2 Sheets—Sheet 1.

G. L. ANDERS.

MAGNETO-PRINTING TELEGRAPH.

No. 169,506. Patented Nov. 2, 1875.

Fig. 1

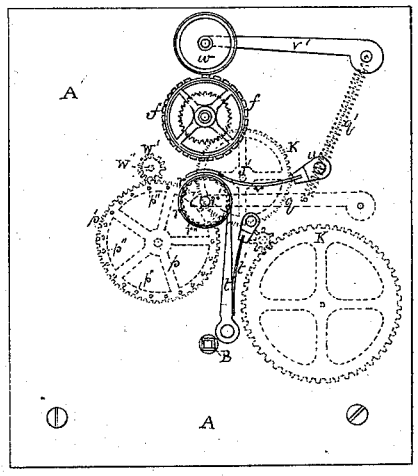
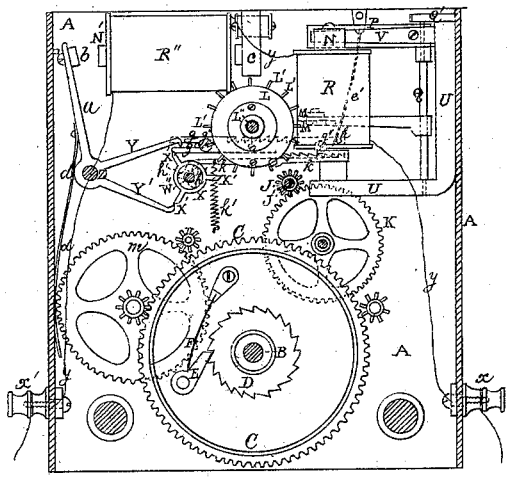


Fig. 2



Witnesses
Sam'l M. Barton
Jesse T. Deeter

Inventor
Geo. L. Anders
by his Atty
Carroll D. Wright

2 Sheets—Sheet 2.

G. L. ANDERS.

MAGNETO-PRINTING TELEGRAPH.

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Fig. 3

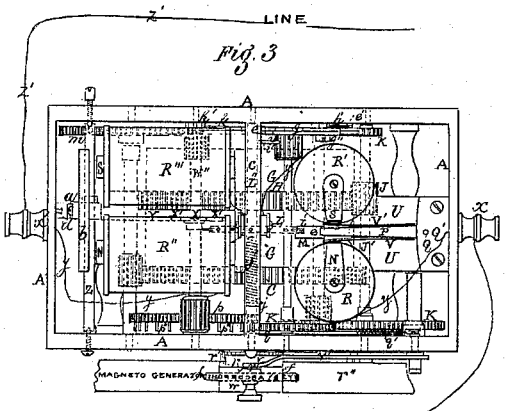


Fig. 6

Fig. 7

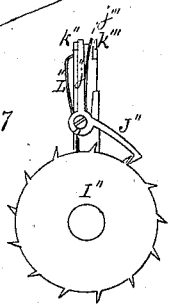


Fig. 8

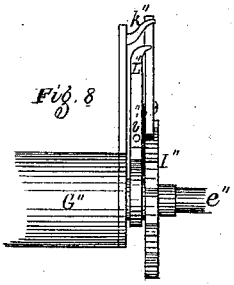


Fig. 4

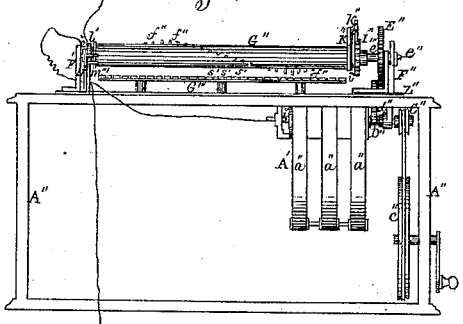
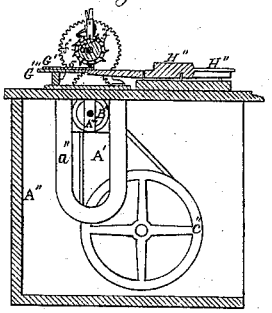
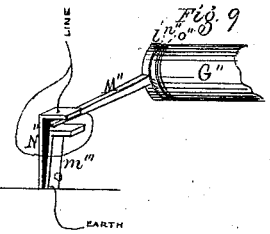


Fig. 5



Witnesses
Sam'l M. Barton
Jesse F. Lucas

Fig. 9



Inventor
Geo. L. Anders
by his atty-
Samuel D. Wright

UNITED STATES PATENT OFFICE.

