

(No Model.)

5 Sheets—Sheet 1.

J. E. WRIGHT.
PRINTING TELEGRAPH INSTRUMENT.

No. 460,457.

Patented Sept. 29, 1891.

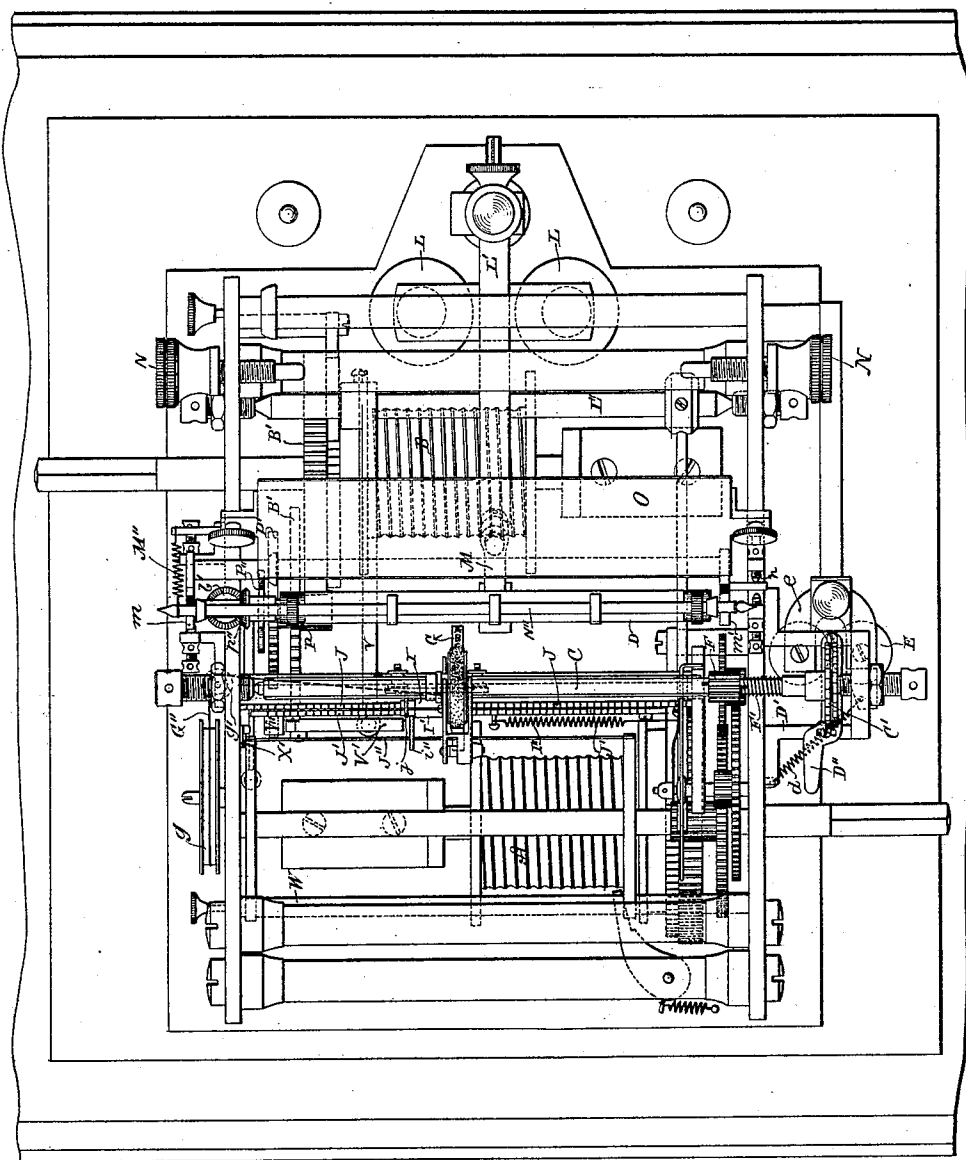


Fig. 1

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