney

Inventor
Geo. M. Phelps
per Lemuel W. Perrell
Att'y

UNITED STATES PATENT OFFICE.

GEORGE M. PHELPS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN MAGNETO-ELECTRIC TRANSMITTERS FOR PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. 195,162, dated September 11, 1877; application filed June 27, 1877.

To all whom it may concern:

Be it known that I, GEORGE M. PHELPS, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Magneto-Electric Transmitters for Telegraphs, of which the following is a specification:

This instrument is especially adapted to use with a printing-telegraph receiving-instrument.

Magneto-electric generators have been used for setting the type-wheel by pulsations of alternate polarity; but in machines of this character the pulsations have been stopped while the impression is made.

The present invention relates to an improvement in the magneto-electric transmitting-instrument, whereby the type-wheel is set by the alternate positive and negative pulsations, and then the alternate pulsations are transmitted into a current of one polarity to effect the printing.

By this arrangement a constant current may be furnished for testing the line with a galvanometer.

By this magneto-electric transmitter a battery is dispensed with, but all the advantages of a prolonged current of one polarity are obtained, the same as they would be from a battery.

In the drawing, Figure 1 is a plan. Fig. 2 is a vertical section, partially in elevation, of my improved transmitting-machine. Fig. 3 is a diagram showing the circuit connections, and Fig. 4 is a plan of the double arms and ratchet-wheels.

The permanent magnet *a* is of suitable size and strength for generating in the revolving armature-coil *b* the magneto-electric currents of the required strength for transmitting to the distant station.

The vertical shaft *c* is revolved by the gearing *d*, shaft *e*, and crank or other suitable appliance for hand, foot, or other power, and the gear-wheel *e'* revolves the armature of the magneto-generator.

The gearing is so proportioned that for every revolution of the shaft *c* the armature will revolve half as many times as there are characters or spaces on the type-wheel of the

distant receiving-instrument. There being a positive current and a negative current sent each revolution of the armature, the pulsations act in the receiving-instrument, and one letter is moved to position by a positive pulsation, and the next by a negative pulsation. This class of receiving-instruments being well known do not require further description. The circuit of the magneto-electric generator is completed through the frame of the instrument at 1, and by the insulated spring 2 at the axis of the armature.

Upon the shaft *c* is a wheel, *i*, with notches equal to half the number of divisions of the receiving type-wheel, and the teeth of the ratchet-wheel *f*, that is above this wheel *i*, equal in number to such type-wheel divisions, and there is a pawl, *g*, to prevent any backward movement of this wheel *f*. This wheel *f* is carried by a sleeve on the shaft *c*, and revolved by the pawl that drops into the notches in the wheel *i*, and this wheel *f* carries a double lever, *g'*, that is arrested by depressing any one of the keys in the double semicircular range of keys *k*, substantially the same as in my Patent No. 126,329.

Upon the sleeve of the wheel *f* is a second wheel, *h*, of half the number of teeth as the wheel *f*, and there are vibrating-pallets *l* that vibrate the four contact-points of B.

By the connections hereinafter explained these four vibrating contact-points close the contact to the line. If the vibrator is stopped in one position the connections will be for a positive constant current, and if in the other position, for a negative constant current, according to the point at which the arm is stopped by the key for the corresponding type to be impressed.

At the end of the armature-axis is a crank-pin, *m*, that operates the pole-changer A by which the alternate pulsations of induced electricity are transmitted to a constant current of one polarity, so long as the transmitting-arm remains stopped by a depressed key, whereby to effect whatever operations are desired at the distant station, such as feeding the paper, effecting the impression, or performing any other desired operation.

Heretofore the magneto-current was ex-

cluded from the line when the type-wheel was stopped, because if it had been allowed on the line the type-wheel would be moved by the alternations in the polarity. My present improvement obviates this difficulty by continuing the current of the polarity last used.

I make use of a circuit-changer, C, to shift the circuit-connections, as hereinafter described. This circuit-changer is operated by a lever, *t*, and a pin, *t'*, moving in the upper part of the shaft *c*, and said pin *t'* is acted upon by vertical pin *s*, that is in line with the shaft *c*, and is moved endwise by a lever, *r*, from a fulcrum-shaft, *u*, upon the wheel *f*, and there is a pawl, *v*, projecting down through an opening in the wheel *f* to the radially-notched wheel *i*, and there is a finger, *x*, upon the fulcrum-shaft *u*, passing up against an offset upon the double arms *g'*. The double arms *g'* are upon a stud that is bracketed to the sleeve that carries the wheel *f*, and there is a small amount of movement allowed to the arms upon this stud.

