5 Sheets—Sheet 1.

R. J. SHEEHY.

PRINTING-TELEGRAPH.

No. 191,479. Patented May 29, 1877.

Fig. 2.

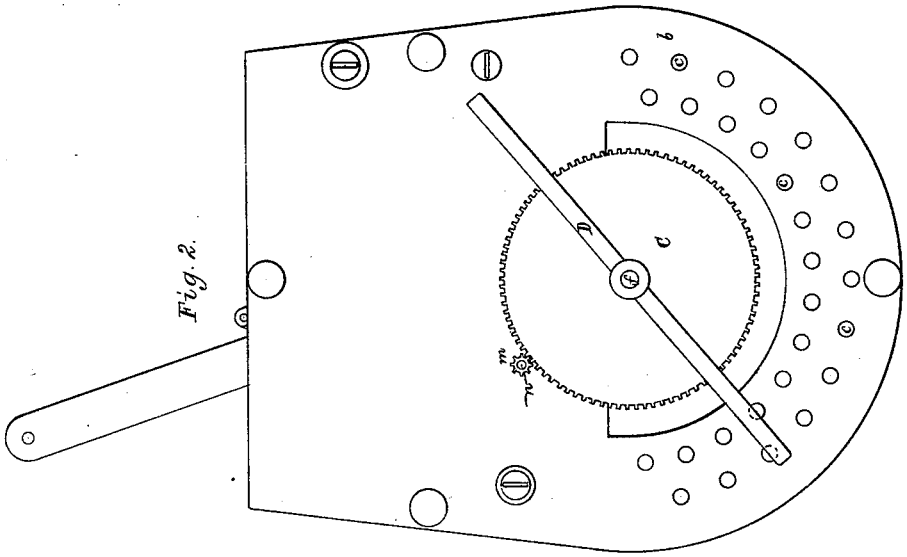
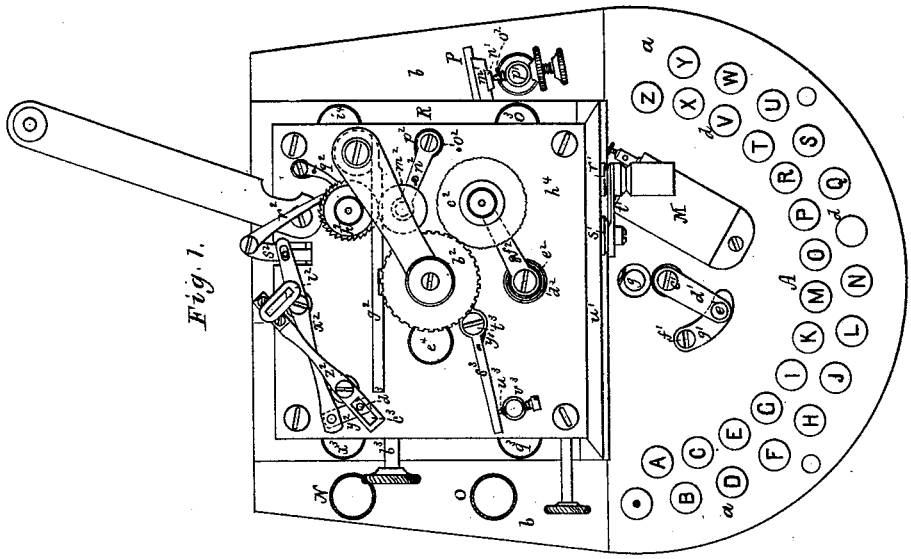


Fig. 1.



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by his attorney
R. H. Eddy.

5 Sheets—Sheet 2.

R. J. SHEEHY.

PRINTING-TELEGRAPH.

No. 191,479. Patented May 29, 1877.

Fig. 3.

