(No Model.)

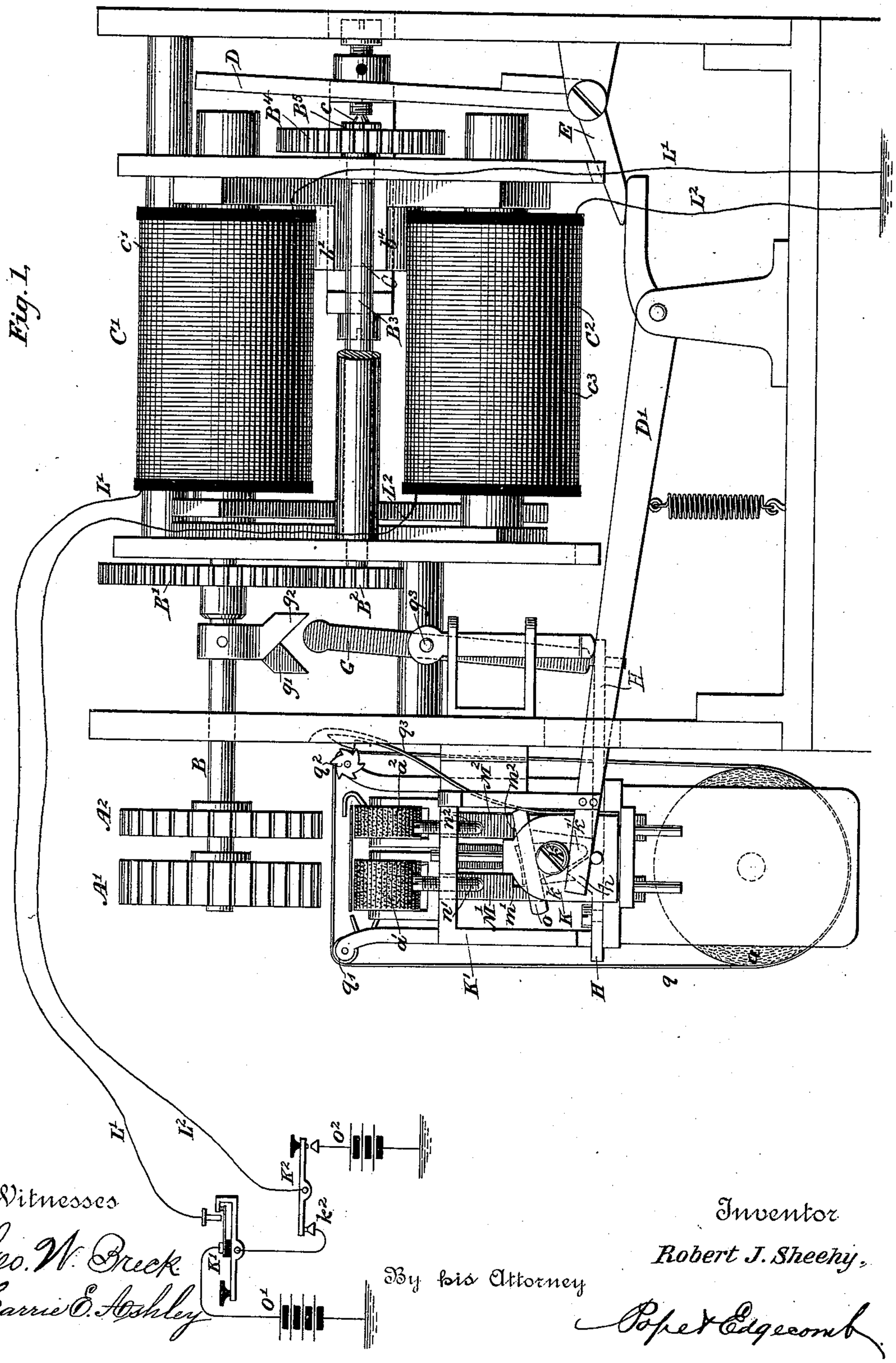
2 Sheets—Sheet 1.