The parts are constructed and positioned so that the end of the pawl *v* engages in one of the radial notches of the wheel *i*, and insures the revolution of the two wheels together, but when the arm *g'* is arrested by coming in contact with a depressed key-pin, the wheels *f* and *i*, moving together, slightly press the finger *x* against the arm, and it and the pawl *v* are turned upon the fulcrum-shaft *u*, raising the pawl *v* out of contact with the wheel *i*, so that wheel *i* can continue to revolve, but the wheel *f* stands still, and the pawl *g* prevents any backward movement of the wheel *f*; hence the pawl *v* is held up against the action of a spring, which returns it to position as soon as the key rises, and the lever *g'* is liberated. By the movement of the pawl *v*, the lever *r* and pin *s* are moved, and the latter gives motion to the pin *t'* and lever *t*, and rocks the circuit-changer C, and the contact-springs *s*¹ *s*² close the circuit through either the pins 3 4 or 5 6.

When the machine is sending alternate currents, the springs *s*¹ *s*² of C are in contact with 3 and 4. When the arms *g'* are stopped the rocker *c* is moved as aforesaid, and *s*¹ *s*² are brought into contact with 5 and 6.

We will now suppose that the magneto-generator is in motion; the positive current passes from 1 by wire 20 to spring *s*¹ of C; thence by 3 and wire 21 to *r*¹ and wire 22 to G and ground, returning by line L; thence by wire 23 to *r*², and wire 24 to 4 and spring *s*², and by wire 25 to spring 2 of magneto-generator. The current cannot go by 5 or 6, because the circuit is open at those points.

The reverse current of opposite polarity passes off by spring 2, wire 25, *s*², 4, 24, *r*², 23, L, upon line returning through ground G, 22, *r*¹, 21, 3, *s*¹, 20 to magneto-generator. Thus the currents pulsate in setting the distant type-wheel independently of the rockers A and B; but when a key is depressed and the

rockers B stopped, the circuit-changer C is moved and the current travels as follows: Suppose that B is stopped in the position shown, and the current sent on the line is negative, then the pulsation passes from 1 by 20 to *s*¹, 5, wire 30 to spring *o*² of A, through 11, wire 29 to 9, thence by *r*¹ and 22 to ground, returning by line and L to 23, *r*², 7, wire 28 to 12, spring *o*¹, wire 27 to 6, spring *s*², wire 25 to spring 2 of magneto-generator.

Now, before another pulsation is sent from the magneto-generator, the crank *m* has changed the rocker pole-changer A, and the pulsation which is of opposite polarity to the previous one passes by spring 2, 25, *s*², 6, 27, *o*¹, 11, 29, 9, *r*¹, 22, G to ground, returning by line to L, 23, *r*², 7, 28, 12, *o*², 30, 5, *s*¹, 20 to magneto-generator.

By this means it will be apparent that the pole-changer A continues upon the line pulsations of the same polarity, although the current alternates from the magneto-generator.

With a type-wheel set by currents of alternate polarity, the pole-changer B puts upon the line the current of the polarity required for the letter that is to be printed.

If two pulsations were used for each letter, making fifty-six pulsations instead of twenty-eight for a revolution of the type-wheel, then pole-changer B would not be required.

I, however, will now suppose that the arm and wheels are stopped with the vibrator B in the reverse position to that shown; then the positive from 1 will pass by 20, *s*¹, 5, 30, *o*², 11, 29, 10, *r*², and 23 to line, returning by ground to G, 22, *r*¹, 8, 28, 12, *o*¹, 27, 6, *s*², 25, and 2 to the magneto-generator, thus putting positive to the line and so continuing the circuit, the pole-changer A acting, as aforesaid, to reverse the connections as the polarity of the pulsations are reversed by the magneto-generator, and so continue the same polarity to the line.

I claim as my invention—

1. The combination, with a magneto-generator and transmitting-instrument, of a pole-changer operated in connection with the magneto-generator to continue pulsations of the same polarity upon the line after the transmitting mechanism is arrested by a key, substantially as set forth.

2. The combination, with a magneto-generator and a transmitting-instrument for a printing-telegraph, of a circuit-changer, C, brought into action by the mechanism that stops the transmitting portion of the apparatus, substantially as set forth.

3. The combination, with the magneto-generator, of the pole-changers A and C, circuit-connections, and transmitting-instrument, substantially as set forth.

4. The combination, with the magneto-generator and the pole-changers A and C, of the vibrator B and circuit-connections, substantially as set forth.

5. The combination, with the magneto-gen-

erator, of the pole-changer A and circuit-connections, substantially as set forth, to produce a current of either polarity, substantially as set forth.

6. The revolving wheel *i*, with notches and the wheel *f*, in combination with the arms *g'*, pawl *v*, finger *x*, lever *r*, and circuit-changer C, substantially as set forth.

Signed by me this 21st day of June, A. D. 1877.

GEO. M. PHELPS.

Witnesses:

GEO. T. PINCKNEY,
HAROLD SERRELL.