GEORGE L. ANDERS, OF BOSTON, ASSIGNOR TO E. B. WELCH, OF CAMBRIDGE, MASSACHUSETTS.

IMPROVEMENT IN MAGNETO PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. **169,506**, dated November 2, 1875; application filed March 25, 1873.

To all whom it may concern:

Be it known that I, GEORGE L. ANDERS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Magneto Printing-Telegraphs, of which the following is a specification:

Figure 1 of the accompanying drawings is an exterior view of one side, showing, by the dotted lines, a portion of the interior mechanism of my improved printing-telegraph instrument. Fig. 2 is a vertical longitudinal section through one side, looking toward the opposite side, of the instrument. Fig. 3 is a top view of the printing instrument. Fig. 4 is a side view of the magneto generator and transmitter, with the key-board and top casing removed. Fig. 5 is a transverse vertical section of the same; and Figs. 6, 7, 8, and 9 are views of parts in detail.

This invention relates to that class of printing-telegraph instruments known as the "step by step," that have their type-wheels controlled by currents alternating in their polarity. These currents have been generated heretofore by a galvanic battery, and the operation of a step-by-step printing instrument by galvanic currents has been found objectionable on account of the inconvenience and expense resulting from the necessarily large size of a battery of the intensity sufficient to generate currents for working the printing instrument rapidly, the constant care and attention required to keep the battery in running order, and the liability of the galvanic currents to vary in strength at different times. My invention has for its object to remedy these difficulties; and to this end it consists in the combination, with a printing telegraph instrument, of the class above mentioned, of a magneto-generator, composed of a battery of permanent magnets, developing negative and positive currents alternately in rapid succession, as I will now proceed to describe.

For the purpose of illustrating my invention I will refer to two patents issued to me, one for a printing-telegraph apparatus, dated October 28, 1873, No. 144,045, and the other for a magneto-generator, shown in Sheet 2 of the drawings of Patent No. 113,240, dated April 4, 1871; and I will here remark that the printing-telegraph apparatus above referred to was designed expressly for use in combination with a magneto-generator.

In the accompanying drawings, A represents the case of a printing-telegraph instrument, supported by and turning in the lower portion of whose sides is a central arbor, B, provided with a gear-wheel, C, having on its outer face a ratchet-wheel, D, with which engages a pawl, E, pivoted to the wheel C, and receiving on its top the bottom of a bent spring, F, whose top is attached by a clamp or otherwise secured to the outer side of the wheel C. Connected with the arbor B, at one side of the wheel C, is a cylinder or drum, G, having an outer-projecting gear-rim, H, and having attached to its inner periphery one end of a coiled or main spring, the other end of said spring being attached to the arbor B. Meshing with the teeth of the gear-rim H is a pinion, J, of an arbor, J′, that operates a train of wheels, K K, &c., provided with suitable arbors and pinions, which together serve to rotate an escapement-wheel, L, provided on its periphery with projecting pins L′ that engage with the ends of pallets M, connected with a vertical rod, Q, so as to vibrate laterally by the action of an armature, P, of a polarized electro-magnet, between the poles N S of which extends the end of the armature P, which is connected at the other end with the upper portion of the rod Q, whose top is supported by and turns in a horizontal projecting bearing, Q′, attached at one end to the interior of the case A, and which rod Q passes downward, its bottom being supported by and turning in the bottom or horizontal portion of a right-angled magnetized standard, U, which supports a polarized electro-magnet, provided with vertical helices R R′, between the poles N S of which and the armature P are bent springs V V′, of brass or other non-magnetic material, and of suitable strength and thickness, attached at one end to each side of the armature P. Engaging with a gear-wheel, W, is a pinion, W′, connected with an arbor, W″, that has, near the center, or in the required position, an escapement-wheel, X, provided with radiating arms X′, beveled or otherwise suitably formed on the ends, so as to be held and

released by the toothed ends of arms or pallets Y Y′, radiating from the nave of an arbor, Z, turning in the sides of the case A. Extending up from the nave of the arbor Z is a vertical arm, *a*, that supports a horizontal transverse armature, *b*, situated opposite the poles N′ S′ of an electro-magnet, whose helices R″ R‴ are arranged horizontally in a longitudinal direction, or in any other suitable position within the instrument A, which is provided at the top with a central cross-bar, *c*, to which the electro-magnet is connected.