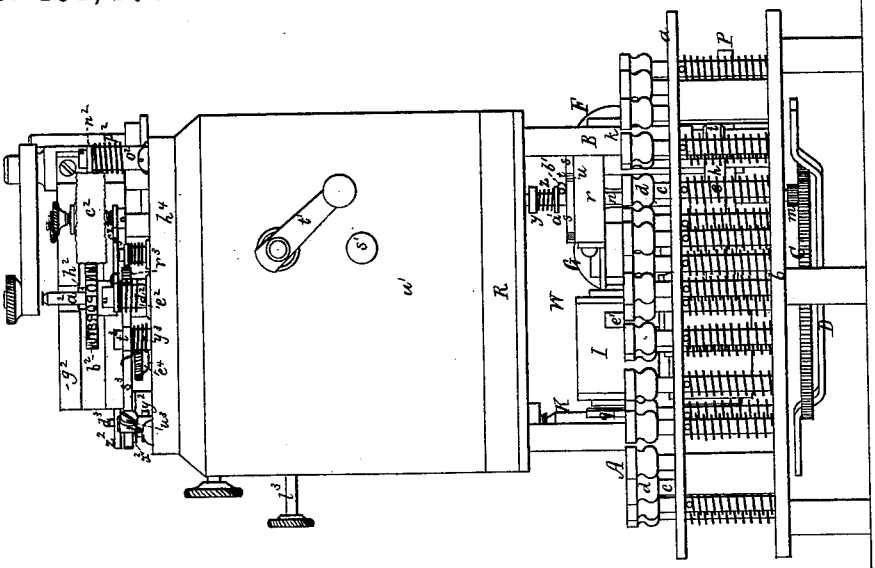
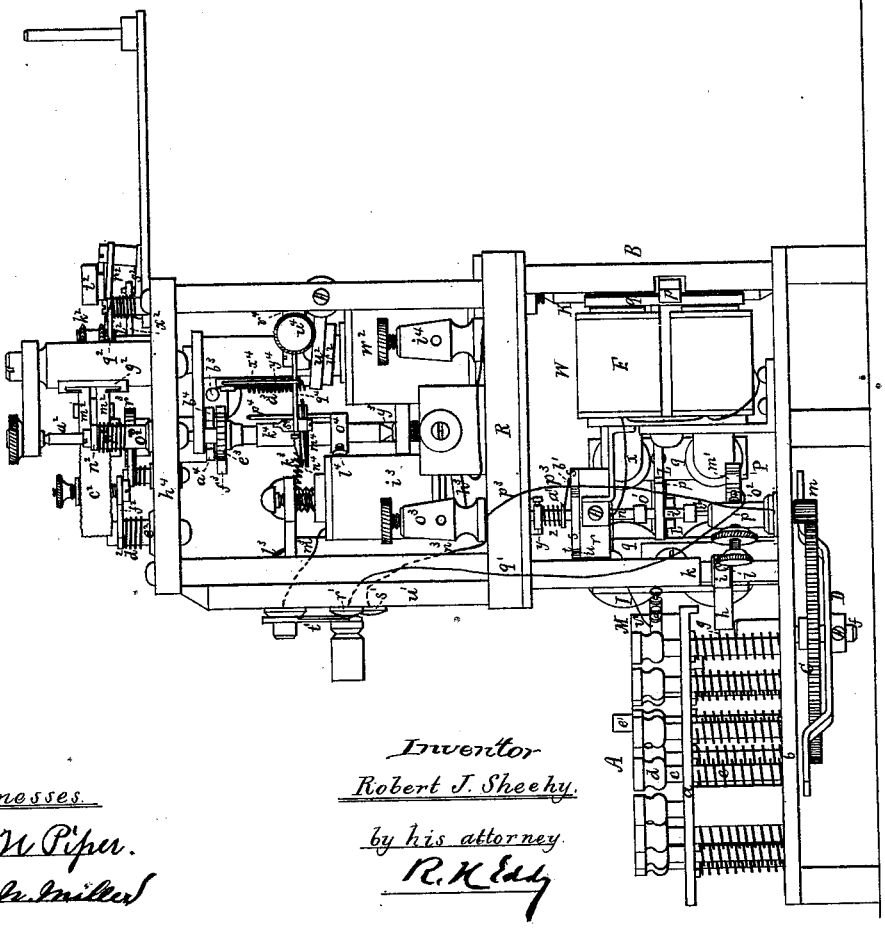


Fig. 5.



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5 Sheets—Sheet 3.

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PRINTING-TELEGRAPH.

No. 191,479. Patented May 29, 1877.

Fig. 4.