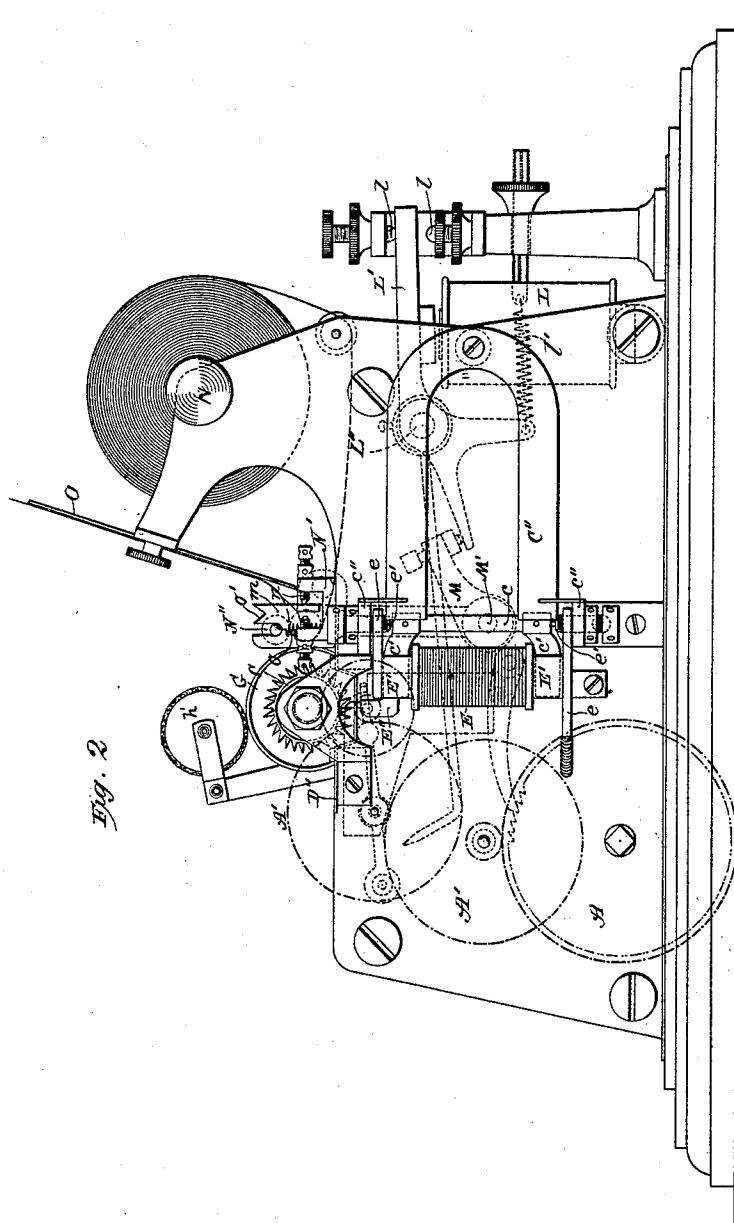


Fig. 2

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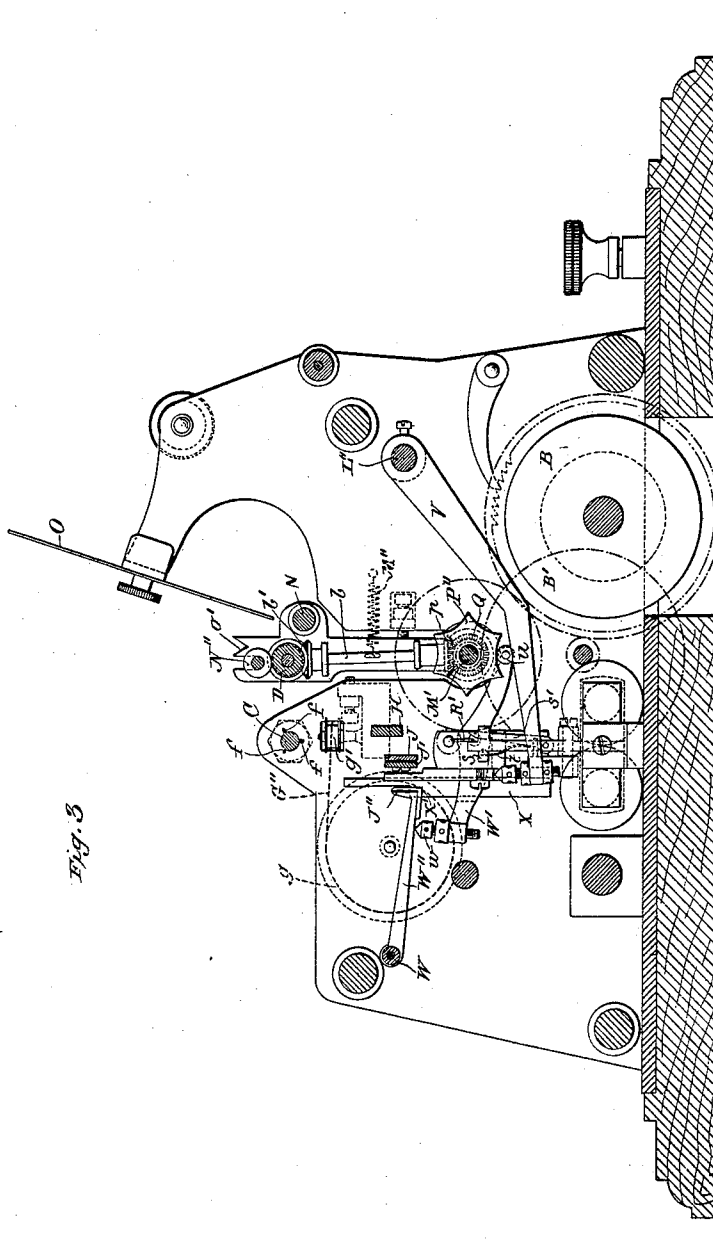


Fig. 3

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5 Sheets—Sheet 4.

