No. 666,861. Patented Jan. 29, 1901.

L. M. CASELLA.

PRINTING TELEGRAPH INSTRUMENT.

(Application filed Oct. 20, 1899.)

(No Model.) 3 Sheets—Sheet 1.

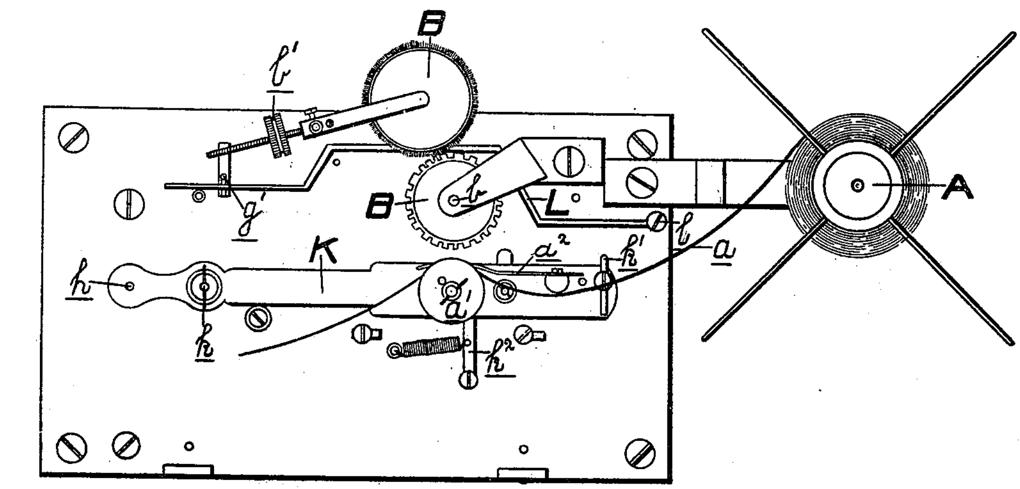

Fig. 1.

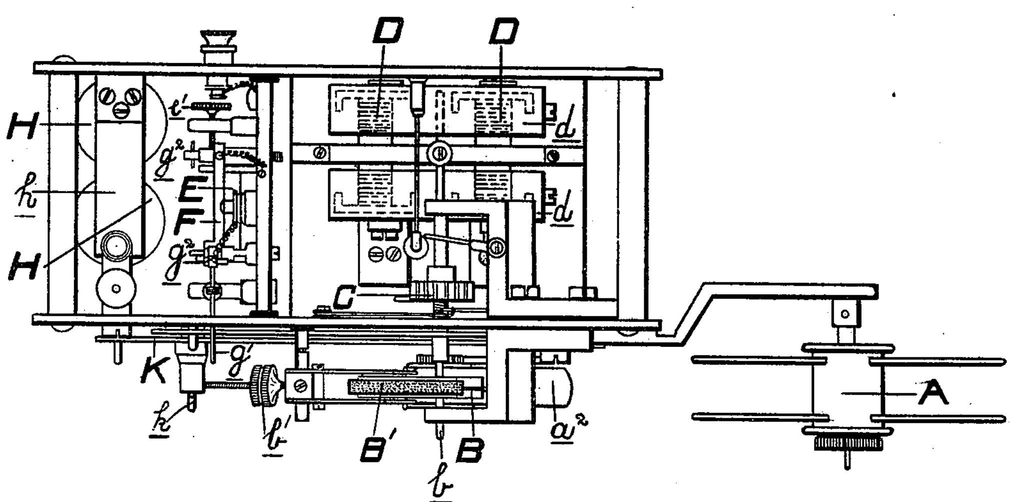

FIG. 2.

WITNESSES:

Ella L. Giles

INVENTOR

Louis Mauro Casella

BY

Richards & Co

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 666,861. Patented Jan. 29, 1901.

L. M. CASELLA.

PRINTING TELEGRAPH INSTRUMENT.

(Application filed Oct. 20, 1899.)

(No Model.) 3 Sheets—Sheet 2.