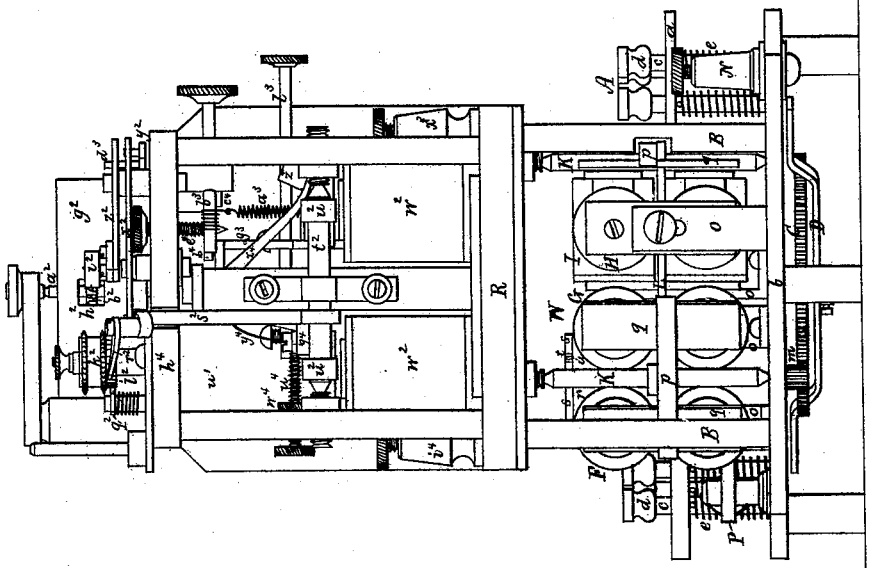
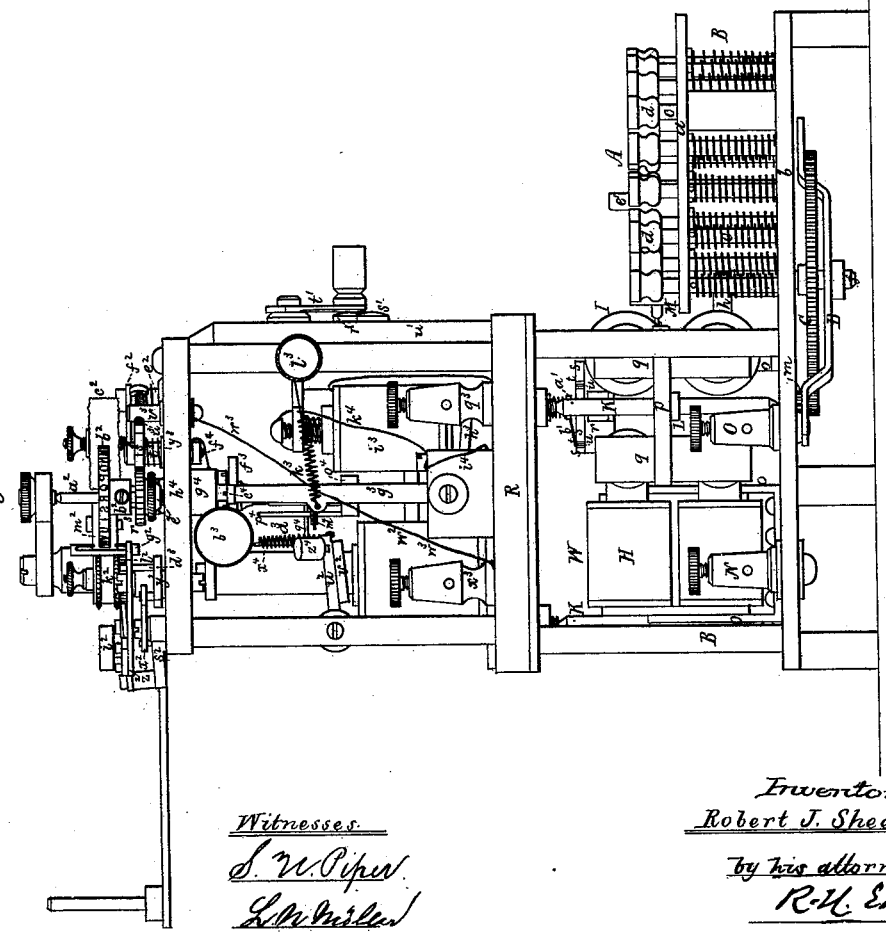


Fig. 6.



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PRINTING-TELEGRAPH.

No. 191,479. Patented May 29, 1877.

Fig. 7.

