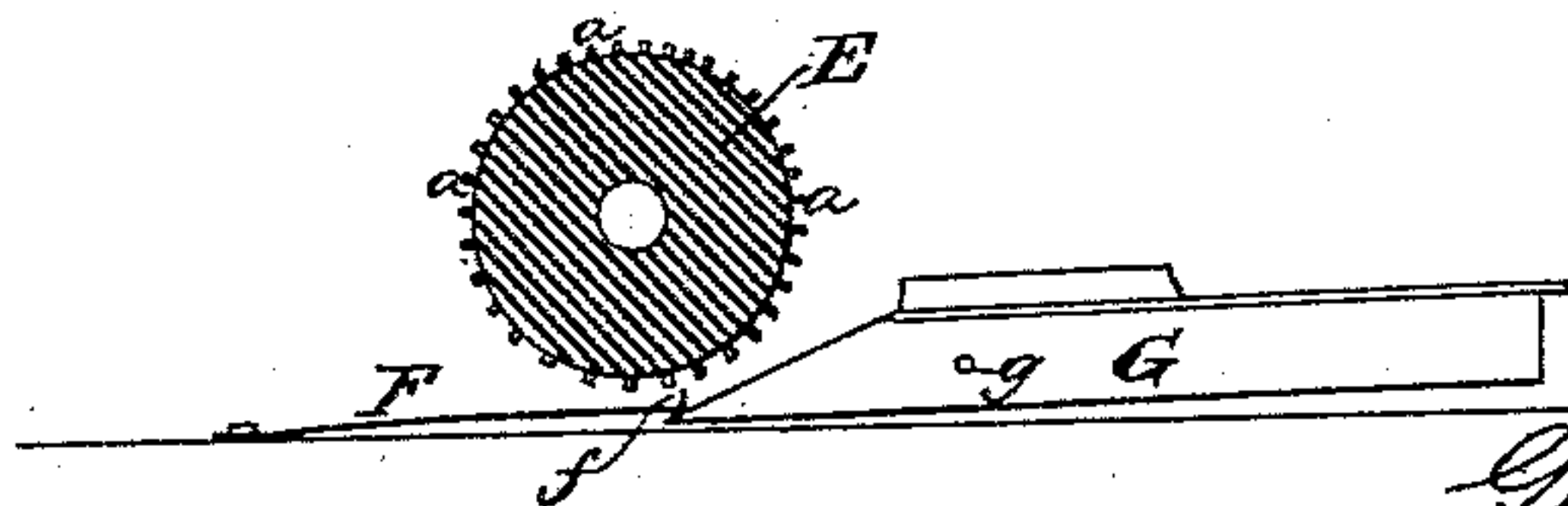
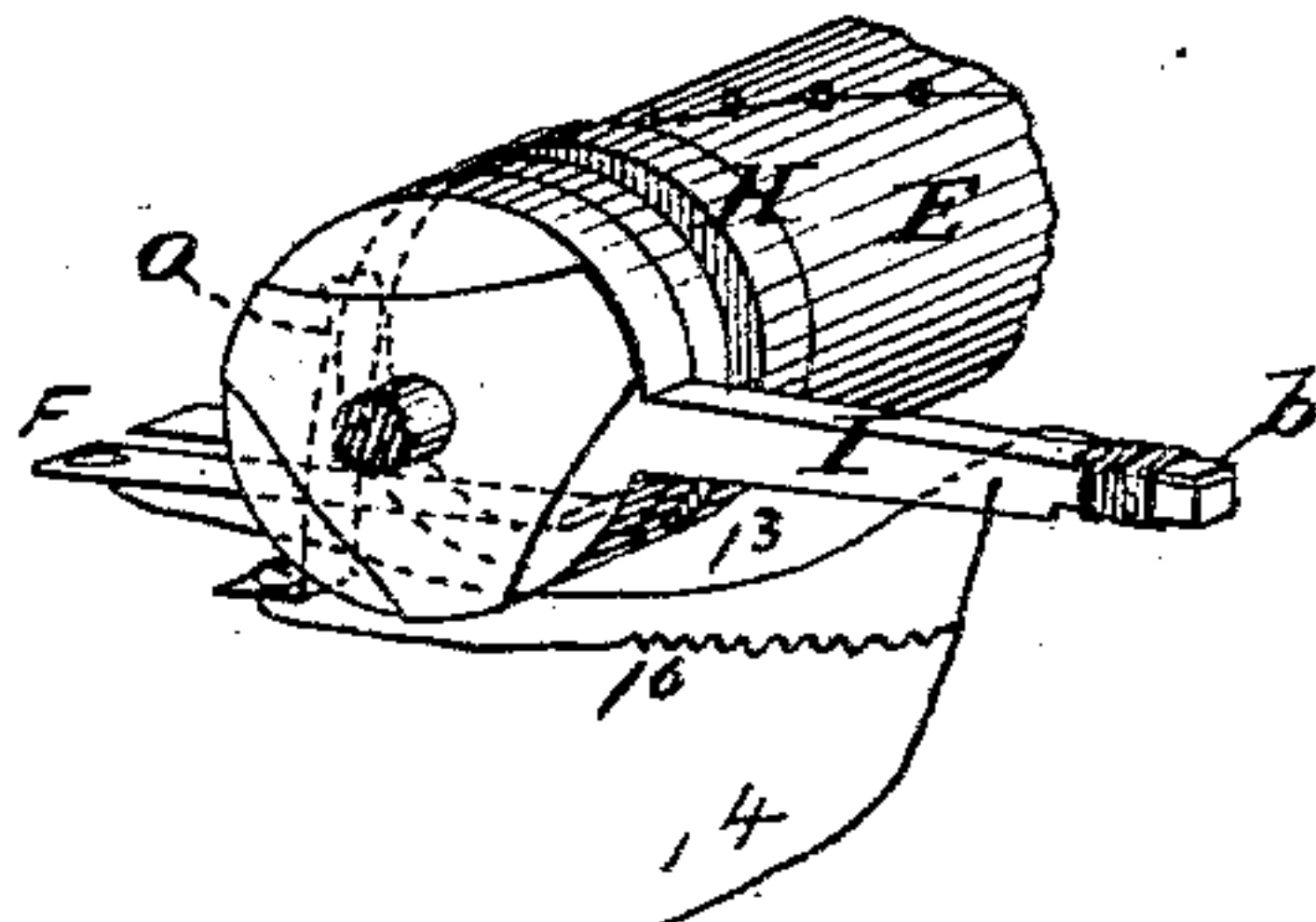


