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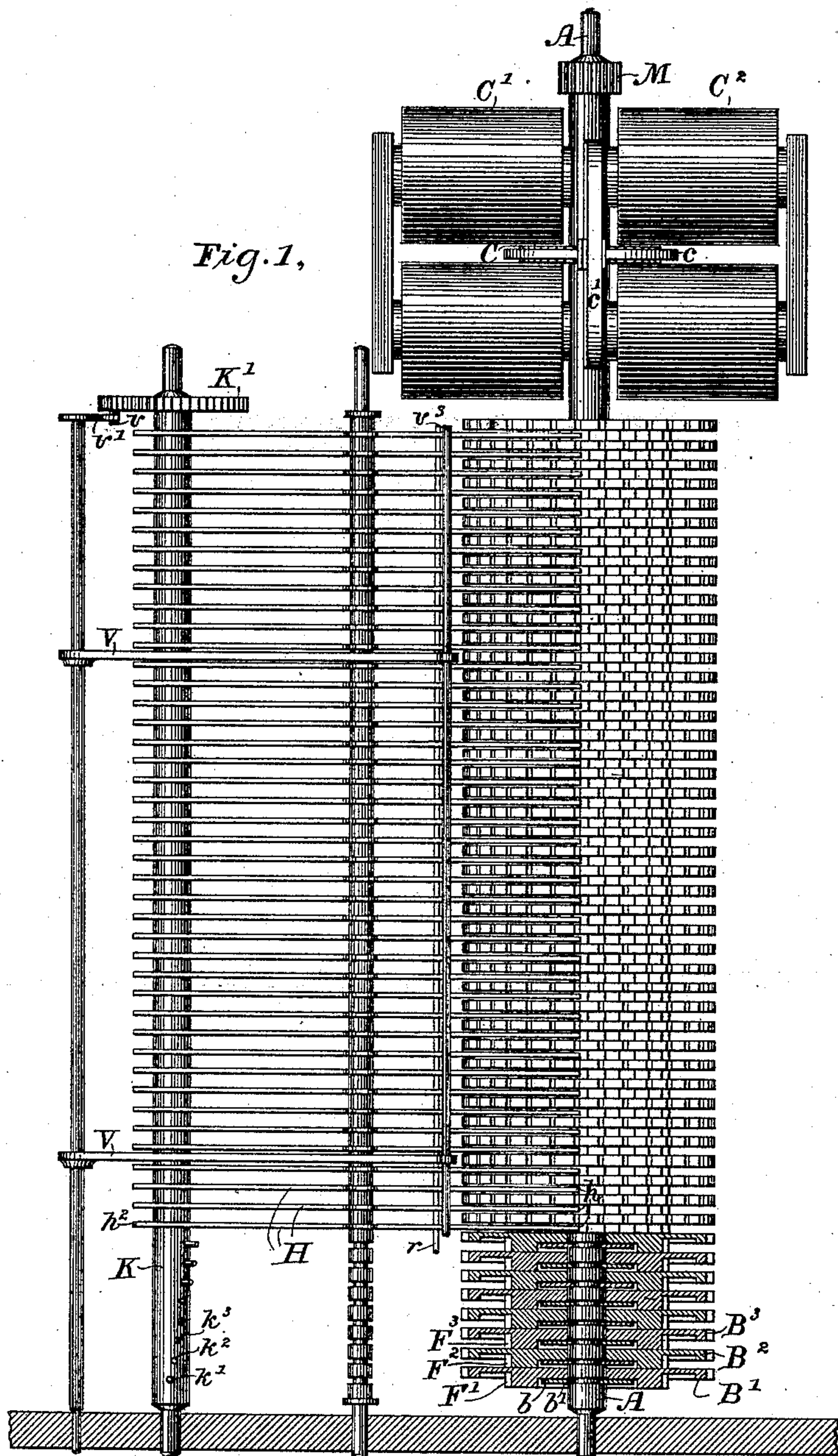
2 Sheets—Sheet 1.