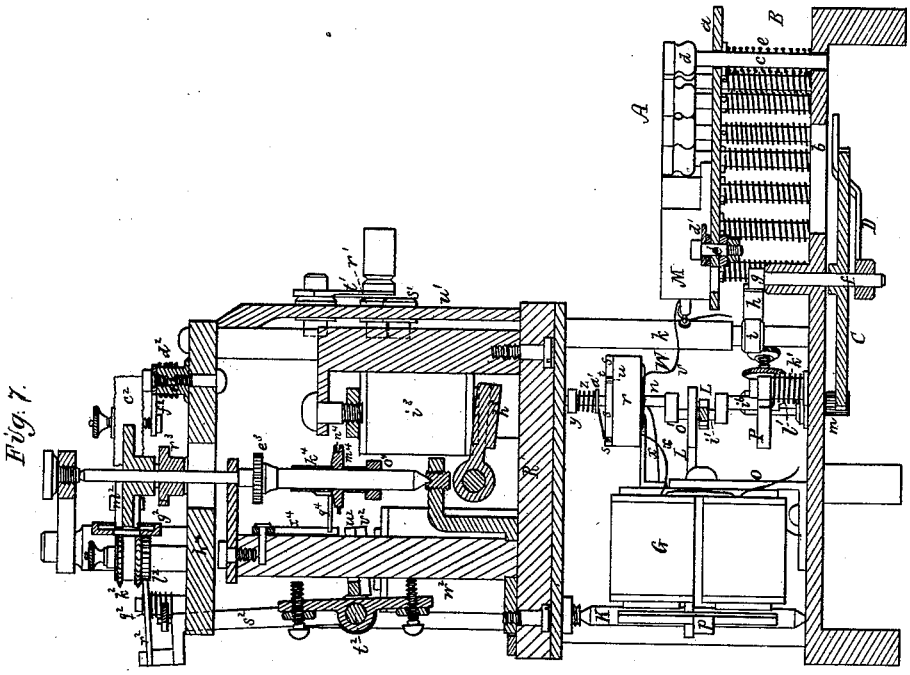
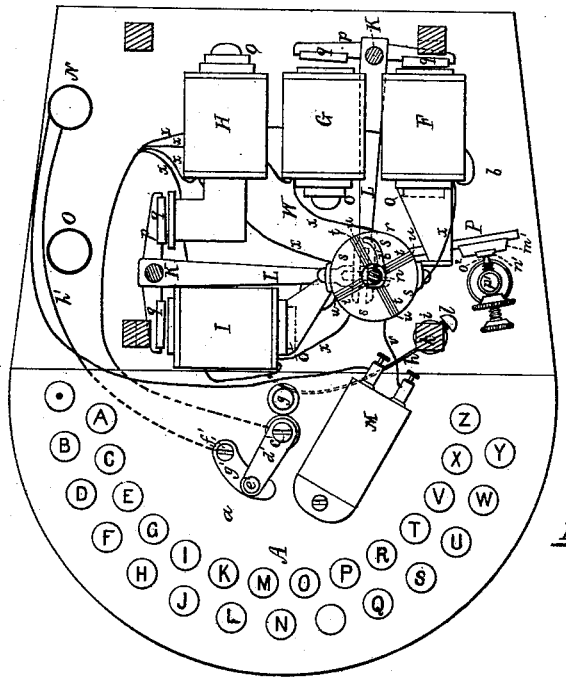


Fig. 8.



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5 Sheets—Sheet 5.

R. J. SHEEHY.

PRINTING-TELEGRAPH.

No. 191,479. Patented May 29, 1877.

Fig. 9.

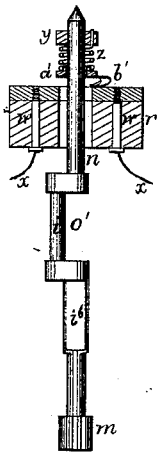


Fig. 10

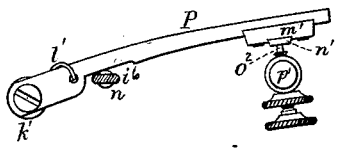


Fig. 11.

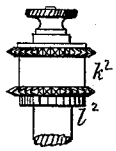
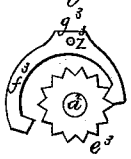


Fig. 12.



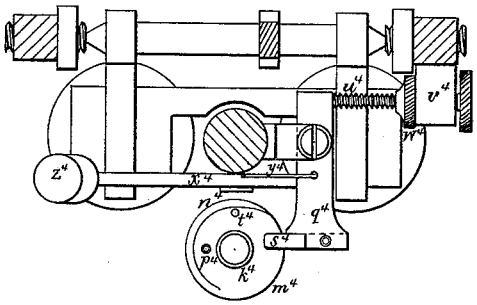


Fig. 16.

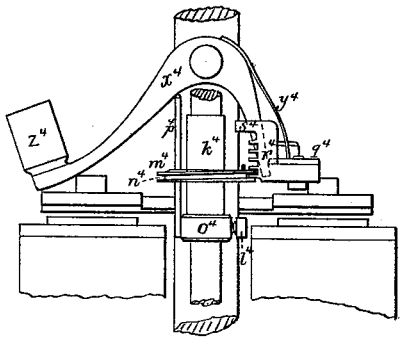


Fig. 13.

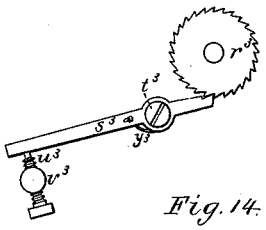
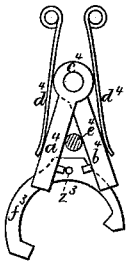


Fig. 14.



Witnesses.
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L. A. Miller.

Inventor
Robert J. Sheehy
by his attorney
R. H. Eddy.

UNITED STATES PATENT OFFICE.