Patented Dec. 17, 1878.



Inventor.

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by his attorney
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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN TRANSMITTERS FOR PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. **210,897**, dated December 17, 1878; application filed
December 3, 1877.

To all whom it may concern:

Be it known that I, GEORGE LEE ANDERS, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Transmitters for Operating Printing-Telegraphs by Magneto-Electric Currents, of which the following is a full, clear, and exact description, reference being had to the drawings accompanying and forming part of this specification.

In Letters Patent No. 169,506, granted to me November 2, 1875, I have described a transmitter for operating a printing-telegraph by magneto-electric currents, the printing-telegraph used therewith having its type-wheel rotated by the action of the alternate positive and negative currents transmitted from the generator upon a polarized type-wheel magnet, and the printing being effected on short-circuiting the current from the generator by the depression of a letter-key.

Instead of effecting the printing in this manner, it can be done by causing the depression of a letter-key to cut out a resistance in the line-circuit, thereby strengthening the current and causing the printing-magnet to attract its armature and effect the printing in the manner well known; or, instead of rotating the type-wheel by the action of positive and negative currents upon a polarized magnet, an electro-magnet of the ordinary form may be used for this purpose, and a straight current of either polarity derived from the generators and straightened by a commutator in the usual manner, transmitted through said electro-magnet, the armature of said magnet being made to vibrate for the purpose of effecting the rotation of the type-wheel by interruptions in said straightened current at the transmitter.