H. VAN HOEVENBERGH.

PAGE PRINTING TELEGRAPH.

No. 316,681.

Patented Apr. 28, 1885.



Witnesses

Wm A. Skink
Jos. S. Latimer

Inventor

Henry Van Hoevenbergh

By his Attorneys

Robert Edgcomb

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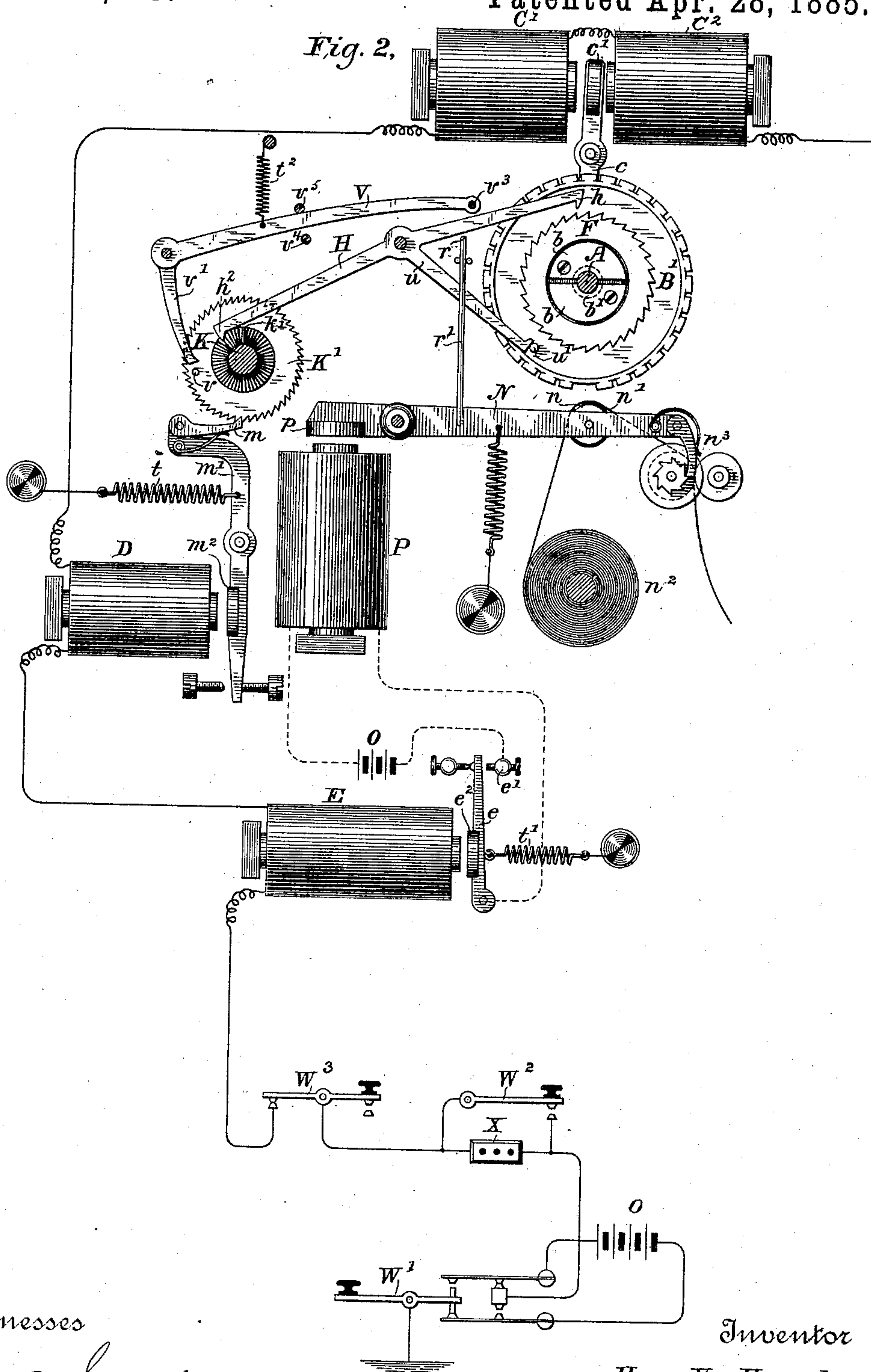
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UNITED STATES PATENT OFFICE.