ROBERT J. SHEEHY, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. **191,479**, dated May 29, 1877; application filed April 11, 1877.

To all whom it may concern:

Be it known that I, ROBERT J. SHEEHY, of Boston, of the county of Suffolk and State of Massachusetts, have invented a new and useful or Improved Telegraphic Printing-Machine; and do hereby declare the same to be described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a bottom view, Fig. 3 a front elevation, Fig. 4 a rear elevation, Figs. 5 and 6 opposite side elevations, and Fig. 7 a longitudinal and vertical section, of it.

In such drawings, A denotes a set of twenty-eight keys, each of which is so applied to a plate, *a*, and the base-plate *b* of the frame B of the instrument or machine, as to be capable of being moved vertically therein. Each key consists of a shank or rod, *c*, and a head, *d*, thereto, as shown, such key being provided with a helical spring, *e*, for automatically raising it. These keys are disposed in two concentric semicircular or arcal rows, and twenty-six of them are marked on their heads with the letters of the alphabet. One of the remaining two is without any mark, and the other has on it that of a punctuation-stop or period.

Underneath the frame B, and concentric with the keys, is a gear, C, which is fixed on a vertical shaft, *f*, properly supported and having a friction-wheel, *g*, on its upper end. A friction-brake or spring, *h*, bears against the periphery of this wheel *g*, and projects from a collar, *i*, that encompasses one of the posts *k* of the frame B. A clamp-screw, *l*, to fasten the collar to the post, is screwed into the former and against the latter. By such means the pressure of the spring against the wheel *g* may be regulated, or increased, or diminished in order to prevent the gear C from being revolved too fast.

There projects diametrically from the shaft *f* a stop-bar, D, which extends beyond the gear in manner as shown. On pressing down either of the keys while the shaft *f* is in revolution, the motion of such shaft will be arrested, when the stop-bar D may meet or is brought up against the shank of the key.

A pinion, *m*, fixed on a vertical shaft, *n*, arranged as shown, and provided with a bell-crank, o^1, engages with the gear C. The electro-motor W for revolving the pinion may be described as follows:

Within the frame B, and fixed to suitable standards *o o o o*, are four electro-magnets, F G H I. (See Fig. 8, which is a horizontal section taken just above such magnets.)

Between each pair of such magnets an upright shaft, K, is arranged, as shown, such shaft having a cross-bar, *p*, fixed to and extended from it in opposite directions, and supporting the armatures *q q* of such pair of magnets. When one of such armatures is in contact with its magnet the other armature is out of contact with its magnet.

From the said shafts K K two forks, L L, are extended at or about at right angles to each other, the prongs of each of such forks being made to embrace the wrist i^1 of the bell-crank o^1.

The shaft *n* goes up through a hole in the central part of a stationary insulator or cylindrical block, *r*, of vulcanite, the hole having a diameter larger than that of the part of the shaft going through it.

There is fixed on the top of the insulator four metallic segments, *s*, between which and the shaft is a space. Furthermore, there is a radial space, *t*, between each segment and that next to it. This space *t* is filled with vulcanite, and with a strip, *u*, of metal inserted in such vulcanite. The several strips *u* are electrically connected by a wire, *v*, with one pole of a condenser, M, arranged as shown. The other pole of the condenser is connected with the insulated battery wire connection-post N. The fellow battery-wire post (shown at O) is fixed to but not insulated from the frame B. The condenser M being a device well understood by, and in common use with, electricians, need not be described. The purpose of it and the series of metallic strips *u*, arranged in the block *r* and between its segments *s*, as set forth, is to do away with the spark that would otherwise occur when the electric arm would be in the act of passing from each segment to the other. This spark could have a tendency to injure or burn the electric arm and corrode the segments.

Fig. 9 is a vertical section of the insulator *r* and the segments thereof, there being ex-

tended down from each of the latter and through the insulator a metallic stud, w. The circuit-wires x of magnets are respectively fixed to the four studs w, and thus the magnets are in electric communication with the studs.

Furthermore, there is fixed to the upper part of the shaft n a collar, y, to which one end of a helical spring, z, encompassing the shaft is fastened. The lower end of the said spring is secured to another collar or ring, a^1, which encircles, and is free to turn on the shaft n, and supports an arm or bent metallic spring, b^1, which, near its free end, rests on the upper surface of one of the segments. This arm is carried around from one segment to the other successively, and across the intervening metallic strips, while the shaft n may be in revolution.

Furthermore, the circuit-wires of the four magnets communicate with the pivot c^1 of a switch, d^1, provided with a vulcanite handle, e^1, and arranged on the key-plate a. To operate with the key there is a metallic stud or screw, f^1, which, by means of a piece of vulcanite, g^1, is insulated from the plate a. From the stud f^1 a wire, h^1, leads to the insulated post N, hereinbefore mentioned.