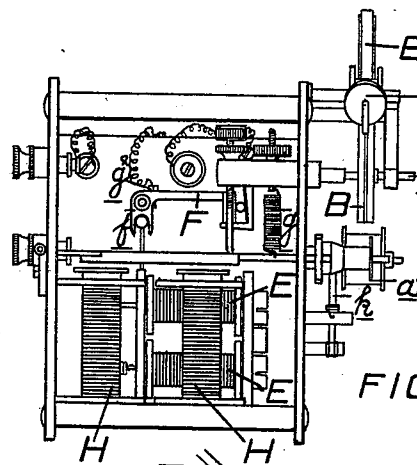

FIG. 3.

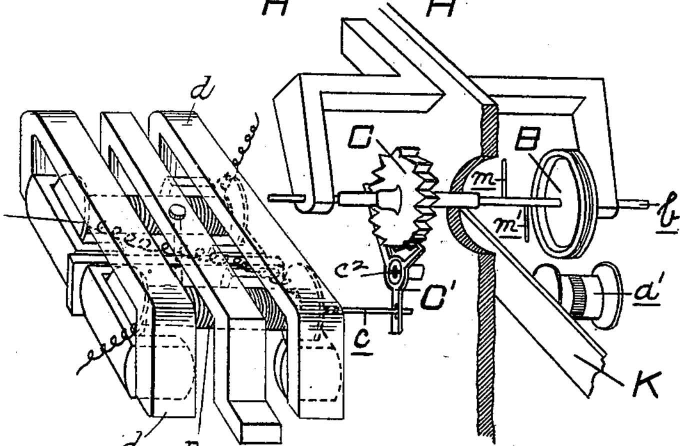

FIG. 4.

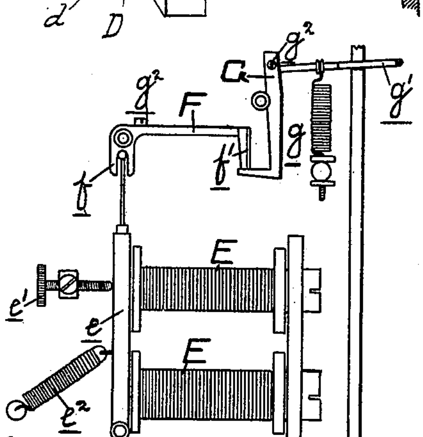

FIG. 5.

WITNESSES:
Ella L. Giles
[illegible]

INVENTOR
Louis Marino Casella
BY
Richards & Co
ATTORNEYS.

No. 666,861. Patented Jan. 29, 1901.

L. M. CASELLA.

PRINTING TELEGRAPH INSTRUMENT.

(Application filed Oct. 20, 1899.)

(No Model.) 3 Sheets—Sheet 3.

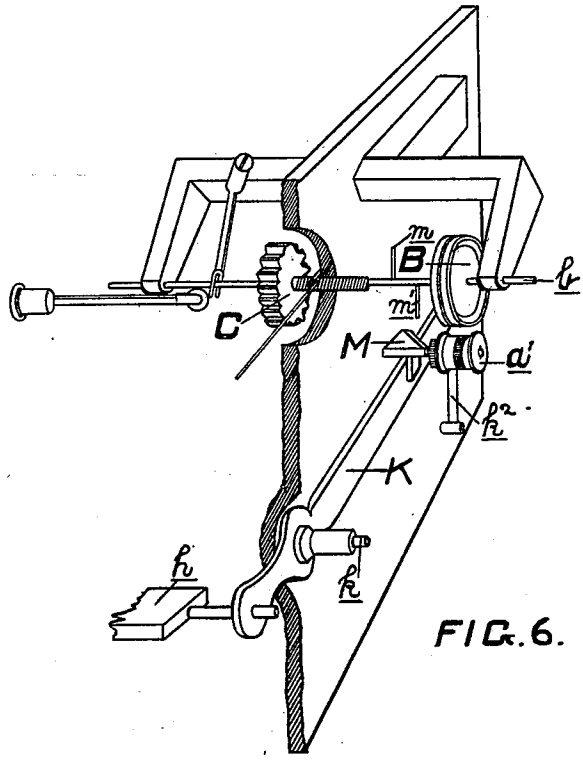

FIG. 6.