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Fig. 4.

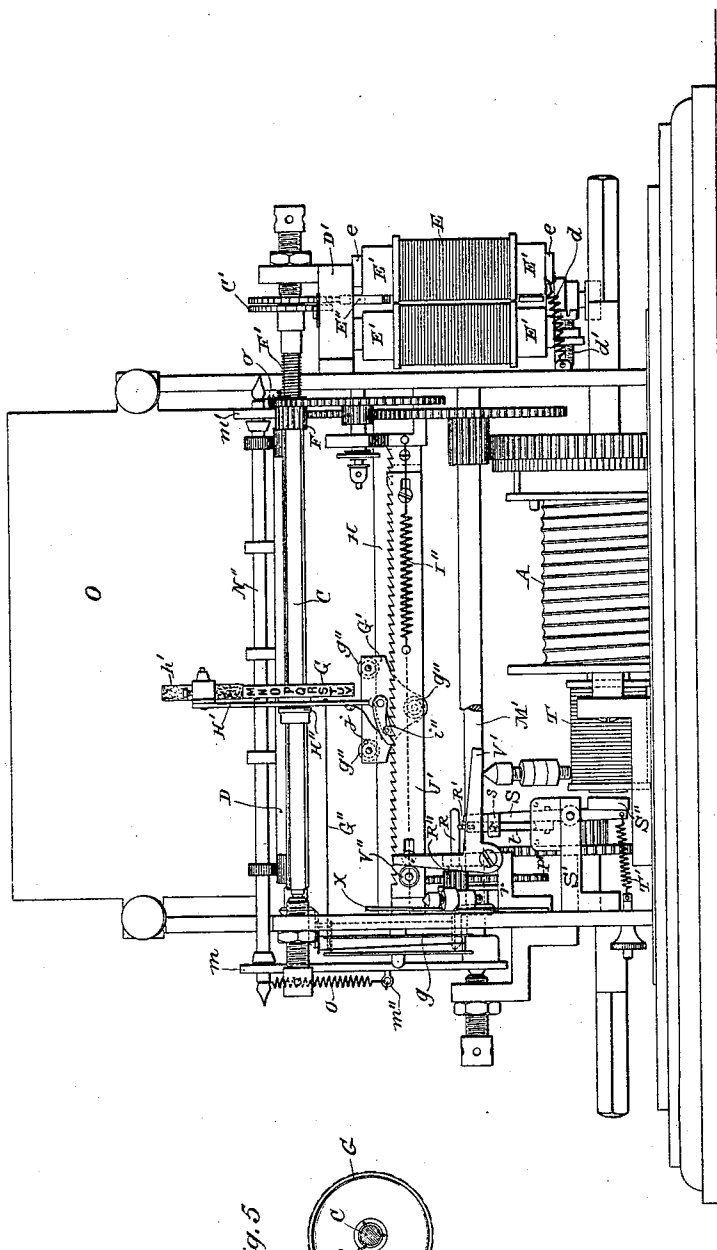
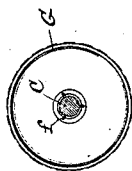


Fig. 5.



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5 Sheets—Sheet 5.

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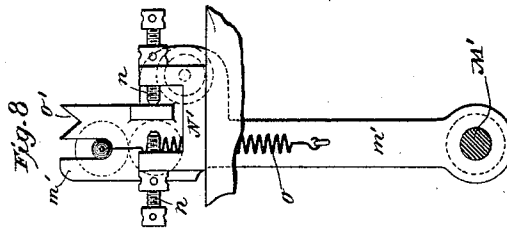