HENRY VAN HOEVENBERGH, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO
THE BALTIMORE & OHIO TELEGRAPH COMPANY, OF BALTIMORE, MD.

PAGE-PRINTING TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 316,681, dated April 28, 1885.

Application filed August 7, 1884. (No model.)

To all whom it may concern:

Be it known that I, HENRY VAN HOEVENBERGH, a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Printing-Telegraph Instruments, of which the following is a specification.

My invention relates to the class of printing-telegraph instruments known as "page" and "line" printers.

The object of the invention is to provide an instrument for automatically printing upon a page of paper, in distinction from a paper-tape, with great rapidity, and to effect a number of impressions by a single operation of the press-lever.

The invention consists in constructing the parts in substantially the following manner: A series of type-wheels, preferably fifty in number and similar to each other, are placed side by side upon a type-wheel shaft with which they are frictionally connected. These type-wheels are designed to be in succession placed in position to print the succeeding characters in a line of matter, and when the entire line has thus been set up the impression is taken from each simultaneously by pressing the sheet of paper against the same.

The following devices are employed for setting the type-wheels: A vibrating escapement device is applied to the type-wheel shaft in the usual manner, and serves to actuate the same step by step. The entire series of type-wheels are free to revolve with the shaft; but when the required character upon the first type-wheel is brought into position to print, it is automatically arrested and locked in that position. The type-wheel shaft, however, continues to revolve until the character desired upon the second type-wheel is brought into position to print. This type-wheel is automatically arrested at that point, and in like manner the entire series of type-wheels are set. The friction between the type-wheel shaft and the individual type-wheels is sufficient to cause each of them to advance until it is arrested by the corresponding detent.

The means whereby the successive type-

wheels are arrested when the desired characters are in position to print consist of a spiral series of radial pins projecting from an independent shaft, and of a series of locking-levers, which are designed to be actuated by these pins. One lever is provided for each type-wheel, and the series of pins is so organized that during a single revolution of the shaft carrying the same the entire series of levers will be actuated in succession. When, therefore, it is desired to actuate the first lever and lock the corresponding type-wheel, the shaft carrying the pins is permitted to advance one step, and the corresponding pin, by striking against one arm of the locking-lever, throws the same into engagement with a ratchet-wheel carried upon the first wheel. The succeeding type-wheels are automatically locked, one after another, by giving the shaft carrying the pins successive step-by-step movements. After all the type-wheels have been thus brought into position, the printing-lever is actuated, and this lever serves to force the sheet of paper against the line of type. The same movement of the printing-lever forces the locking-pawl out of engagement with the corresponding ratchet-wheels. An electro-magnet vitalized by a local battery is employed for actuating the printing-lever.

For the purpose of setting all the type-wheels at unison preparatory to setting up a second line of matter, the device employed for releasing the wheels from their locking-levers is so organized that when actuated it will cause each lever to stand in such a position that a unison-detent carried thereby will intercept the path of a unison-stop carried upon the corresponding type-wheel. After the impression is effected and the unison-detents are thus set, the type-wheel shaft is again revolved, and each type-wheel will be automatically arrested at its unison-point by the unison stops and detents. A bar extending across the entire series of locking-levers serves to subsequently throw the unison-detents out of the paths of the unison-stops without causing the locking-pawls to engage the ratchet-wheels. This bar is actuated by a pin carried upon the ratchet-wheel employed for locking the individual

type-wheels, and it is brought into operation at the last movement of the ratchet-wheel required to set the same at its starting-point. Suitable means are also employed for feeding forward the paper after the line of matter has been printed.

