T. A. EDISON.

2 Sheets—Sheet 1.

Electrical Printing Instrument.

No. 96.567.

Patented Nov. 9, 1869.

Fig: 1.

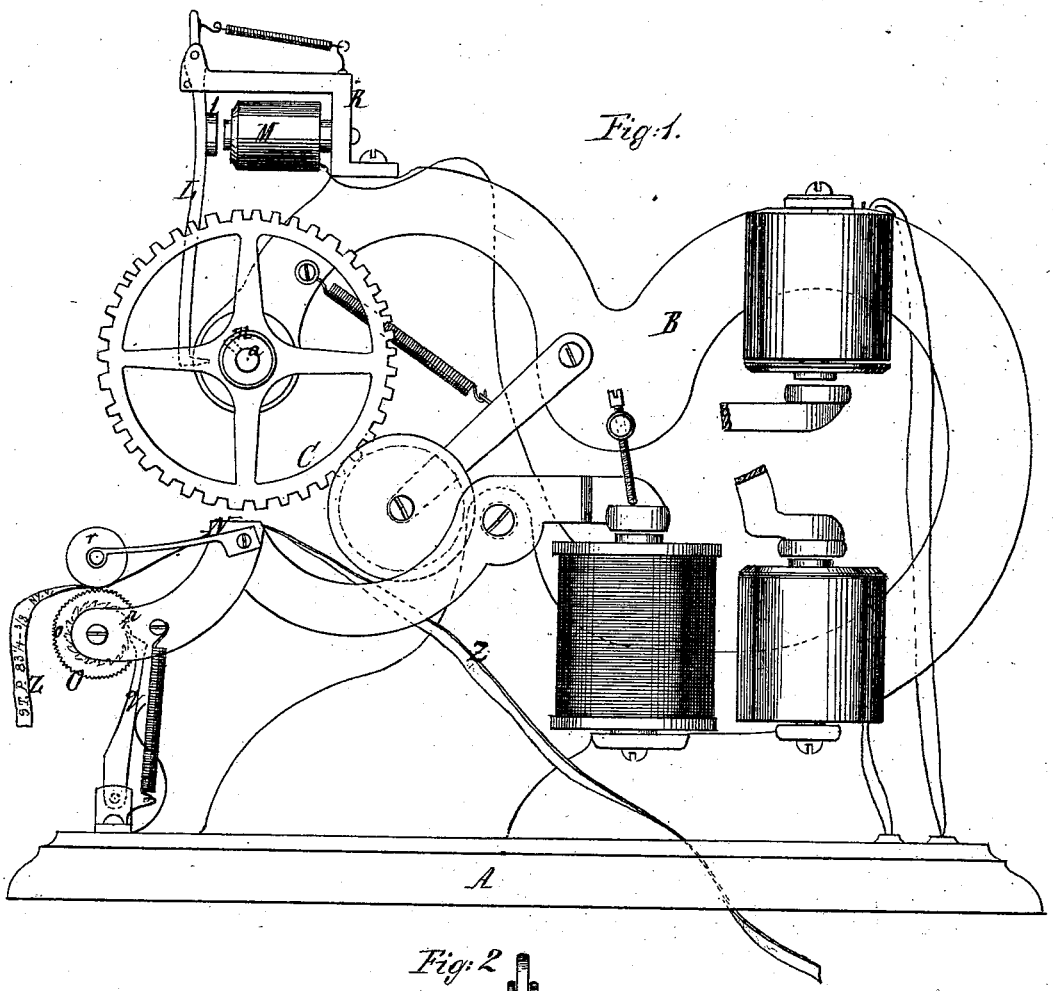
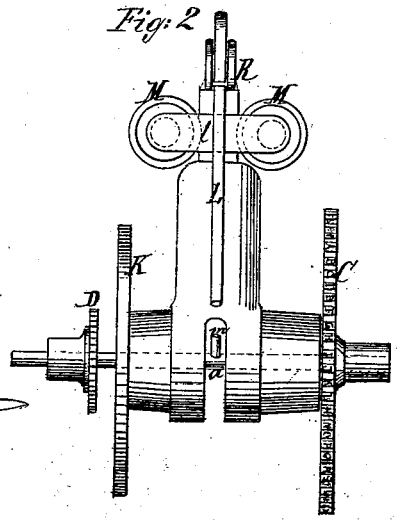


Fig: 2



Witnesses.