Fig. 6

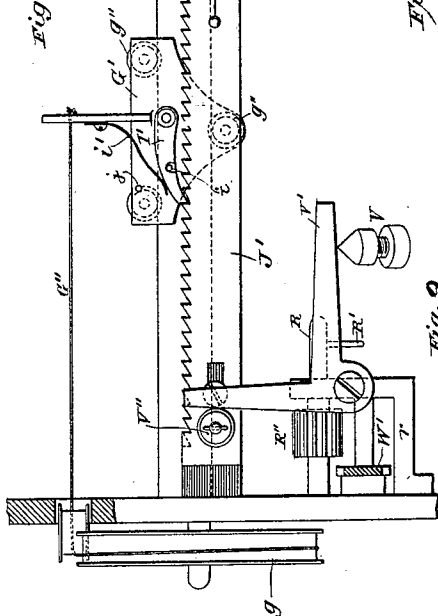


Fig. 7

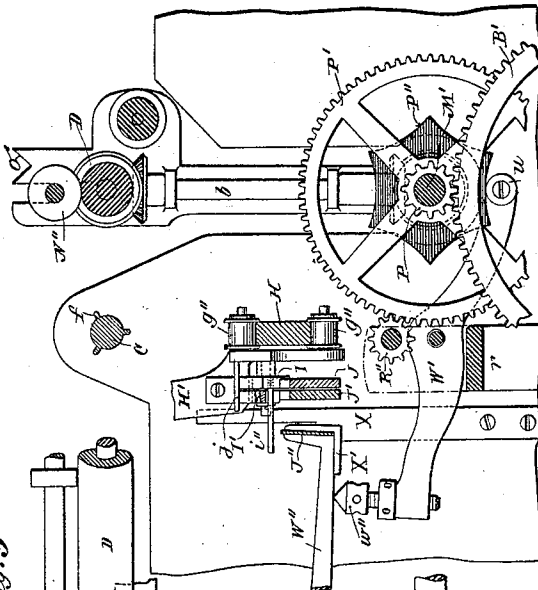


Fig. 9

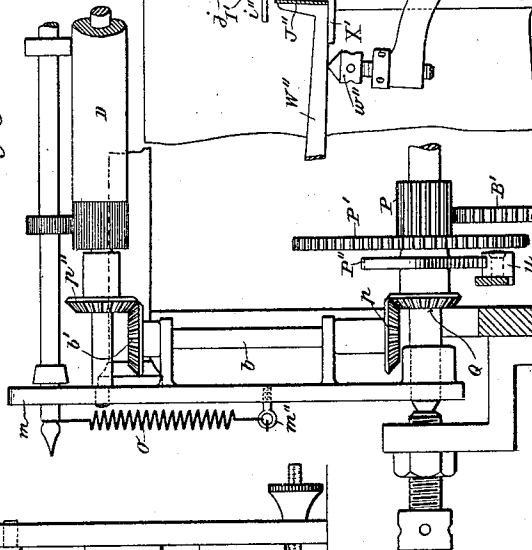
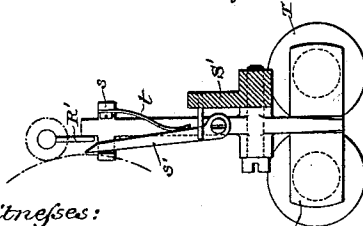
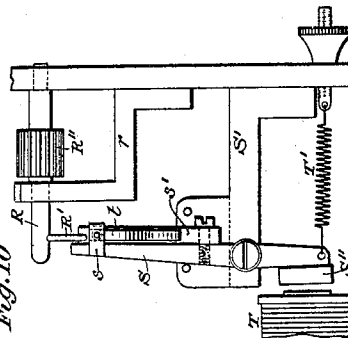


Fig. 11



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Fig. 10



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UNITED STATES PATENT OFFICE.

JOHN E. WRIGHT, OF NEW YORK, N. Y.

PRINTING-TELEGRAPH INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 460,457, dated September 29, 1891.

Application filed December 31, 1889. Renewed September 5, 1891. Serial No. 404,821. (No model.) Patented in England December 22, 1887, No. 17,641; July 18, 1888, No. 10,437, and February 11, 1889, No. 2,413.

To all whom it may concern:

Be it known that I, JOHN E. WRIGHT, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Printing-Telegraph Instruments, (for which I have obtained Letters Patent in England No. 17,641, dated December 22, 1887; No. 10,437, dated July 18, 1888, and No. 2,413, dated February 11, 1889,) of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

This invention relates to instruments known as "telegraphic printers," and more particularly to that class or species of these instruments which print in lines on a web or sheet of paper of any desired width, or what, in other words, are known as "column-printers," as distinguished from those which print on a continuous tape or band and which are known as "tickers" or tape-machines.

The object of the invention is primarily to improve the construction and mode of operation of such machines, whereby they will more nearly approximate, at least in the character of the work done, to mechanically-operated printing or writing-machines, such as are commonly known as "type-writers." The great superiority of such machines, whether electrical or mechanical, with respect at least to the facility with which their work or printed records may be read or preserved, as for posting or filing away, has been fully recognized; but printing-telegraph instruments, properly considered, have not been heretofore developed or perfected, so far as I am aware, to such a degree as to be capable of practically producing a printed record similar in all respects to ordinary print or to create a demand for such as have been devised or proposed sufficient to warrant their manufacture or use on any extensive scale.