The switch d^1 is for opening and closing the circuit of the electro-motor battery, such electro-motor being the four magnets, their armatures, the two forks, the shaft with the bell-crank, and the current-transferrer composed of the series of insulated segments and the elastic arm b^1, as set forth.

The part i^6 of the shaft n, below the bell-crank o^1, has a transverse section, as shown in Fig. 10, which is a sectional view of the shaft, and a top view of a vibratory arm, P, arranged with such shaft in manner as shown. This arm is pivoted to a standard, k^1, to which and the arm there is fixed a helical spring, l^1, to move the arm in a direction opposite to that in which it may be moved by the shaft. The arm has fixed to it, near its free end, a piece of vulcanite, m^1, carrying a metallic stud, n^1, to act with the stud o^2 of an insulated post, p^1. From the stud n^1 a wire, q^1, is led to one (viz., r^1) of two metallic buttons, r^1 s^1, of another switch, t^1, arranged as shown, and applied to a wooden board, u^1.

The electro-motor W effects a rotary motion of the pinion m. By such pinion the gear C will be revolved, it being stopped in its revolution by pressing down either of the keys, and by the stop-bar D being brought against the shank of such key.

On a vertical arbor, a^2, there is fixed a printing-wheel, b^2, divided on its circumference into twenty-eight equal parts. On twenty-seven of these parts or arcs there are types for printing the letters of the alphabet, and a punctuation period. There is to such printing-wheel a rotary inking-wheel, c^2, whose periphery is borne against that of the type or printing-wheel by a spring, d^2, applied to a post, e^2, and to an arm, f^2, which supports the pivot of the inking-wheel, and is pivoted on the said post.

There is arranged with the printing-wheel a trough or paper-guide, g^2, which, where tangential or nearest to the wheel, has a rectangular hole, h^2, made through it. Such hole is to enable the press-pad or striker i^2 to drive the paper against a type of the wheel.

A toothed rotary feeder, k^2, arranged as shown, pivoted on a vertical arbor, and provided with a ratchet-wheel, l^2, extends through the guide g^2, and against the strip of paper when in such guide. Fig. 11 is a side view of the feeder and its ratchet-wheel. A pressure-wheel, m^2, pivoted to an arm, n^2, arranged as shown, works against the strip of paper opposite to where it is seized by the feeder. The arm n^2 is pivoted to the upper end of a post, o^2, and provided with a spring, p^2, attached to it and the post, and serving to force the presser-wheel m^2 up to the strip of paper.

There is to the ratchet-wheel l^2 a retaining pawl, q^2, and an impelling-pawl, r^2, the latter being pivoted to the upper end of an arm, s^2, projected up from a rocker-shaft, t^2. This rocker-shaft has short arms u^2 projecting from it, and supporting the armature v^2 of an electro-magnet, w^2, arranged as represented.

There is pivoted to the arm s^2 a lever, x^2, which, by means of a link, y^2, is connected with a lever, z^2, which carries the press-pad or striker i^2, all being arranged and applied as represented.

While the armature v^2 is being drawn to its magnet the strip of paper will be fed along, and the press-pad will be driven up against such strip, so as to force it against the type-wheel, and cause an impression thereupon to take place.

A spring, a^3, attached to one of the arms u^2, and to a cord fixed to and wound on a windlass-pin, b^3, arranged as shown, serves to effect the raising of the armature off the magnet, and consequently the retreat of the press-pad and the impelling-pawl of the feeder.

The slot c^3 in the press-pad lever I make sufficiently wider than the diameter of the pin d^3, which passes up into it from the link y^2, to enable the striker after each blow on the strip of paper to rebound or fall back a little from the strip. This is to relieve the type-wheel from any pressure of the strip of paper or the press-pad, in order that the type-wheel, when next moved, may be free to do so without obstruction from the strip.

The mechanism for revolving the type-wheel may now be described.

An escapement-wheel, e^3, fixed on the wheel-arbor a^2, is operated or turned by the pallets of an escapement, f^3, (see Fig. 12,) which is a top view of the said wheel e^3 and escapement f^3. The said escapement f^3 is carried by the longer arm of a bent lever, g^3, whose shorter arm supports the armature h^3 of an electro-magnet, i^3, arranged as represented. A spring,

k^3, fixed to the longer arm of the lever g^3 and to the cord of a windlass-pin, l^3, serves to retract the lever g^3.

The circuit-wire m^3 of the magnet i^3 leads to the switch t^1. From the metallic button s^1 of the switch a wire, n^3, is extended to an insulated battery-connection wire post, o^3, from which another wire, p^3, is led to the post p^1 hereinbefore mentioned. The magnet i^3 is also in electrical connection with a telegraph line-wire connection-post, q^3.