Connected with the vertical arm *a* is one end of a bent or other suitable spring, *d*, that extends downward and bears against the inside of one end of the instrument-case A. The arbor of the escapement-wheel L extends through one side of the case A, and is provided on the outside with a type-wheel, *f*, arranged on its periphery with suitable letters, &c., and having on its other end, within the case A, a latch, *e*, that engages with teeth formed in the upper edge of a unison-bar, *g*, arranged with slots *g′* to slide on, and be held by, screw-stems *g″*, connecting with the case A, and provided with a stem, *h*, against which abuts one end of a bent spring, *e′*, the other end of which is attached to the inside of the case A. The bottom of the unison-bar *g* is formed with teeth, engaging with which is the toothed end of a pivoted click or lever, *k*, whose other edge is formed to engage with a cam, *h′*, on the end of the arbor W″. Projecting inward from the upper portion of the bar *g* is a stop, *i*, with which engages the end of an arm, *i′*, radiating from the escapement-wheel arbor L″, which has at one end a collar, *j*, that receives one end of a spiral spring, *j′*, the other end of which is connected with the escapement-wheel L, so as to allow the pins L′ to fall rapidly on the pallets M. To the pivoted lever or click *k* is attached one end of a spring, *k′*, the other end of which is secured to the side of the case A. Connected with a train of wheels, *m m*, &c., provided with suitable arbors and pinions, and actuated by the rotation of the gear-wheel C, is a gear-wheel, *p*, provided with pins *p″*, projecting outward from the side of its rim. A lever-arm, *q*, pivoted to the side of the case A, is arranged to engage with, and disengage from, the pins *p″*, a spiral or other suitable spring, *q′*, being attached to the lever-arm *q* and to the case A, for the purpose of regulating the tension of a feed-roller, *r*. Projecting at a right angle from the side of the lever-arm *q* is an arbor, *r′*, that extends through the side of the case A, and is provided on the outside with a press and feed roller, *r*, having on its inner face ratchet-teeth *r″*, with which engages the end of a vertical arm, *t*, pivoted to the case A, and held in proper position by a spring, *t′*, bearing against its side, the top of the spring being properly secured to the outside of the case A, to which is also attached a clamp, *u*, that holds one end of a bent spring, *v*, curved at the other end to fit over the roller *r*, and bear upon the paper slip *r″*, that is fed along between it and the roller *r*. Over the type-wheel *f* is an ink-roller, *w*, connected with one end of a lever-arm, *v′*, whose other end is pivoted to the case A. On each end of the case A, near the bottom, is a screw-cup or binding-screw, *x x′*, from one of which, *x*, extends a wire, *y*, that connects the helices R R′ of the polarized magnet, and thence continues to the helices R″ R‴ of the electro-magnet, and down to the binding-screw *x′*, which is connected with the line-wire *z′* and distant instruments, and the other binding-screw *x* is connected, by a wire, *z*, with a magneto generator and transmitter instrument, the magneto-generator A′ of which is located within a case, A″, (represented in Figs. 4 and 5 in Sheet No. 2 of the drawings,) and consists of horseshoe-magnets *a″ a″ a″*, between the poles of which is a revolving armature, B″, located on a shaft, *b″*, which has an insulated bearing, A‴, and is revolved by a belt connecting a pulley, C″, and a drive-wheel, *c″*, the latter being operated by a crank or treadle, &c., as desired. The shaft *b″* is provided with a pinion, D″, which meshes with a cog-wheel, *d″*, which has its bearings in the top of the instrument-case, its shaft being in turn provided with a pinion, which meshes with the cog-wheel E″, which latter is loosely sleeved on shaft *e″*, which has its bearings in standards F′ F″ on the top of the case A″.