The features which distinguish my invention, generally stated, are, first, the employment in a printing-telegraph instrument of the special construction herein described of two independent motors, such as clock mechanisms, one for turning the type-wheel under the control of suitable means for arresting the same and the other for moving the paper

line by line and dependent upon certain conditions in or of the machine; second, the combination, with the type-wheel and the means for traversing the same, of two racks and engaging pawls and mechanism for tripping said pawls and permitting the type-wheel to return to its initial position after the completion of a line; third, certain details of construction of the instrument the nature of which will be more fully hereinafter described.

In the drawings annexed hereto, and which illustrate the invention, Figure 1 is a plan view of the instrument complete. Fig. 2 is a side elevation of the same. Fig. 3 is an end view, looking toward the paper and printing mechanism. Fig. 4 is a broken longitudinal section, and Fig. 5 is a detail of the type-wheel and its shaft. Fig. 6 is a view in side elevation of the devices for traversing the type-wheel carriage. Fig. 7 is a side view and part section of a detached portion of the mechanism, including portions of the paper-feeding mechanism and means for releasing the type-wheel carriage. Fig. 8 is a view in elevation of one of the paper-roller supports. Fig. 9 is a similar view of the other paper-roller support, showing portions of the mechanism connected therewith. Fig. 10 is a side elevation of a magnet and detent mechanism for controlling the feed of the paper. Fig. 11 is a front view of the same. Figs. 6 to 11, inclusive, are drawn to an enlarged scale to better illustrate the construction and mode of operation of the parts contained therein.

The mechanism is supported by a suitable frame-work mounted on the usual wooden base. In the lower part of the frame are mounted two barrels A and B, each adapted to be driven by a cord and weight. I prefer this kind of motor for the instrument, though any other suitable form for the purpose may be used.

The barrel A is connected by a train of spur gear-wheels A' with the spindle C, on which the type-wheel G is mounted, and the barrel B imparts movement to the paper by means of a train of spur-gears B' and other devices, which will be hereinafter described.

The spindle C carries an escapement, by means of which its motion is controlled. This

escapement, instead of having the ordinary toothed escape-wheel released by embracing pallets, is a double-toothed wheel *C'*, the rows of teeth being parallel to one another in alternate positions along the periphery, as indicated in Fig. 2. To operate this wheel I employ the following means: *C''* is a permanent horseshoe-magnet fixed to the outside of the frame. A vertical non-magnetic spindle *c* is mounted across the poles of the same on pivot-screws set in brackets *c'' c''*. The spindle *c* carries two soft-iron armatures *c' c'*, fixed rigidly to it and brought up to the poles of the magnet *C''*, so as to form, practically, extensions of said poles, being polarized thereby.

E E are two magnets secured in front of the poles of magnet *C''* to yoke-plates *e e*, which are pivoted to the brackets *c''* on the screws *e'*, upon which the spindle *c* is mounted. The magnets *E* are provided with pole-pieces *E'*, between which the tongues or armatures *c'* are adapted to vibrate. The above-described arrangement constitutes a polarized electro-magnet, the armatures of which are oscillated by the passage through the coils of magnets *E* of current impulses of alternately opposite direction. An arm *E''*, attached to the upper armature *c'*, engages with the teeth of the escapement-wheel. When, therefore, the armatures are oscillated, the end of arm *E''* is shifted from engagement with a tooth of one row on the escapement-wheel over to the space between two teeth on the other. Hence for each movement of the armature the escapement-wheel *C'* turns through the space of one tooth.

I provide for the adjustment of the devices for controlling the escapement-wheel in the following manner: To the bracket or frame *D'*, which carries one of the bearings for the type-wheel shaft, is secured a slotted metallic strip *D''*, by means of a screw passing through a transverse slot in said strip. The end of the engaging pawl or arm *E''* passes up through the slot in strip *D''*, and by the proper adjustment of said strip the said arm is brought into proper relative position to the escapement. The yoke-plates *e*, carrying the magnets *E*, are pivoted, as has been stated. Their effect upon or position relative to the oscillating armature *c'* is adjusted by means of a spiral spring *d* between the lower yoke *e* and the side of the main frame and an adjusting-screw *d'*, carried by the yoke and bearing against the main frame, as shown in Fig. 4.

The type-wheel shafts in column-printing telegraph-instruments, and along which the type-wheel is moved, have been made in various forms, to all of which, so far as I am aware, there is the objection of too much friction. I have devised a form of shaft materially better than those previously used, and which is constructed with two or more knife-edges *f f*, as shown in Figs. 3 and 5, and the type-wheel is caused to slide upon these. By this means the rotary motion of the spin-

dle is communicated to the type-wheel, while the friction is very largely avoided and the shaft lightened in a marked degree. Another advantage of these knife-edges is that, while allowing great freedom of motion to the type-wheel along the shaft, they prevent periphery shake during the operation of printing to a greater extent than previous devices.