R. J. SHEEHY.

PRINTING TELEGRAPH.

No. 370,357. Patented Sept. 20, 1887.

Fig. 1.



Witnesses

Geo. W. Breck.

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By his Attorney

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(No Model.) 2 Sheets—Sheet 2.

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PRINTING TELEGRAPH.

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Fig. 2.

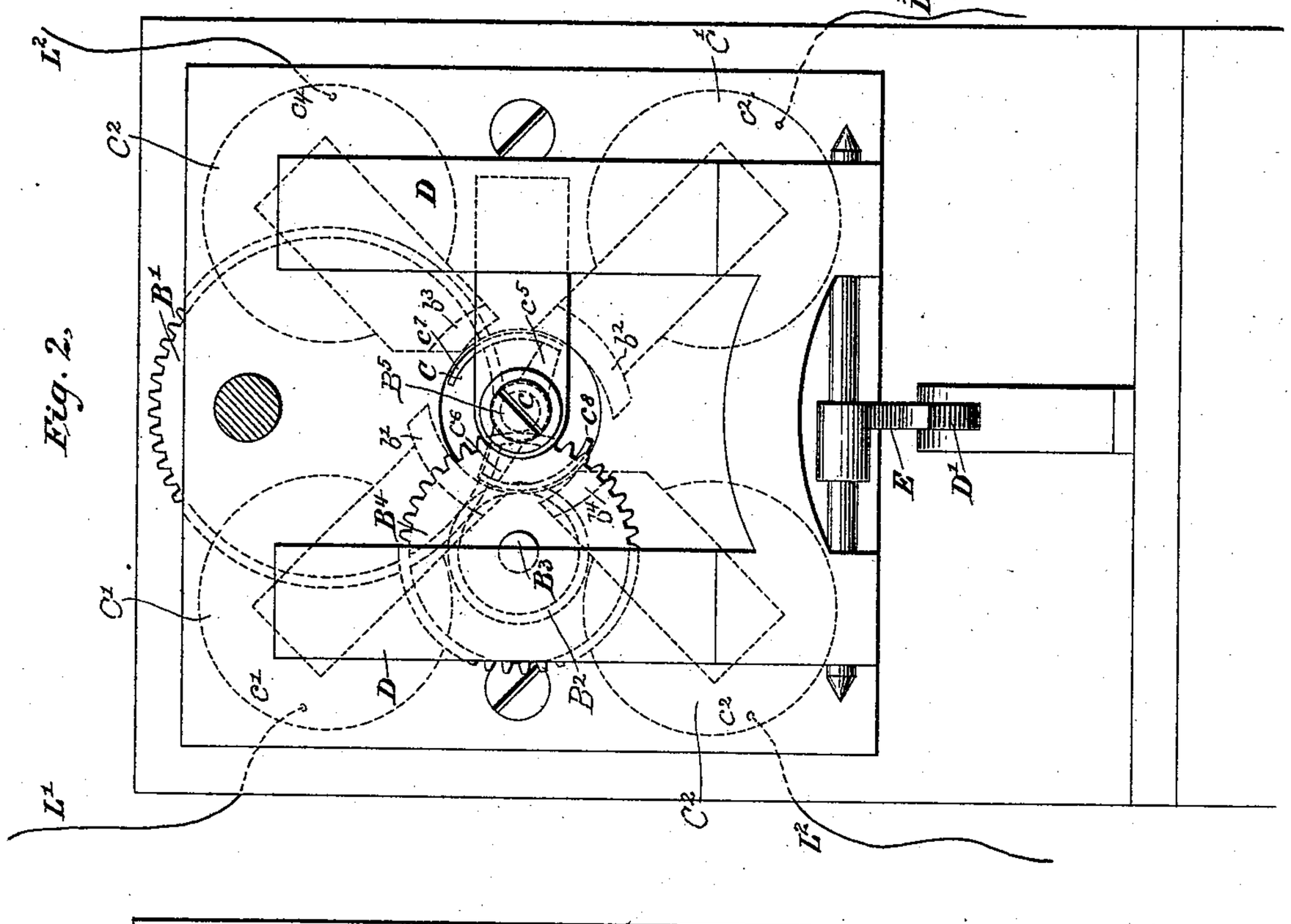
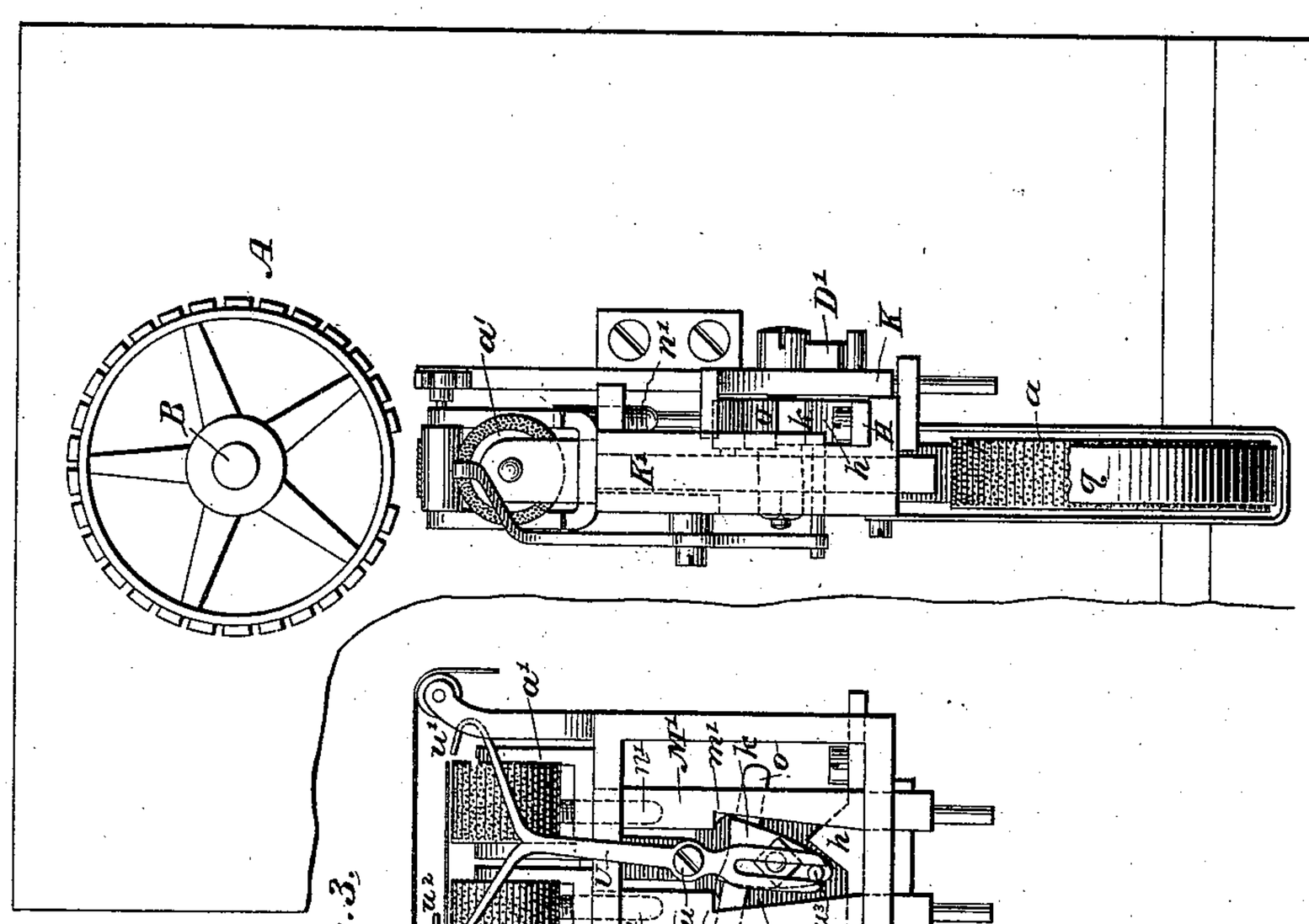


Fig. 4.