To send a message by the instrument, the switch t^1 should be placed on the button r^1; but when a message is to be received by the instrument the said switch should be on the button s^1.

When the switch is on the button r^1 the vibratory arm P is in circuit with the magnet i^3. While the bell-crank o^1 of the electro-motor is in revolution it will cause the arm P to be moved so as to successively break the circuit with the stud o^2, in consequence of which the escapement will be moved so as to actuate the escapement-wheel, and thereby effect the rotary motion of the type-wheel.

By depressing any one of the keys the rotary motion of the type-wheel will be arrested, when the stop-bar D may next bring up against the shank of such key, the type of the wheel corresponding with the letter of the depressed key being brought into position for printing the strip of paper. The type-wheel makes two revolutions to one of the gear C, and the cranked shaft of the motor makes fourteen revolutions to one of the said gear, from which it will be seen that the type-wheel is moved an arcal distance of four letters or types for each revolution of the bell-crank shaft.

In order that the striker or press-pad may be moved up to the strip of paper only at such time as it may be desirable to effect the printing of a letter, I provide the printing-wheel shaft and the escapement with a mechanism which keeps open the circuit of the press-magnet w^2 while the type or printing wheel may be in motion. I would remark that such magnet w^2 is to be operated by a local circuit.

On the arbor a^2 of the printing-wheel, and immediately under the latter, a ratchet-wheel, r^3, is fastened concentric with the said arbor.

A lever, s^3, whose fulcrum is shown at t^3, is arranged with the said ratchet-wheel and a screw, w^3, in manner as shown in Fig. 13, which is a top view of the ratchet-wheel, the lever, and the screw. The said screw is screwed through a post, v^3, which, by means of a wire, w^3, is electrically connected with the connection-post x^3 of one of the battery-wires of the local circuit, by which the press-magnet w^2 is operated. There is to the lever s^3 and its fulcrum t^3 a helical spring, y^3, for forcing the shorter arm of the lever toward the toothed periphery of the ratchet-wheel.

There projects up from the escapement-lever g^3 a small platina stud, z^3. This stud extends between two arms, a^4 b^4, that have or turn on a common pivot, c^4, and, by springs d^4, are forced toward and against the opposite sides of the conical terminator of a screw, e^4.

Fig. 14 is a top view of the arms a^4 b^4, their springs d^4 d^4, the escapement-lever g^3, and the stud z^3, the screw e^4 being represented in horizontal section in such figure.

A wire, f^4, connects the fulcrum t^3 of the lever s^3 with the metallic block g^4, to which the arms a^4 b^4 are pivoted. The upper plate h^4 of the frame is to be supposed to be of vulcanite, whereby the fulcrum t^3 and the post v^3 become electrically insulated from each other.

The magnet w^2 has its wire i^4 put in electrical connection with the escapement-lever g^3, by means of a wire, k^4, extending from the said wire i^4 to the retracting-spring k^3 of said lever.

During the vibratory movements of the escapement-lever g^3 the stud z^3 will be brought alternately into contact with the arms a^4 b^4 or small studs projecting from them.

While the type-wheel arbor is revolving rapidly, the ratchet-wheel r^3, by its action against the lever s^3, will keep such lever out of contact with the screw u^3, because the lever will not have time to pass fully into the space between any two next adjacent teeth of the wheel before it will be met by the rear teeth of the two. As soon, however, as the type-wheel may stop the lever can fall into such space, and thereby come into contact with the screw u^3. Thus, by the action of the ratchet-wheel on the lever, the local circuit will be kept open while the type-wheel is revolving, such circuit being closed the moment the type-wheel may stop. Therefore the press pad will be at rest while the circuit is open, and will be moved up to the strip of paper on the circuit being closed.

In order to prevent accidental closing of the circuit through imperfect action of the ratchet-wheel on the lever, I use the stud z^3 and the arms a^4 b^4, applied as hereinbefore described. Should the lever, by accident, touch the screw u^3 while the type-wheel may be revolving, the circuit would be closed. The arms a^4 b^4 being in the circuit with the escapement-lever, it will be seen that the stud of the latter must rest against either of such arms or the studs thereof, in order for the circuit to be closed. The pivots are to be so arranged that the stud of the escapement-lever shall be midway, or thereabout, between the arms, when there is accidental contact of the lever and screw. Consequently the circuit will be kept open until such time as the type-wheel may stop.

It was hereinbefore mentioned that one of the wires of the battery of the local circuit is to be coupled with the post x^3. The other wire of such battery is to be coupled to another post, i^4, electrically connected with the magnet w^2.