The pinion *F*, through which motion is imparted to the shaft *C* by the motor *A*, is loose on said shaft and is connected with the shaft through a long spiral spring *F'*. This comes into play in the rapid working of the instrument by permitting the shaft and type-wheel to start when a new letter is to be made without much inertia and to catch up to the proper position before the desired character is reached. This is a well-known device for this purpose.

The type-wheel *G*, having the capability of longitudinal movement on the shaft *C*, is shifted the space of one letter after each impression by means of a carriage *G'*. It is returned to its initial position from any point along the shaft *C* by means of a cord *G''*, passing around a pulley *g'* and wound on a spring-actuated drum *g*. The carriage *G'* is a plate, with three grooved rollers *g''* traveling along the opposite edges of a flat bar or plate *H*, extending across the instrument beneath the shaft *C*. A bifurcated plate *H'* extends upward from the carriage and engages with a groove in the hub *H''* of the type-wheel. One of the arms of plate *H'* is extended upward and carries the inking-roller *h'*, that bears upon the face of the type. A pin *i* extends laterally from the carriage *G'*, and upon said pin are mounted two pawls *I I'*, held by a spring *i'* in engagement with the teeth of two rack-bars *J J'*, respectively. The rack *J* is stationary, while the rack *J'* is moved backward through the space of one tooth by each operation of the printing mechanism and returned by a spring *I''*. By this device the pawls *I I'* are forced forward through the space of one tooth at each impression until the end of the line is reached, when the absence of teeth on rack *J'* permits the other parts of the instrument to move without moving the type-wheel along the shaft. When this point is reached or when it is desired to return the type-wheel to begin a line from any point on the shaft *C*, a pivoted bar *J''* is raised by mechanism hereinafter described, which, by lifting a pin *i''*, set in the pawl *I* and extending under the pawl *I'* into the path of said bar, raises both pawls from engagement with the racks *J J'*, whereupon the carriage and type-wheel are returned by the cord *G''*. The type-wheel having been revolved by rapid alternations of current passing through the magnets *E* until the desired letter is brought into printing position, a prolonged impulse of current is directed over the line which operates the printing magnet *L*. The armature of this magnet is carried by a lever *L'*, secured to a

shaft L''. The lever L' vibrates between adjustable stops *ll* and is retracted from the magnet L by a spring *l'*. A prolongation of the lever L' extends under an adjustable stop at the end of an arm M, secured to a rock-shaft M', and when the lever is attracted by the magnet L it engages with the said arm and imparts a limited rotary movement to the rock-shaft M'. The movement of the shaft L'' is caused to shift the type-wheel along its shaft by the following means: V is a long arm secured to the shaft and in position to engage with one end of a bell-crank lever V', pivoted to a bracket *r*, secured to the frame of the instrument. The other end of the lever V' is in position to engage a stud or roller V'', projecting from the side of the movable rack J'. When the shaft L'' is turned by the action of the printing-magnet, the arm V raises the lower end of the bell-crank lever V', and thereby forces back the rack J' through the space of one tooth. Upon the demagnetization of magnet L the spring I' returns the rack J' and moves forward the type-wheel, as has been above explained.

To the rock-shaft M' are secured two up-rights *m m'*, which afford bearings for the paper-roller D above the shaft M' and substantially on a level with the type-wheel shaft C. A spiral spring M'', Fig. 1, between the main frame and a pin *m''* on upright *m* draws the paper-roller D away from the type-wheel, its play being limited by two adjustable stops *n*, secured to the frame, as shown in Fig. 8.

When the printing-magnet L is caused to draw down the lever L' by the effect of a prolonged current impulse, the arm M is raised, and this throws the paper-roller D, over which the paper is carried, against a given letter on the type-wheel, thus making the impression.

The paper, as indicated in Fig. 2, is carried in a roll on a suitable holder, which is supported by the pivot-screws N. It is led under a bar N', carried by the up-rights *m m'*, then under the roller D and between the same and a guide-roll N'', mounted in slots in the ends of up-rights *m m'*, and held down against the roller D by springs *o o* between its ends and the frame. Recesses or ledges *o'* are formed in the up-rights *m m'* by the side of the slots in which the guide N'' normally rests, to which the said guide may be transferred by lifting it out of its bearings against the force of the springs *o* when it is desired to remove the paper or insert the end of a new web.