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UNITED STATES PATENT OFFICE.

ROBERT J. SHEEHY, OF NEW YORK, N. Y.

PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 370,357, dated September 20, 1887.

Application filed March 24, 1886. Serial No. 196,340. (No model.)

To all whom it may concern:

Be it known that I, ROBERT J. SHEEHY, a citizen of the United States, residing in New York, in the county and State of New York, have invented certain new and useful Improvements in Printing-Telegraphs, of which the following is a specification.

The invention relates to the class of apparatus employed for printing messages and dispatches telegraphically from one or more type-wheels capable of being revolved by electric currents transmitted from a distant station.

The object of the invention is to provide a simple, efficient, and rapidly-operating instrument, which may be manufactured at a small expense, which is noiseless in its movements, and is operated without the use of driving-weights, such as are usually employed for operating printing-telegraph instruments.

The invention consists, in general terms, in organizing the instrument in essentially the following manner: In place of an escapement device driven by a weight or spring, an electric motor is employed for securing the required revolution of the type-wheel shaft. This motor preferably consists of two electro-magnets included in two independent line-wires, and having pole-pieces projecting toward a common center. The pole-pieces form an annular field for a revolving armature. The armature is carried upon a shaft, which is journaled to the type-wheel shaft, and is advanced by the alternate vitalization of the two electro-magnets. In this manner a positive and a regulated movement of the type-wheel shaft is secured. One of the electro-magnets is employed for assisting in the revolution of the armature, and also for arresting the same when the current is continued through its coils. The other electro-magnet is employed, not for arresting the armature, but simply for assisting in revolving the same. Its poles are specially constructed for this purpose. Impressions are effected by means of an armature applied to the poles of the two electro-magnets and responding to either a prolonged current or a current of increased strength, or to a current sent through both electro-magnets at the same time. The latter method is preferable. The impressions are effected from one type-wheel or the other, as desired, by means of two independently-movable platens, the one or the other of which is impelled against its corresponding type-wheel according to the position of a platen-shifting block which is capable of being placed in either of two positions. Two positions of the type-wheel shaft are devoted to shifting this block. When the shaft is arrested in a given position and the press-lever actuated, the shifting-block will be placed in position to cause one of the platens to be subsequently actuated. If, on the other hand, the type-wheel shaft is arrested in the second position and the press-lever actuated then the block will be moved into position to operate the second platen. This block does not act directly upon the platens, but serves to place a movable latch in position to engage one or the other of the platens, as will be hereinafter fully explained.

Any suitable form of unison device may be applied to the instrument.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of an instrument embodying the features of the invention. Fig. 2 is a transverse section of the same. Fig. 3 is a detail of the platen-controlling devices, and Fig. 4 is an elevation of the front of the instrument.

Referring to the figures, A′ and A² represent two type-wheels, the former of which is designed to carry, essentially, numerals and arbitrary characters and the latter letters. These are carried upon a shaft, B. The shaft carries a toothed wheel, B′, which meshes with a pinion, B². The pinion B² is carried upon a shaft, B³, which in turn carries a wheel, B⁴, meshing with a wheel, B⁵, carried upon a shaft, *c*, of a motor. This motor is constructed with two electro-magnets, C′ and C², having their cores parallel. A main line, L′, is connected with the coils *c′* and *c²* of the electro-magnet C′, and a line, L², leads through the coils *c³* and *c⁴* of the magnet C². An armature, C, is placed between the poles of these magnets, and it is revolved by means of the attraction exerted alternately by the poles of the magnets C′ and C². The armature consists of two oppositely-projecting arms, *c⁵* and *c⁶*, which are preferably curved, as shown, and carry forwardly-projecting extensions *c⁷* and *c⁸*, respectively. The lengths of these extensions are approximately equal to or slightly less than one-quarter of the circumference of