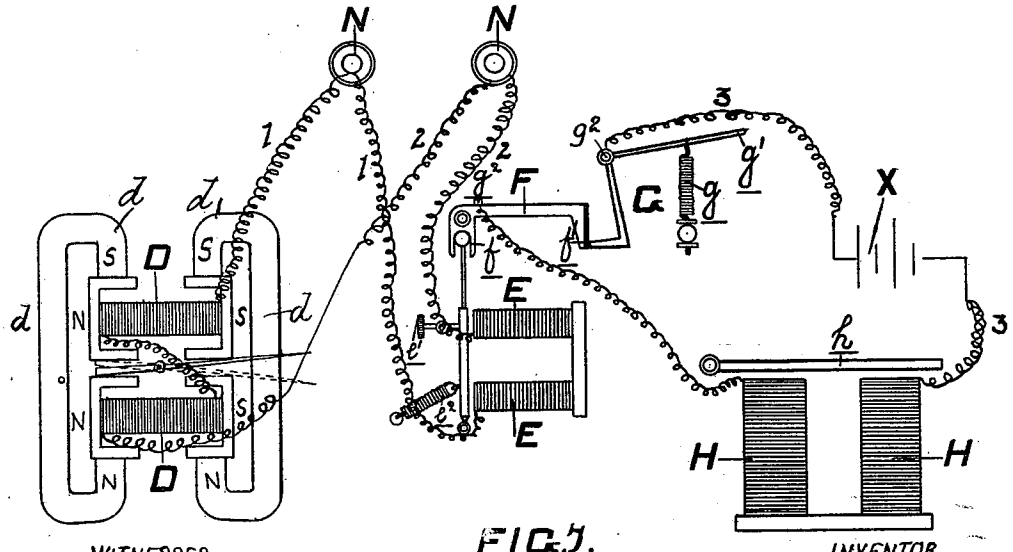

FIG. 7.

WITNESSES:
Ella L. Giles

INVENTOR
Louis Marino Casella
BY
ATTORNEYS

UNITED STATES PATENT OFFICE.

LOUIS MARINO CASELLA, OF LONDON, ENGLAND.

PRINTING-TELEGRAPH INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 666,861, dated January 29, 1901.

Application filed October 20, 1899. Serial No. 734,224. (No model.)

To all whom it may concern:

Be it known that I, LOUIS MARINO CASELLA, a subject of the Queen of Great Britain and Ireland, residing at London, England, have invented a new and useful Improved Printing-Telegraph Instrument, (for which I have made application for Letters Patent in Great Britain under No. 6,833, dated the 29th day of March, 1899,) of which the following is a specification.

This invention relates to step-by-step printing-telegraph instruments; and it consists in improvements in the direct electrical step-by-step driving mechanism for the type-disks, in the control and operative devices of the printing and feed mechanism, and in the type-wheel-shifting devices, whereby the construction of the instrument is simplified and rendered cheap and reliable in action.

To carry this invention into effect, I entirely dispense with the clockwork mechanism so frequently used in other printing-telegraph instruments and rely upon an alternating current (generated by the operator in any ordinary "Wheatstone" or other transmitter) to operate the type-disks step by step and upon a continuous relay-current (generated by any convenient attached batteries or generator) to set in action the printing and feed mechanism when permitted so to do by a control-electromagnet in the alternating current, which is adapted to hold up its armature during the continuance of the alternating current and to release the same when the alternating current ceases, thus bringing by trip-contact devices the continuous relay-current into action to effect the printing and feed of the paper.

For the step-by-step revolution of the type disk or disks I use any known arrangement of an electro-magnet or magnets in the alternating circuit having an armature adapted to reciprocate, and by a specially-designed escapement-pallet attached to said armature and engaging on a star-wheel the shaft of the type disk or disks is caused to revolve step by step, as required, according to the indication of the transmitter.

Figure 1 is an outside elevation of my instrument. Fig. 2 is a plan of the same. Fig. 3 is an end elevation of the same. Fig. 4 is a perspective view of the type-disk-driving mechanism detached. Fig. 5 is a detail detached view of the relay-circuit contact. Fig. 6 is a perspective detail of the disk change and unison devices detached. Fig. 7 is a diagrammatic view of the various electromagnets and the connecting-circuits.