O is an inclined detachable plate over which the web of paper passes after leaving the impression-roller D. The web of paper is moved forward at the end of a line or at any other time when it is desired to space for lines by the following means: On the rock-shaft M' is a loose sleeve carrying or composed of a pinion P, engaging with the train of gears from the barrel B, a spur gear-wheel P', a cam-wheel P'', and a bevel-pinion Q. The latter meshes with a bevel-gear *p* at the end of a spindle *b*, mounted in brackets ex-

tending laterally from the inner side of the upright *m*, secured to rock-shaft M'. A slot is formed in the side frame of the instrument to accommodate this spindle and its bearings. A bevel-pinion *b'* at the upper end of the spindle *b* meshes with a similar gear *p''* on the paper-roller D, and through this train of gears a tendency to rotate is imparted to the roller D by the clock-work or motor B. R is a stud or spindle mounted at one end in the frame and at the other in a bracket *r*, secured thereto. R'' is a pinion on said spindle meshing with the spur-gear P'. The spindle R also has a projecting pin R', in the path of which is a movable detent S. The detent S is a lever pivoted to an arm S', and at its lower end it carries the armature S'' of an electro-magnet T. Normally the spindle R is prevented from rotating by the engagement of the pin R' with the detent S, but by the action of the magnet T the detent S is disengaged and the spindle R makes one turn. The movement of the train of gears from motor B thus permitted moves the web of paper the space necessary for a new line. In order that the spindle R may make only one complete revolution when disengaged from the detent, the latter is so constructed that the pin R' is not disengaged until the armature S'' has been attracted toward the magnet T and then retracted by the spring T'. To accomplish this the lever S is made with a cross-arm *s*, the ends of which are bent at right angles, as shown in Figs. 10 and 11. A tongue *s'* is pivoted to the lever S and vibrates between the ends of the arm *s*. A spring *t*, secured to one end of arm *s*, bears upon the tongue *s'*. In the normal position of the lever the end of tongue *s'* lies in the path of the pin R', and the two are in engagement; but when the magnet T is energized the pin R' slips from the tongue *s'* over against the end of the lever S, the spring *t* acting immediately to shift the tongue back of the position of the pin. As soon as the circuit of magnet T is interrupted the lever S resumes its normal position and the pin R' is disengaged therefrom. After making one turn the pin again engages with the tongue *s'*.

During the interval of time in which the paper web is being moved the type-wheel is returned to its initial position by the following means: A lever W' is pivoted to the side frame of the instrument and carries at one end an adjusting-screw *w*, that bears against the under side of one of the arms W'', by means of which the releasing-bar J'' is supported on a shaft W, and at the other end a roller *u*, that bears upon the periphery of the cam-disk P''. The latter, as has been explained, forms a part of the train driven by motor B, and its movement is dependent thereon. When the train is permitted to move by the release of the pin R', the cam-wheel is moved through a space sufficient to cause the roller *u* to pass over one prominence thereon. The bar J'', through the connections de-

scribed, will therefore be raised and lowered once while the paper web is moved through the space for one line.

To insure the complete return of the type-wheel to its initial position, I employ some device to maintain the bar J'' in position to hold up the pawls I' until the type-wheel has reached its proper position. This I accomplish by securing to the side frame of the instrument a spring-strip X , having a tendency to stand out from the frame into the path of the arm W'' or some part of the bar J'' or its moving supports. A notch x' is cut in the strip X , and when the bar J'' is raised it permits the spring x to move outward, and it is engaged by the notch or shoulder x' and is retained in an elevated position. When the type-wheel returns, a pin j on its carriage strikes the spring x and permits the bar J'' to drop.

The circuit connections for this instrument I have not shown, as they are well understood. The following explanation will, however, serve to illustrate the manner in which I prefer to operate the instrument:

I connect up the three magnets in one circuit. Rapid alternations of current directed over this circuit will cause the armatures c' of magnets E to vibrate and set the type-wheel, but will not affect the other magnets. A prolonged impulse of current in either direction will, however, cause the printing-magnet L to draw down its armatures, but will not affect the magnet T , which will only respond to a current of considerably greater strength than is required for the other two. Any well-known form of transmitter may be employed to transmit these various currents.

There is employed in this, as in other machines of this character, a synchronizing mechanism; but this I have not considered it necessary to describe, as many well-known forms may be used.

What I claim is—

1. In a column-printing telegraph-instrument, the combination, with a rotary type-wheel a clock-motor for turning the same, and an electro-magnetic controlling device, of a swinging paper-carrying or impression roll, an electro-magnet for moving the same, a clock-motor geared with the paper-roll, and an electro-magnet for controlling the movement of the said motor, as herein set forth.

2. The combination, with the rotary type-wheel of a column-printing telegraph-instrument, of two racks, one fixed, the other capable of longitudinal movement, pawls carried by the type-wheel supports and engaging with said racks, and a mechanical connection between the movable rack and the armature of the printing-magnet, whereby the type-wheel is advanced by the action of the printing-magnet, as herein set forth.