the circle formed by the four projecting pole-pieces b', b^2, b^3, and b^4 of the electro-magnets. By this construction a portion of the armature will at all times be within the field of each of the electro-magnets. The preponderance of the metal in the arms c^5 and c^6 insures an advance movement of the motor, in whatever position it may stand, whenever the succeeding electro-magnet is vitalized. It is required, however, that the motor shall come to rest only when the arms of the armature are opposite the poles b' and b^2, for it is only when in that position that printing can be effected.

The pole-pieces b^3 and b^4 are specially constructed to give a quick advance or starting movement to the armature after it has been brought to rest opposite the poles b' and b^2, when the magnet C^2 is again vitalized; but this magnet does not serve to arrest the movement of the armature. Preferably the curve of the pole-pieces is eccentric from that of the faces of the armature, so that as the armature advances within the field of any pole-piece its separation therefrom diminishes. In this manner the armature is allowed to approach more nearly the metal of the pole-pieces as it advances within the fields. The position of strongest attraction, therefore, is opposite the edges of the pole-pieces last reached by the arms c^5 and c^6, and the armature tends to stop when opposite these curved portions of the pole-pieces b' and b^2. The portions of the pole-pieces b^3 and b^4 opposite which the armature might stop are cut away. This construction insures a quick start of the armature after it has been brought to rest opposite the pole-pieces b' and b^2, and in no way retards its movement.

The number of teeth in the train of gear between the armature and the type-wheels is such that one type and space will move across the printing-platens for each half-revolution of the armature, so that in whichever position the armature is stopped one type of each wheel will be above the corresponding printing-platen. In this manner a movement somewhat corresponding to the step-by-step movement of a mechanical escapement is secured, and a very rapid revolution of the type-wheels is obtained. The successive impulses which are transmitted alternately through the magnet C′ and C^2 serve to maintain the armature and type-wheels in unison with the transmitter. When the type-wheels have been arrested by prolonging the current through the magnet C′, an impression should be effected by means of an additional armature, D, applied to the poles of the electro-magnets C′ and C^2. Preferably this armature responds to the additional attraction exerted by vitalizing the electro-magnet C^2, while the magnet C′ remains vitalized. This armature D, however, does not respond to the rapidly-recurring alternating impulses employed for advancing the type-wheels. When the armature D is drawn forward by the two magnets, it turns its lever E upon its pivot. The lever E engages one arm of a supplemental lever, D′, which is employed for impelling one or the other of two platens, a' or a^2, against the type-wheels A′ or A^2.