W. Hauff

R. Baumeister

Inventor.

Thomas. A. Edison

2 Sheets—Sheets 2.

T. A. EDISON.

Electrical Printing Instrument.

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Fig: 3.

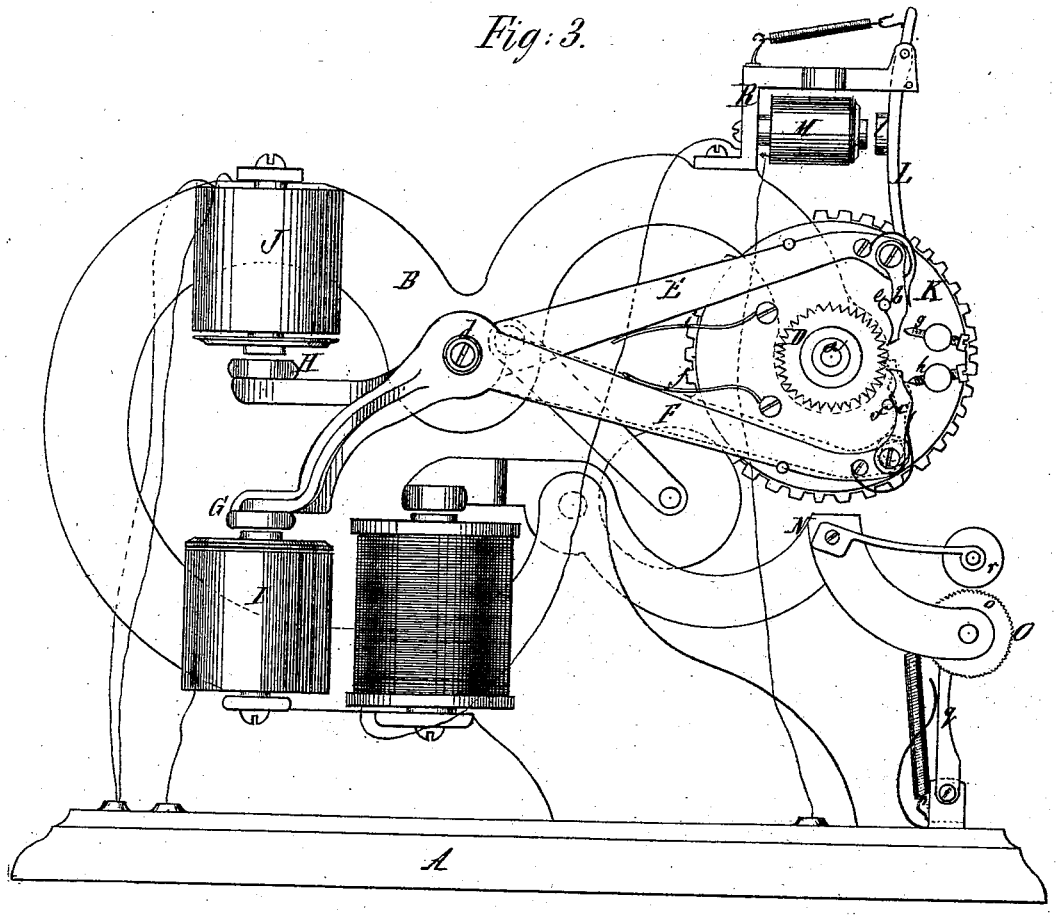


Fig: 4.