3. The combination of the rotary type-wheel of a column-printing telegraph-instrument, means for advancing or traversing the same step by step against the tension of a

spring, a pivoted bar for releasing the type-wheel and permitting it to return to its initial position, a clock-motor for moving said bar into position to release the type-wheel, and an electro-magnet for controlling the same.

4. The combination, with the spring-retracted type-wheel carriage of a column-printing telegraph-instrument and pawls carried thereby, of fixed and movable rack-bars with which the pawls engage, a bar adapted to be moved to a position to release the pawls from engagement with the racks, and an electro-magnet controlling the movement of said releasing-bar, as set forth.

5. The combination, with the spring-retracted type-wheel carriage of a column-printing telegraph-instrument and pawls carried thereby, of fixed and movable rack-bars with which said pawls engage, a bar adapted to be moved into position to disengage the pawls, and a catch for retaining the bar in such position and placed in the path of the type-wheel carriage at or near the limit of return movement, as set forth.

6. The combination, with the type-wheel carriage of a column-printing telegraph-instrument and a retaining-pawl carried thereby, of a fixed rack-bar along the path of movement of the carriage with which the retaining-pawl engages, means, substantially as described, for advancing said carriage step by step, a bar adapted to be moved into a position to release the carriage from engagement with its traversing devices, and an electro-magnet controlling the movement of the releasing-bar, as set forth.

7. In a column-printing telegraph-instrument, the combination, with the paper-feeding mechanism and a clock-motor for actuating the same, of the type-wheel advanced along its path step by step by the printing-magnet, a bar for releasing the type-wheel from its traversing devices to permit its return and moved or operated by the paper-feeding clock-motor, and an electro-magnet for controlling the said motor, as set forth.

8. In a column-printing telegraph-instrument, the combination, with a shaft provided with longitudinal runners or knife-edges, of a type-wheel having grooves through its bore to receive said knife-edges, as set forth.

9. The combination, with the type-wheel carriage of a column-printing telegraph-instrument and pawls carried thereby, of two racks parallel with the path of the type-wheel and with which said pawls engage, one of said racks being fixed, the other capable of longitudinal movement, a printing-magnet, a stud projecting from the movable rack, and a system of levers operated by the printing-magnet and engaging with said stud for imparting to the rack a forward movement at each operation of the printing-magnet, as set forth.

10. In a printing-telegraph instrument, the means for controlling the type-wheel escapement, composed of a permanent magnet, a spindle mounted across the poles of the same,

soft-iron tongues carried by the spindle and forming extensions of the magnetic poles, means for limiting the play or vibration of said tongues, and two electro-magnets with poles on opposite sides of the tongues, the said magnets being adjusted about the axis of vibration of the tongues, these parts being combined in the manner herein set forth.

11. In a column-printing telegraph-instrument, the combination, with the type-wheel, mechanism for traversing the type-wheel, mechanism for releasing and returning the type-wheel, and mechanism for feeding the paper, of two clock-motors, one adapted to impart rotary movement to the type-wheel, the other to impart movement to the mechanism for returning the type-wheel and that for feeding the paper, an electro-magnet for controlling the type-wheel motor, a printing-magnet and connections therefrom to the traversing mechanism, and a third electro-magnet for controlling the paper-feeding motor, as herein set forth.

12. The combination, with the type-wheel shaft provided with the parallel knife-edges, of the type-wheel movable longitudinally thereon and provided with grooves along its bore, forming bearings for said knife-edges, and a carriage adapted to be moved step by step and engaging with the type-wheel for moving the same along its shaft, as set forth.

13. The combination, with the type-wheel shaft and the type-wheel movable along the same, of the guide-bar H, the carriage movable thereon and engaging with the type-wheel, the stationary rack J, the movable

rack J', the pawls II', carried by the carriage and engaging with said rack, and the levers V V', operated by the printing-magnet and engaging with the movable rack, as and for the purpose set forth.

14. The combination, with the fixed and movable racks, the type-wheel carriage, and pawls thereon engaging with the racks, of the pivoted bar J'' for raising said pawls, a clock-motor having as a part of its train a cam-wheel P'', a lever W', bearing thereon and engaging with the bar J'', and an electro-magnet for releasing the clock-train and permitting it to raise the bar J'', as herein set forth.

15. The combination, with the type-wheel of a column-printing telegraph-instrument, of a paper or impression roller L, mounted in a pivoted frame, a clock-motor and gear between the same and the roller D, an electro-magnet for controlling said motor, and a printing magnet and armature for rocking and swinging the frame for taking an impression from the type-wheel, as set forth.

16. In a column-printing telegraph-instrument, the combination of the paper-carrying and impression rollers, a clock-motor, and an intermediate train of gears between the impression-roller and the motor, a pin carried by one of the shafts of the said train, a detent in the path of said pin, and an electro-magnet for withdrawing said detent, as herein set forth.

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