On the shaft *e″* is a drum, G″, which is fitted loosely thereon, composed of india-rubber or other like material, and provided with a line of radially-projecting pins, *f‴*, running spirally from end to end of the drum. Immediately under drum G″ is a metallic spring-plate, G′, constructed like a comb, with springs *s′*, attached to a plate, G‴, over the upper surface of case A″, said springs having their ends bent upward to form catches. The springs *s′* are so located with relation to pins *f‴* that each spring, when raised, will catch one of said pins and suspend the revolution of drum G″, the raising of the springs being effected by a bank of keys, H″, which are similar to those of a piano-forte, each key, when depressed, raising a corresponding spring. The shaft *e″* is provided with a ratchet, I″, which, with the cog-wheel E″, is attached to a sleeve, *e‴*, which turns loosely on shaft *e″*, near one end of drum G″, between which and the ratchet I″ is an arm, *i″*, which is rigidly attached to shaft *e″*. To the arm *i″* is pivoted a pawl, J″, which is provided with an arm, *j″*. K″ represents an arm on the end of drum G″, which arm is provided at its upper end with two fingers or projections, *k″ k‴*, which project on both sides of arm *j″* of pawl J″, and allow the same to have a limited play between them. The arm *j″* is provided with a spring, *j‴*, which bears against fingers *k″*, while a spring, L″, on arm *i″* bears against the opposite side of arm *j″*. Near the opposite end of drum G″ is a metal disk, *l′*, which is loosely located on shaft *e″*, and

provided with an arm or lever, M″, the end of which projects between the ends of standard m''' and insulated plate N″, the insulation of the latter being effected by a layer of rubber between itself and standard m''', as shown in Fig. 9. Between the disk l and the end of drum G″ is a disk of leather, n'', and another metal disk, O″, which is provided with a spring which presses disks n'' O″ against disk l, which is prevented from revolving by the contact of lever M″ with plate N″, to secure a positive reaction, thereby securing a positive change of contact from the plate N″ to standard m''', and also securing the efficient operation of the ratchet-and-pawl arrangement I″, J″, &c., at the opposite end of the drum G″. The shaft b'', which has an insulated bearing at A‴, is connected to standard m''' by wire z, and the latter with the ground by wire z'. The standards F′ F″ are located on a metallic plate, Z″, which, with the arbor e, forms a conductor from end to end of the machine.

The operation of my invention is as follows: The magneto-current is generated by revolving the armature B″, on which is wound a coil of insulated wire, one end of which connects with the earth, and the other through the metallic portions of the instrument with the contact-lever M″. To send a message the first key is depressed, thereby releasing the last key, marked "stop," and the drum G″, which now begins its revolution and lifts the contact-lever M″ into connection with the circuit and printing apparatus, through which it transmits one or more of the alternating pulsations of the generator. These currents, in passing through the helices R R′ R″ R‴ of the printer, effect a to-and-fro motion of the armature P of the type-wheel-escapement magnet until the desired letter is reached. During this to-and-fro motion of the type-wheel-releasing armature P, the armature b of the press-magnet is drawn up in readiness to release the press mechanism. As soon as a pin on the revolving drum G″ of the transmitter reaches a raised spring-catch, the contact-lever M″ is withdrawn from the line-contact, and the currents cease. At this cessation the armature P of the type-wheel magnets ceases to act, and the armature b of the press-releasing magnets is withdrawn, and an impression of the desired letter is taken.

The application of the electric pulsations of a magneto-generator for controlling the motion of the type-wheel is advantageous on account of the economy, reliability, and convenience of the magneto-generator, it being a marked improvement over the galvanic batteries heretofore used, the latter being objectionable on account of their varying strength, the attention they require to keep them in order, and the cost of material required to keep them in order. All this is avoided by the use of a magneto-generator.

Having thus fully described my improvements, what I claim as my invention and desire to have secured to me by Letters Patent, is—

1. The type-wheel of a printing-telegraph instrument, operated or controlled by currents from a magneto-generator, without the use of a relay or galvanic battery.

2. The combination of a type-wheel and printing mechanism placed in the same circuit, and both operated or controlled by currents from a magneto-generator without the use of a relay or galvanic battery.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEO. L. ANDERS.

Witnesses:

CARROLL D. WRIGHT,

SAML. M. BARTON.