The next part of the machine to be described is that by which the type-wheel is set or ad-

justed in unison, or in due relation with the keys, or those of a corresponding instrument in the line of the telegraph.

Fig. 15 is a top view, and Fig. 16 is a side elevation, of such part of the machine.

On the type-wheel arbor is a sleeve, k^4, arranged over a collar, o^4, provided with a set-screw, l^4, for fixing it in place on the arbor. This sleeve has a wheel or disk, m^4, fixed on it concentrically, there being a helical or screw thread, n^4, formed on the periphery of said disk. In fact, the disk is a very short screw. A round rod, p^4, extends up from the collar parallel to the shaft and through a hole in the screw-wheel m^4. The rod keeps the said wheel from turning on the shaft while allowing such wheel to move either up or down.

A lever, q^4, arranged as shown, has to its longer arm a series, r^4, of teeth, to operate with the screw-thread of the wheel. It also has a projection, s^4, extended from it above the teeth, as shown. There is in the wheel, and projecting up from it, a stud, t^4, to operate with such projection.

A screw, u^4, screwed through a stationary ear, v^4, and provided with a check-nut, w^4, is arranged, as shown, with the lesser arm of the lever q^4, and serves to limit the forward movement of the larger arm of the said lever. A curved lever, x^4, arranged with the lever q^4, in manner as represented, has a spring, y^4, projecting from it, as shown, and going down through the larger arm of the said lever q^4. The larger arm of the lever x^4 carries a weight, z^4, and rests on the armature of the magnet w^2.

Every time the armature of the magnet w^2 drops, the weight z^4 falling with it, will so move its lever x^4 as to cause the latter to press the lever q^4 back far enough to prevent the teeth r^4 from engaging with the screw-wheel; but when the local circuit is open and the printing mechanism not in operation, the teeth r^4 will be in engagement with the screw-wheel, whereby such wheel, while revolving, will be caused to rise upward until the stud t^4 of such wheel may be carried into contact with the projection s^4, which, taking place, the type-wheel will be stopped in its motion, so as to bring it into proper correspondence with the keys—that is, so that the wheel, when next printing, shall print the letters corresponding to those of the keys that may be depressed.

The plate R, over which the magnet w^2 is situated, is made of vulcanite, in order to save the necessity of insulating the local and main battery wire connection-posts, such as would be necessary were such plate made of metal.

My machine as described may be used with a single wire telegraph. On very long circuits I usually employ, or contemplate employing, a relay-magnet, and with the points of such connect the type-wheel operative-magnet in a local circuit, thereby enabling me to use any number of my machines on a long line of telegraph.

I claim—

1. The combination of the type-wheel b^2, its escapement-wheel e^3, and lever f^3, with the magnet i^3, and its armature h^3, and with the vibratory arm P, the insulated stud n^1, and screw o^2, the switch t^1, buttons r^1 s^1, the electro-motor W, and the series A of keys, and the stop-bar D, all being arranged and applied essentially as set forth.

2. The combination of the slotted lever z^2, the connection-link y^2, pin d^2, and lever x^2 with the press-pad or striker i^2, and the arm s^2 of the armature-shaft t^2, as described, all being arranged and applied substantially as set forth.

3. In combination with the printing-wheel b^2 and its shaft a^2, and the escapement e^3 f^3 for revolving such shaft, the mechanism which keeps open the circuit of the press-magnet w^2 while the type or printing wheel may be in motion, such mechanism consisting of the ratchet-wheel r^3, lever s^3, screw u^3, post v^3, spring y^3, stud z^3, arms a^4 b^4, and springs d^4 d^4, all being constructed and applied and to operate essentially as set forth.

4. The combination of the ratchet-wheel r^3, lever s^3, screw w^3, post v^3, spring y^3, stud z^3, arms a^4 b^4, and their springs, all being arranged and applied as explained, and constituting a mechanism for keeping open the circuit of the press-magnet while the printing-wheel may be in motion.

5. The combination for setting or adjusting the type-wheel in unison or due relation with the keys, such consisting of the screw-threaded disk m^4, stud t^4, the lever q^4, teeth r^4, projection s^4, weighted curved lever x^4, and the spring y^4.

6. In combination with the series A of keys and the type-wheel b^2, provided with mechanism, substantially as described, for revolving and stopping it, as explained, the mechanism for setting or adjusting the type-wheel in unison or due relation with the keys, such mechanism consisting of the screw-threaded disk m^4, the stud t^4, lever q, teeth r^4, projection s^4, weighted lever x^4, and the spring y^4, all being essentially as set forth.

ROBERT J. SHEEHY.

Witnesses:
R. H. EDDY,
J. R. SNOW.