In the accompanying drawings, which illustrate my invention, Figure 1 is a plan view of the series of type-wheels, the escapement device, and the locking-levers; and Fig. 2 is a diagram showing in elevation the several parts of the instrument, together with their connecting-circuits.

Referring to the figures, A represents the type-wheel shaft, upon which are mounted fifty or any convenient number of type-wheels, B' B² B³, &c. The type-wheels are coupled to the shaft by means of friction-springs *b*, which enter corresponding grooves, *b'*, formed in the type-wheel shaft.

The type-wheel shaft is provided with an escapement device consisting of a scape-wheel, C, of the usual construction, and an escapement-anchor, *c*, which is applied thereto. The anchor *c* is actuated by means of a polarized armature, *c'*, and two electro-magnets, C' and C², in the usual manner. The electro-magnets C' and C² are included in the main line, together with two other electro-magnets, D and E, the function of which will be hereinafter described.

Any suitable means—such as a weight or spring—are employed for driving the type-wheel shaft when it is released by means of the anchor-escapement described, and the type-wheels are revolved with the shaft until they are purposely arrested.

Secured to each type-wheel B is a ratchet-wheel, as shown at F' F² F³, &c. Each ratchet-wheel is constructed with a number of teeth equal to the number of characters carried upon the periphery of the type-wheels. A pawl, *h*, carried upon one arm of a corresponding lever, H, is applied to each of the type-wheels, and these pawls are intended to arrest the corresponding type-wheels in any desired position by being automatically forced into engagement with the teeth of the ratchet-wheel when the desired type has been brought into position to print.

The means whereby the pawls are actuated one at a time for the purpose of locking the type-wheels consist of a series of pins, *k* *k*² *k*³, &c., which are arranged in a spiral line upon a shaft, K. These pins are intended to successively engage the extremities *h*² of the levers H, and by passing beneath the same to thrust the corresponding pawls *h*, into engagement with the corresponding ratchet-wheels. During a single revolution of the shaft K each lever H will be actuated once and all the type-wheels will be locked. Only one lever, however, will be actuated at a time, so that each type-wheel will be locked separately and in succession, commencing with the first type-wheel, B'. It will be understood, there-

fore, that for the purpose of setting the entire series of type-wheels it is necessary only to actuate the shaft K when the first type-wheel is in proper position to print the first character of the line, and to thus lock the same, and to then continue the revolution of the shaft until the second type-wheel is in position to print the second character, and to then lock this type-wheel in like manner, and so on throughout the entire series. The means which are employed for thus actuating the shaft K and locking the type-wheels consist of a ratchet-wheel, K', carried upon the shaft K, to which is applied a pawl, *m*, carried upon a lever, *m'*. The lever *m'* carries an armature, *m*², which is applied to the electro-magnet D, hereinbefore referred to. The magnet D is included in the circuit of the main line; but it is adjusted so as to respond only to currents of greater strength than those which are normally employed for actuating the escapement. When the electro-magnet D is vitalized, the armature *m*² is drawn forward, causing the lever *m'* to be actuated in opposition to the tension exerted by a spring, *t*. The pawl *m* thereby causes the ratchet-wheel K' to be advanced one tooth, thus causing one of the pins *k* to pass beneath the extremity of the corresponding locking-lever. When a succeeding type-wheel has been brought into the required position, the electro-magnet D is again vitalized, by a strong current and the ratchet-wheel K' is advanced a second tooth. If there are fifty type-wheels in the series, the ratchet-wheel K' is constructed with fifty-one teeth, so that there will be, besides one tooth for each locking-lever, an extra tooth which is employed for actuating the ratchet-wheel for the purpose of throwing the unison-arms out of the paths of the unison-stops, as hereinafter described. Instead of fifty-one teeth, however, fifty-two or more may be employed, if found desirable, and it may here be observed that any other desired number of type-wheels than fifty may be employed.