For the purpose of effecting an impression from either of these type-wheels at will, the following device is employed: Two arms, g' and g^2, are carried upon the type-wheel shaft B, and these are respectively in alignment with two open or blank spaces upon the type-wheels. A lever, G, projects toward the type-wheel shaft, and it will be engaged by the arm g' or g^2 if it is impelled toward the type-wheel shaft when one or the other of the blank spaces is above the platens. The lever is pivoted at g^3 upon a support engaged by the press-lever D′, and therefore rises and falls with the press-lever. The faces of the arms g' and g^2 are beveled in opposite directions and serve to turn the lever G upon its pivot g^3 in one direction or the opposite, accordingly as it strikes against one or the other of the arms. The position of the arm G determines the position of a wedge-shaped extension or shifting block, h, carried upon a sliding bar, H. The lever G is coupled with the bar H, and accordingly as the former is turned in one direction or the other the bar is carried into position to place the shifting block h beneath a tilting platen-latch, k, carried upon a movable support or frame, K. The tilting latch is pivoted to the support or plate K, and is constructed with an extension, k', passing below its pivot k^2. When the lever falls after effecting an impression, the extension k' passes upon one side or the other of the block h. In the drawings, Fig. 1, the parts are shown as having been placed in position by the contact of the lever G with the arm g', the press-lever having fallen with the extension k' upon the rear side of the shifting block h. The tilting detent k is thus turned, so that it will enter a notch, m', upon a bar, M′, carrying the platen a'. When the press-lever is raised, its end engages the bolt or pivot k^2, and the frame K rises, carrying with it the latch k, which engages and lifts the arm M′. The latter is vertically movable within a stationary frame, K′. The upward movement of the frame K will thus carry the platen a' toward the type-wheel A′ and cause an impression to be made therefrom. The parts are, however, so adjusted that at the moment the platen strikes against the type-wheel A′ the latch k will be thrown out of engagement with the notch m' and the arm M′ will fall. Such a release is effected by means of an arm or cross-bar, o, extending from opposite sides of the catch k. The arm is engaged by two adjustable screws, n' and n^2, in the frame K′. When the catch is in position to strike the platen a' and an impression is taken, the bar o will strike the set-screw or limiting-stop n^2, and the further movement of the press-lever and stop K will tilt the latch k sufficiently to disengage it from the bar M′. The bar o will then strike against the pin n' also, and be set in a horizontal position. Upon the subsequent descent of the platen-frame and press-lever upon

the demagnetization of the two electro-magnets C′ and C² the latch *k* will be engaged by the block *h*. In this manner it will be insured that it will occupy the proper position for again engaging the bar M′ upon its next upward movement. The platen, however, will have descended to its normal position or rest even before the electro-magnets have been demagnetized, thus insuring a quick stroke, and it also results that each impression is made with the same pressure, and that there is no opportunity for the impression to become blurred by the movement of the paper across the type-wheels while pressed against the same by the platen. When the lever G has been moved in the opposite direction by being thrust against the arm g^2, then the shifting block *h* will be moved backward and the latch *k* will be tilted in the opposite direction upon the descent of the frame K. The arm M² will then be engaged by the latch entering the notch m^2, and the platen a^2 will be impelled toward its type-wheel A² at each upward movement of the press-lever. In like manner, the bar M² will be released the moment an impression is effected, and the platen allowed to fall by reason of the contact of the bar *o* with the stop *n*′.

For the purpose of preventing the paper upon which the impressions are being made from striking against one wheel when the printing is to be effected by the other, a movable guard, U, is employed. This consists of a lever pivoted at *u* to the support K′, having two arms or fingers, *u*′ and u^2, designed to extend over one edge or the other of the paper. The lower end of the lever is forked and a pin, u^3, projects from the extension *k*′ through the fork. When the latch *k* is in position to print from the wheel A′, the finger u^2 will hold the paper from the wheel A². When the latch is tilted in the opposite direction to effect impressions from the wheel A², then the finger *u*′ is thrust between the wheel A′ and the corresponding edge of the paper.

Instead of inking the type upon the type-wheels by means of inking-rollers, as has usually been the custom, it is preferred in this instance to employ an ink-ribbon, *q*, which passes over an ink-supply roller, *a*, and is held in suitable position between the paper passing over the platens and the type-wheels by means of small rollers *q*′ and q^2. The ribbon passes in a direction parallel to the axis of the type-wheels, and it is evident that the faces of the type will effect impressions upon the paper through the type-ribbon. The roller *a* is suspended upon the ribbon and its weight maintains the necessary tension. A spring, q^3, attached to the press-lever D′, engages a ratchet-wheel upon the arbor of one of the rollers, q^2, and each downward movement of the lever will advance the ribbon one step by reason of this pawl and ratchet-wheel, thus causing a fresh surface to be presented to the type.

Any suitable forms of unison and paper-feeding devices may be applied to this instrument, as required; but detailed description of any particular forms will not here be necessary.