A is the reel, carrying a continuous slip of paper a, which is fed forward by a serrated roller a' and is pressed thereon by a forked spring a^2.

B represents the type-disks, preferably in duplicate, one carrying letters and the other figures, mounted on the arbor b, which latter is capable of longitudinal movement in its bearings by control mechanism, hereinafter described, so that either the letter or the figure disk is brought over the printing-line of the paper.

B′ is an inking-brush of usual form with adjusting counterbalance-weight b', so that the brush is adapted to lie in contact with the relief letters and figures of the type-disks B as they revolve.

C is the star-wheel on the type-disk arbor b, and C′ is the pallet-escapement, rocked on a pivot c^2 by the arbor c, (seen in detached detail in Fig. 4,) such arbor c having a light sensitive armature thereon (shown in proper position above the ends of D D in Fig. 2 and shown turned down into horizontal plane diagrammatically in Fig. 7) and adapted to oscillate between the poles of the electromagnets D D, polarized by the permanent magnets $d\,d$, or caused to oscillate by any known equivalent means, when energized by an alternating current from a Wheatstone or other transmitter. The electromagnets D D are wound so that they present like poles in the same direction, which poles become reversed with every reversal of the alternating current. The permanent magnets $d\,d$, embracing the pole-pieces of these magnets, also present like permanent poles in the same direction, which do not change, hence giving a differential action upon the electromagnet-poles as they change. When the current passes through the electromagnets in one direction, giving poles as shown at N S, it will be observed that the permanent magnets neutralize the magnetism of those poles of the electromagnets which are opposite in polarity to the adjoining poles of the permanent mag-

nets, while those poles which are like in polarity to the adjoining poles of the permanent magnets are reinforced. The two reinforced poles are situated diagonally to the needle or armature and determine its oblique position, the other oblique poles being neutralized. Upon reversal of the transmitted current the obliquity of the reinforced poles and the neutralized poles is inverted, and the needle takes the opposite oblique position, (shown in dotted lines,) and thus the armature oscillates for every alternation of the transmitted circuit. E E are electromagnets, also energized by the same alternating current from the transmitter, but having a non-polarized soft-iron armature *e*, controlled by a stop *e'*, and a light adjustable recoil-spring e^2, so adapted that the said armature is constantly held up to the electromagnets E E against the recoil-spring so long as the alternating current is passing; but so soon as the said alternating current ceases the recoil-spring e^2 withdraws the armature *e*. The armature *e* engages with the claw *f* of the bell-crank F, such bell-crank F terminating in a bent metal end *f'*, faced on its outside with an insulating material. When the armature *e* is held up to the electromagnet E, the end *f'* of the bell-crank F is held up upon a pivoted claw-detent G, normally held by a spring *g*, so that the said claw is under the metal head of the bell-crank F. The withdrawal of the armature *e* from the electromagnet E permits the head of the bell-crank F to fall upon the claw-detent G and to make therewith metallic contact, closing a relay-circuit 3 3, Fig. 7, from an external battery X through electromagnets H H. The claw-detent G has a long tail *g'*, passing through a slot in the frame, by which the claw-detent is removed from under and from contact with the end of the bell-crank F by the operation of the printing-lever, hereinafter to be described, and the relay-circuit 3 3, Fig. 7, is thus broken. The claw-detent G then rests against the insulated face of the bell-crank F until the latter is again lifted by the energizing of the electromagnet E, when the claw-detent G slips under the end of the bell-crank F, ready to remake contact upon the release of the latter. The relay-circuit 3 3, Fig. 7, closed through the binding-screws g^2 g^2 on the said bell-crank F and detent-claw G, energizes the electromagnets H H, provided with an armature *h*, pivoted on the frame at one end and at the other passing through a hole in the opposite frame and engaging with the end of the printing-lever K, Fig. 6. This lever is pivoted upon the frame at *k* and carries at its other end the paper-feed roller *a'*, thus lifting the paper slip thereon up to the type-disks B and obtaining an imprint of the selected letter or figure. The printing-lever by a nose *k'* strikes a return-lever L, pivoted upon the frame at *l*, which strikes up the tail *g'* of the claw-detent G, before described, and thus breaks the relay-circuit. The printing-lever thus drops again, and on its return a pawl k^2 turns a ratchet-wheel upon the feed-roller spindle, and thus advances the paper slip for the next impress.