Referring, now, to the means employed for effecting impressions from the type-wheels, a press-lever, N, carries an elongated platen, *n*, which extends beneath the entire series of type-wheels. This platen is designed to be impelled toward the type-wheels when an impression is to be effected, and to thereby force a sheet of paper, *n'*, against the type which are presented to it. The paper is preferably contained in a roll, as shown at *n*², and passes over the platen through any suitable form of paper-feeding device, as illustrated at *n*³. The lever N carries an armature, *p*, which is applied to an electro-magnet, P. The electro-magnet P is included in the circuit of a local battery, *o*. The connections of this circuit are designed to be completed through the armature-lever *e* and back contact-stop, *e'*, of the electro-magnet E, which is included in the main-line conductor, as has already been stated. The retractile spring *t'*, applied to this arma-

ture-lever, is so adjusted that it will respond to currents of whatever strength transmitted over the main-line, and during the transmission of alternating impulses it will be held toward the electro-magnet and prevented from making contact with the back-stop, e' . When, however, the main-line circuit is interrupted, then the armature-lever falls against its back contact-stop, thus completing the connections of the local battery and causing the electro-magnet P to be vitalized and the press-lever to be actuated.

For the purpose of unlocking the type-wheels at the moment an impression is taken therefrom, a rod or bar, r , is supported beneath the locking-levers by means of one or more arms, r' , extending from the press-lever N. When the press-lever is actuated, the bar r is thrown upward, thereby carrying the locking-pawls out of engagement with the corresponding ratchet-wheels. The friction, however, which exists between the type-wheels and their shaft, is sufficient to prevent them from being displaced during the operation of effecting an impression. The locking-levers are thus moved upward a sufficient distance to carry a series of unison arms or detents, u , which are respectively applied to and move with the locking-levers into the paths of corresponding unison-stops, u' , carried upon the respective type-wheels. When, therefore, an impression has been effected, and the lever N is allowed to return to its normal position, each of the unison arms or detents is left in the path of the corresponding unison-stop. By subsequently actuating the escapement device each type-wheel will be rotated until it is arrested at its unison-point by means of the detent and stop. When each type-wheel has thus been brought to unison, it is necessary in some manner to remove the detents from the paths of the stops preparatory to setting the succeeding line of type. For this purpose the ratchet-wheel K' is provided with a pin, v , which is designed to actuate a lever, V, when the ratchet-wheel is again actuated after having locked each of the fifty type-wheels—that is to say, after the ratchet-wheel has been driven forward by fifty successive impulses the pin v is brought into proximity to the extension v' of the lever V, and the next succeeding movement of the armature-lever N serves to carry the pin v beneath the extension v' , thereby actuating the lever V in opposition to the tension exerted by a spring, t^2 , which is applied thereto. The lever V carries a rod or bar, v^3 , extending above the series of locking-levers, and when the lever V is thus actuated each locking-lever is forced downward a sufficient distance to carry the unison-detents u out of the paths of the stops u' . Suitable limiting-stops, v^4 and v^5 , are applied to the lever V, and one of these stops, v^4 , prevents the lever from forcing the locking-pawls downward a sufficient distance to cause them to engage the corresponding ratchet-wheels. In this manner the locking-levers are

set in position to be operated by the pins k , as the type-wheels are again in turn set in position.

I have shown in diagram three keys, W^1 , W^2 , and W^3 , in connection with a battery, O, which illustrates the method of transmitting currents of the proper character for operating the instrument. The key W^1 is a pole-changing key of any convenient form adapted to transmit alternating impulses from the battery O through an artificial resistance, X, to the receiving-instrument. These currents are employed for actuating the escapement. The key W^2 serves to complete a shunt-circuit around the resistance X, and to thereby increase the strength of current transmitted to the receiving-instrument. Such currents of increased strength serve to operate the locking device through the instrumentality of the electro-magnet D. The key W^3 serves merely to interrupt the circuit-connections of the main line, and to thereby allow the armature-lever e of the electro-magnet E to fall against its back contact-stop, thereby causing the electro-magnet P to be vitalized and an impression to be effected. Any other convenient organization of transmitting-keys may, however, be employed, as found desirable.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of a series of type-wheels, a type-wheel shaft carrying the same, means, substantially such as described, for actuating said shaft, a locking device for each type-wheel, means, substantially such as described, for actuating each of said locking devices in succession when its corresponding type-wheel is in any desired position, a printing-platen for effecting impressions from all of said type-wheels simultaneously, and an electro-magnet, its armature, and armature-lever for actuating said platen.