It is preferred to operate the printing device by causing the magnet C² to be vitalized while the current is continued through the magnet C′. The armature D will still be held at rest, because of the superior attraction exerted by the electro-magnet C′. After an impression is effected, simply interrupting the circuit through the magnet C′ would cause the armature D to advance; but to insure that the armature D shall fall away, it is preferred to also interrupt the connections through both magnets, and then complete the circuit through the magnet C².

In the drawings there is shown a diagrammatic representatation of a system of keys for transmitting the required currents for operating the instrument. This consists of any suitable device, K′, for transmitting currents alternately upon the lines L′ and L². In this instance a continuity-preserving key is shown merely for the purpose of explanation. The spring *k* is connected with one pole of the battery O′. The other pole of the battery is connected with the earth. The line L′ leads to a contact-point, *k*′, and the line L² leads to a key, K², the resting contact k^2 of which is connected with the lever of the key K′. When the key K′ is operated, the currents are sent from the battery O′ upon the lines L′ and L² alternately. The front contact of the key K² is connected with one pole of a battery, O², the other pole being connected with the earth. When this key is operated, the connection of the line L² with the key K′ is interrupted, and a current is sent from the battery O². When, therefore, it is desired to vitalize both magnets C′ and C², both keys are depressed, and when both magnets are to be demagnetized the key K′ is released, interrupting the connections of the line L′, and then the key K² is also released, and thus the connections of the line L² will be interrupted during the time it is passing from its front to its back contact-stop.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of two main lines, electro-magnets respectively included in said main lines, means for vitalizing the same alternately, an armature-shaft revolved by said electro-magnets when so vitalized, a type-wheel shaft revolved by said armature-shaft, an impression device, and an armature for operating the same applied to said electro-magnets and responding to currents transmitted over both lines simultaneously.

2. The combination, substantially as hereinbefore set forth, of a type-wheel shaft, two electro-magnets for controlling the position of the same, two main lines respectively including said electro-magnets, an impression device, and an armature applied to both of said electro-magnets for operating said impression device when simultaneously vitalized.

3. The combination, substantially as hereinbefore set forth, of a type-wheel shaft, an elec-

tric motor having a revolving armature for revolving said shaft, and a second armature applied to the magnets of said motor for effecting impressions from said type-wheels.

4. In a printing-telegraph instrument, a motor having a revolving armature and two electro-magnets for revolving the same, extended pole-pieces for one magnet for arresting said armature by a prolonged current through said electro-magnet, and pole-pieces of less dimensions for the other electro-magnet, whereby such a current through that electro-magnet will not arrest the armature.

5. The combination, substantially as hereinbefore set forth, of a type-wheel shaft, a revolving armature, electro-magnets for moving said armature having polar projections for establishing a field for the same, transmitting devices for alternately vitalizing said magnets, and a circuit-controller constructed to prolong a current through one of said magnets, and means for simultaneously transmitting a current through the other magnet.

6. In a printing-telegraph instrument, a motor consisting of the combination of two electro-magnets having their cores parallel and their poles alternately placed with reference to each other, and an armature centrally pivoted with respect thereto and constructed with two oppositely-projecting curved arms, substantially as described.

7. The combination, substantially as hereinbefore set forth, with two electro-magnets having their poles alternately placed, of an armature pivoted centrally with respect thereto and revolved thereby, substantially as described, and a second armature applied to the poles of said magnets, and means for moving the last-named armature toward and away from the poles of said magnet.

8. The combination, substantially as hereinbefore set forth, with two electro-magnets having their poles alternately placed, of an armature pivoted centrally with respect thereto and revolved thereby, substantially as described, and a vibrating armature applied to the poles of said magnets.

In testimony whereof I have hereunto subscribed my name this 18th day of February, A. D. 1886.

ROBERT J. SHEEHY.

Witnesses:

DANL. W. EDGECOMB,

CHARLES A. TERRY.