The object of this invention is to obtain a transmitter of the general form described in the patent before referred to, which can be used to operate printing-telegraph instruments in the manner above set forth; and to this end the invention consists of the combination, substantially as hereinafter more fully set forth, of a magneto-generator and transmitting-cylinder, a commutator, and certain circuit-interrupting and circuit-changing devices,

a switch connected to the line and earth, and an arrangement of circuits connecting said devices.

In the accompanying drawing, Figure 1 is a plan view of the generator, the transmitting-cylinder and key-board, and the switch, showing the commutator, the circuit-interrupters and circuit-changer, and the arrangement of circuits. Fig. 2 is a perspective view of one end of the transmitting-cylinder. Fig. 3 is another view of the same end of the transmitting-cylinder. Fig. 4 is a transverse sectional view of the transmitting-cylinder, showing a letter-key and circuit-closing spring. Fig. 5 is a longitudinal view of the transmitting-cylinder, and Fig. 6 is an end view of the commutator.

In these several figures the same letters refer to the same parts.

A A are the permanent magnets of the generator, which is similar in form to that described in the patent before referred to, and B is its armature, which is rotated in any suitable manner. The shaft C of this armature gears, as shown at D, with the shaft of the transmitting-cylinder E, also similar to that described in the before-mentioned patent, and made of hard rubber or any other suitable insulating substance. Upon this cylinder is a series of metallic pins, *a a a*, corresponding in number to the characters upon the type-wheel, arranged in a spiral. These pins are connected together by a wire, and the last one is connected by a wire to a metallic collar, H, upon the shaft of the cylinder, but insulated from said shaft. Arranged under this cylinder is a series of metallic springs, F F, one for each pin, which springs are connected together by metallic contact. G G are the finger-keys, pivoted at *g*, as shown in Fig. 4, and, as shown in the same figure, the farther end of each finger-key extends under the end of the spring opposed to it, and when a key is depressed the end of the corresponding spring is elevated, and a hook, *f*, on the end of the spring engages with the corresponding pin on the transmitting-cylinder, and arrests the rotation of said cylinder. I is an arm attached to the shaft of the cylinder, and K is a post, having two insulated plates, *c c'*, at-

tached to it, between which the end of the arm I plays. W is a ratchet-wheel upon the end of the transmitting-cylinder, and U is a pawl which bears upon it. This mechanism is the same as that used in the before-mentioned patent, and operates as there described. When the cylinder is rotating, the end of the arm I bears against the plate *c*; but when the rotation of the cylinder is arrested by the depression of a letter-key, the arm I leaves the upper plate, *c*, and makes contact with the lower plate, *c'*, and remains in contact therewith as long as the key continues depressed; but, owing to the action of the pawl U and ratchet-wheel W, the arm I does not break contact with the plate *c* until the armature has made half a rotation, and consequently, by the contact made by the pin *a* with its corresponding spring, a strengthened current will be sent to the line. Upon the upper surface of the arm I is a plate of metal, *b*, insulated from said arm, and connected by a wire, 1³, with the springs F F. S is a switch of the usual form, *l* being the plate by which connection is formed with the line, and *e* the plate by which connection is formed with the earth. R is a resistance-coil, one end of which is connected by a wire, 1⁵, with the springs F F, and the other is connected by a wire, 1⁴, with the arm I. A wire, 1⁶, connects the arm I with a spring O, which bears against the periphery of the disk H. A wire, 1¹, connects one pole of the armature to the division 5 of the switch, from which connection is made to the line in the usual manner, and a wire, 1², connects the division 1 of the switch to the plate *c*. Division 1 is connected to the earth in the usual manner.