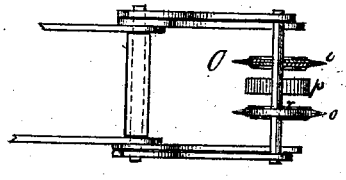
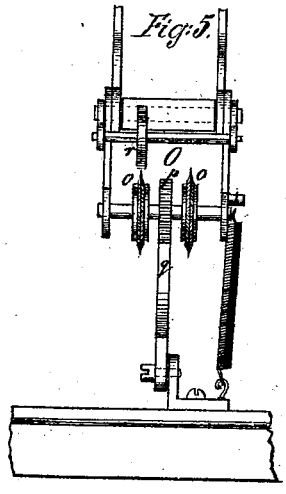


Fig: 5.



Witnesses.
W. Hauff
R. Langmeister

Inventor.
Thomas A. Edison

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF NEW YORK, N. Y., ASSIGNOR TO SAMUEL S. LAWS, OF SAME PLACE.

IMPROVEMENT IN PRINTING-TELEGRAPH APPARATUS.

Specification forming part of Letters Patent No. **96,567**, dated November 9, 1869.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of the city, county, and State of New York, have invented a new and useful Improvement in Electrical Printing Instruments; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which drawings—

Figure 1 represents a side elevation of this invention, showing the printing mechanism. Fig. 2 is a front view of the unison mechanism detached. Fig. 3 is a side elevation of my instrument, showing the mechanism for imparting to the type-wheel a step-by-step movement in either direction. Fig. 4 is a plan of the paper-feed mechanism detached. Fig. 5 is a front view of the same.

Similar letters indicate corresponding parts.

This invention relates to certain improvements in that class of instruments for which Letters Patent were granted to S. S. Laws December 31, 1867, and March 24, 1868, and also described in an application for a patent filed by said S. S. Laws in the Patent Office January 4, 1869.

My present improvements consist in the arrangement of two dogs, pawls, or clicks pivoted to two armature-levers and acting on a star-shaped or double ratchet-wheel, in combination with stationary pins which are not connected with the ratchet or pawls and which act on the pawls in such a manner that by one set of pins the pawls are thrown out of gear with the ratchet, and by the other set of pins said pawls are locked in gear with the ratchet, and that by the action of the two pawls a uniform step-by-step movement can be imparted to the ratchet in either direction with ease and facility, the mechanism required for this purpose being exceedingly simple and not liable to get out of repair, and the type-wheel or ratchet is held in position, when at rest, by means of a graduated or adjustable friction instead of holding-pawls.

The invention consists, also, in the arrangement of a separate magnet in combination with the unison-lever in such a manner that the operator has absolute control over the unison-stops of all the instruments in the line without danger of disturbing the power of any of the other magnets.

In the drawings, the letter A designates a bed-plate, from which rises an arm, B, which may be cast solid with or otherwise rigidly attached to said bed-plate. The outer end of this arm B is bored out to form a bearing for a shaft, *a*, on one end of which is mounted the type-wheel C, while on its other end is mounted the ratchet-wheel D, said shaft being fitted in its bearings, so that it turns freely therein; but sufficient friction is secured by adjusting the position of the type-wheel to retain it in any position into which it may be brought. This friction may be obtained and regulated by the pressure of an adjustable spring upon the ratchet-shaft or some part carried around thereby.