The change from the adjacent letter-type disk to the figure-type disk is effected as follows: There are two zero or blank positions upon the transmitter at opposite ends of a diameter, with corresponding blanks on the type-disks. The transmitter may be operated in a manner well known to produce the movement of the printing-lever with the type-disks at either of these points, producing no impress, owing to the blank spaces on the type-disks. The movement of the printing-lever K is, however, utilized by means of an angled stud M, Fig. 6, to shift laterally either to the left or the right the arbor *b* of the type-disks B by means of coming in contact with one or other of the pins *m m'*, which project a short distance on either side of the angle-point of the stud M from the arbor *b* in the direction of the two blank spaces on the type-disks B. According to whether the type-disks B are set with one or other of the pins *m* or *m'* downward the rise of the printing-lever K shifts the type-disks either to the left or right, and thus brings either the letter-disk or the figure-disk over the printing-line on the paper slip.

In the diagrammatic view, Fig. 7, of circuits, N N are terminals of an alternating current from any known transmitter, from which alternate circuits 1 1 and 2 2 are made through the electromagnets D D, operating the step-by-step movement of the type-disks B, and the electromagnets E, holding up the armature *e* during continuation of such current and keeping the bell-crank F from contact with the claw-detent G, thus breaking the relay-circuit 3 3 from the battery X. The position shown of the detents F and G in this figure is after the contact has been broken by the tilting upward of the tail *g'* of the claw-detent G by the printing-lever, the claw of G coming back to rest upon the insulated face of the bell-crank F. Upon the completion of the current through the electromagnets E E the bell-crank F lifts, allowing the claw of G to pass under it, to be thus in readiness to complete the relay-circuit when the bell-crank F next drops.

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

1. In combination in a printing-telegraph instrument, a vibrating armature, electromagnets controlling said armature, circuit connections to the magnets, a rocking pallet operated by the said armature, a type-wheel with its arbor, a star-wheel on said arbor operated step by step by the rocking pallet, control-magnets having circuit connections thereto, a non-polarized sluggish armature acted upon by said control-magnets, a recoil-spring acting on the sluggish armature, printing devices, a relay-circuit, printing-electromagnets in said circuit, an armature for said printing-electromagnets connected

with the printing devices and trip-contact means whereby the non-polarized sluggish armature controls the relay-circuit, substantially as described.

2. In combination, in a printing-telegraph instrument, an electromagnet, circuit connections thereto, a non-polarized pivoted armature operating in connection with the magnets, an adjustable recoil-spring, a stop, a bell-crank lever operated by said armature, a relay-circuit, connections from said bell-crank to the relay-circuit, said bell-crank having thereon an insulated face, a pivoted claw-detent under spring tension and arranged to have its claw contacting with either the insulated face or with the metallic end of the same, said claw-detent being in the relay-circuit, printing devices and means in the relay-circuit controlling the same, substantially as described.

3. In a printing-telegraph instrument a pivoted printing-lever carrying a paper-slip-feeding roll; a pivoted armature operating the same; electromagnets attracting said armature against a recoil-spring, a relay-circuit with a battery therein for energizing said electromagnets; a return pivoted lever parallel to said printing-lever, operated by the rise of said printing-lever; a trip-contact device adapted to make or break the said relay-circuit, electric means for controlling the trip and circuit connections to said means, substantially as described.

4. In a printing-telegraph instrument, a pivoted printing-lever; means for operating the same, a triangular stud, upon the said printing-lever; two radial pins at opposite ends of a diameter upon the type-wheel arbor, situated on either side of the point of said triangular stud, adapted to move the arbor of the type-wheels longitudinally in either direction, according as one or other of the said radial pins are directed so as to make contact with one or other of the faces of the said triangular stud upon the said printing-lever, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

LOUIS MARINO CASELLA.

Witnesses:

JOHN C. FELL,

RICHARD A. HOFFMANN.