When this transmitter is used in connection with a receiving-instrument in which printing is effected by sending a stronger current than is used for rotating the type-wheel, connection is made by a pin in the usual manner with division 5 of the switch and the line, and with division 1 of the switch and the earth. While the type-wheel is being rotated the current passes from one pole of the armature by wire 1¹ to division 5 of the switch, and thence to line; thence from earth by division 1 of the switch-wire 1² to plate *c*; thence by the insulated plate *b* and wire 1³ to the springs F F; thence by wire 1⁵ to the resistance-coil R, and by wire 1⁴ to the arm I, shaft of the transmitting-cylinder, and the other pole of the armature.

When it is desired to print any letter, the key corresponding thereto is depressed, thereby raising up the end of the corresponding spring F, so that when the pin which corresponds to this spring reaches it as the cylinder rotates it will catch on the bent end *f* of the spring, and the rotation of the cylinder will be arrested.

By the contact of the pin with the spring a shunt-circuit is established by disk H, spring O, and wire 1⁶ to the arm I, so that the resistance-coil R is cut out of the circuit and a

strengthened current sent to the line, which operates the printing-magnet.

Upon the shaft of the magneto-generator is a commutator, (shown in detail in Fig. 6,) by means of which the alternate positive and negative currents from the generator are straightened. The construction of a commutator for this purpose being well known, it need not be particularly described. Each half of this commutator is connected to opposite poles of the rotating armature, and from one half a wire, 2, passes to a spring, *p*, which bears upon a disk, M, upon the shaft of the cylinder, provided with a series of insulated and uninsulated spaces equal in number to one-half of the characters upon the type-wheel. From the other half of the commutator another wire, 2², passes another spring, *p'*, which bears upon a similar disk, M'. Springs *n n* bear upon these disks, respectively; and from these springs wires 2³ and 2¹ lead, respectively, to the divisions 2 and 3 of the switch. One of these divisions is connected to the earth and the other to line. On the rotation of the transmitting-cylinder, if connection is made at the switch, as stated, the straightened current flowing to the line will be made intermittent by the disks M and M', and this intermittent current will cause the rotation of the type-wheel in the manner well known. By changing the connections of the divisions 2 and 3 of the switch with the earth and line the direction of the current can be reversed at will, and this change of connections can be effected in any suitable manner. This reversal of the current may effect the movement of certain parts of the receiving-instrument—as, for instance, shifting devices or unison mechanism.

It will be obvious from the above description of this transmitting apparatus that by establishing the desired connections it can be used with printing-telegraph instruments operated in several different ways, and the necessity of having a special form of transmitter for each form of receiving apparatus is avoided.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. The combination, with the transmitter, magneto-generator, commutator, straightening-disks M M', and resistance-coil R, of the switch S, having four or more divisions, and devices and circuits, substantially as described, whereby the current can be sent through the switch on a long or a short circuit, or intermitted and reversed, as described.

2. The combination of the magneto-generator, the transmitting-cylinder E, pins *a a a*, springs F F, keys G G, disk M, plates *c c'*, insulated plate *b*, resistance-coil R, and connecting-wires 1¹, 1², 1³, 1⁴, 1⁵, and 1⁶, substantially as and for the purpose set forth.

3. The combination of the magneto-generator, the transmitting-cylinder E, pins *a a a*, springs F F, keys G G, disk H, spring O, arm

I, standard K, plate C, insulated plate *b*, resistance-coil R, and connecting-wires 1¹, 1², 1³, 1⁴, 1⁵, and 1⁶, substantially as and for the purpose set forth.

4. The combination of the transmitting-cylinder E and its keys, the plates *c c'*, disk H, arm I, and disks M M, and the switch S, resistance-coil, and connections, substantially as and for the purpose as set forth.

5. The combination of the transmitter, its commutator T, straightening-wheels M M', and their connections, for transmitting intermit-

tent currents of the same or alternate polarity, the receiving-instruments in the same circuit, severally adapted to be operated by said different currents, and the switch arranged in the circuit to transmit the various currents to the different instruments, as set forth.

In witness whereof I have hereunto set my hand on this 28th day of November, 1877.

GEORGE LEE ANDERS.

Witnesses:

CHAS. W. HOBART,

ALEXANDER L. HAYES.