The ratchet-wheel D is star-shaped or double-acting, and it is acted upon by two pawls or clicks, *b c*, which are pivoted to levers E F, extending from the armatures G H of two electro-magnets, I J. Said levers have a common fulcrum on the pivot or stud *d*, which is rigidly secured in the arm B, and their armatures and electro-magnets are arranged in such relation to said levers and to the ratchet-wheel that by alternately closing and opening the circuits through said electro-magnets the levers E F are caused to oscillate in opposite directions, and that by the action of one of the clicks the ratchet-wheel assumes a step-by-step movement in one direction, while the other click produces a step-by-step movement of the ratchet-wheel in the opposite direction. The position of the clicks, in relation to the teeth of the ratchet-wheel, is governed by two sets of pins, *e f*, *g h*, which are secured in a disk, K, that is rigidly attached to the end of the arm B. The pins *e* and *f* act on projections on the inner edges of the clicks *b* and *c*, and if the levers E and F are forced back, by the action of their springs *i* and *j*, said pins lift and hold the points of the clicks out of the path of the ratchet-teeth, and if either of the armatures is attracted and its lever caused to move, the pawls, being released of the pins *e* and *f*, are thrown in gear with the ratchet-teeth by the action of their springs, and the stop-pin *g* or *h* acts against the outside edge of the corresponding click and

holds it in gear and locks it with the ratchet-wheel, causing the same to stop at the distance of one tooth. The stop-pins *g* and *h* might be combined into one pin, serving the same purpose for each of the pawls. By this arrangement a step-by-step movement can be imparted to the ratchet-wheel, governed by the action of the stationary pins *e f g h* on the projections on the edges of said clicks, the friction of the type-wheel arbor being made sufficient to prevent the ratchet from moving when the lever-pawls are drawn back from the teeth.

It is obvious that the effect of the two clicks will be the same if they are made to engage with two ratchet-wheels on the same arbor, with teeth facing in opposite directions, such ratchets being a mechanical equivalent of the star-shaped ratchet shown in the drawings.

The electro-magnets I and J are fastened to the arm B, so that they straddle said arm, and easy access can be had to them and to their connections.

In order to throw all the instruments on a line in unison, a "unison-lever," L, is used, such as described in the application of S. S. Laws for a patent on printing-telegraph, filed in the Patent Office January 4, 1869. This unison-lever is hinged to a bracket, R, which is firmly secured to the main arm B, and to said lever is attached the armature *l* of a separate electro-magnet M, which is secured to the bracket R. The lower end of the unison-lever L forms a hook, (see Fig. 1,) and if the circuit through the electro-magnet M is closed, this hook is thrown in the path of a pin, *m*, which projects from the shaft *a*, (see Figs. 1 and 2,) so that the motion of said shaft is stopped as soon as the pin *m* comes in contact with the unison-lever. The pins *m* on the several instruments in a line are made to correspond in position to a certain type or character on the several type-wheels, and consequently by working all the instruments round in either direction until the several pins *m* are brought in contact with the several unison-levers, all the type-wheels are arrested in the same position and all the instruments are thrown into unison.

The object of working the unison-lever by a separate magnet is to enable the operator to control the position of said unison-lever without disturbing any other part of the mechanism, and particularly without diminishing the power of the main magnets, as when the unison-lever is operated by secondary armatures from either or both of the main magnets.

The strip of paper Z is carried through between the platen N and the type-wheel by the feed mechanism O. A roller, *r*, presses the strip of paper against one of the serrated rims or flanges *o* of the feed-wheel, and as the platen-lever oscillates, by the combined action of its electro-magnet and its detaching-spring the ratchet of the feed-drum acts against the click *g* and receives an intermittent rotary motion, so that for each oscillation of the platen-lever the strip of paper is moved a sufficient distance to make room for a subsequent impression. The pressing-roller *r* is situated on the inside of the feed-drum, and consequently the letters and characters printed on the strip of paper are not at all concealed by it while the strip passes through the feed mechanism, and said characters remain open to view from the time when they have been printed.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The stationary pins *e f g h*, in combination with the clicks *b c*, actuated by the armature-levers E F, and acting on the ratchet D, substantially as and for the purpose described.

2. The combination of a separate electro-magnet with the unison-lever L, substantially as set forth.

THOMAS A. EDISON.

Witnesses:
W. HAUFF,
E. F. KASTENHUBER.