2. The combination, substantially as hereinbefore set forth, with a type-wheel shaft and a series of independently-movable type-wheels carried thereon, of a series of locking-levers and means, substantially such as described, for locking each of said type-wheels in succession, a printing-lever for effecting impressions from all of said type-wheels simultaneously, an electro-magnet for actuating the same, and means, substantially such as described, for unlocking said type-wheels.

3. The combination, substantially as hereinbefore set forth, of a series of type-wheels, means, substantially such as described, for causing said type-wheels to revolve, a series of locking-levers applied to said type-wheels respectively, means, substantially such as described, for causing said type-wheels to be successively locked through the agency of said levers, a printing-magnet, and a platen actuated thereby for effecting impressions from all of said type-wheels, and a local battery for actuating said printing-magnet.

4. The combination, substantially as herein-

before set forth, with a series of type-wheels and a type-wheel shaft with which they are frictionally connected, of a series of ratchet-wheels respectively applied to said type-wheels, a series of locking-levers respectively applied to said ratchet-wheels, means, substantially such as described, for actuating said locking-levers in succession, a printing-platen for effecting impressions from said type-wheels, means, substantially such as described, for actuating said platen, a series of unison arms and stops respectively applied to said type-wheels, and means, substantially such as described, for causing said unison-arms to intercept the paths of said unison-stops.

5. The combination, substantially as hereinbefore set forth, with a series of type-wheels, and a type-wheel shaft carrying the same, of means, substantially such as described, for independently locking each of said type-wheels in any desired position, and a releasing device serving to unlock all of said type-wheels simultaneously.

6. The combination, substantially as hereinbefore set forth, of a type-wheel shaft and a series of type-wheels actuated thereby, means, substantially such as described, for causing said type-wheels to be successively locked in any desired position, means, substantially such as described, for effecting impressions from all of said type-wheels simultaneously, and for successively arresting the same at their unison-points, and means, substantially such as described, for causing said type-wheels to be released from their unison-detents preparatory to being again actuated.

7. The combination, substantially as hereinbefore set forth, of a telegraphic main line, a series of type-wheels, a type-wheel shaft for carrying the same, an independent device for actuating said shaft, a series of levers for independently locking said type-wheels in any desired positions, an electro-magnet located in said main line and responding to currents of greater strength than are employed for actuating said escapement device, an armature and armature-lever applied to said second magnet, a ratchet-wheel actuated by means of said armature-lever, and a radial series of pins and a shaft carrying the same, actuated by said ratchet-wheel, which pins are respectively applied to said locking-levers.

8. The combination, substantially as hereinbefore set forth, of a series of type-wheels, a type-wheel shaft with which said type-wheels

are frictionally connected, means, substantially such as described, for actuating said shaft, a series of unison-levers respectively applied to said type-wheels, and means, substantially such as described, for causing said unison-levers to intercept or to be removed from the paths of said type-wheels at will.

9. The combination, substantially as hereinbefore set forth, of the type-wheel shaft, a series of type-wheels, means, substantially such as described, for actuating the same, and for causing them to stand in any desired positions independently of each other, a main line, an electro-magnet included therein for locking said type-wheels independently of each other, a local magnet for effecting impressions therefrom, and a second electro-magnet included in the main line for controlling the circuit-connections of said local magnet.

10. The combination, substantially as hereinbefore set forth, with a series of type-wheels and a type-wheel shaft with which they are frictionally connected, of a series of levers for locking the same, a spiral series of radial pins respectively applied to said locking-levers, and means, substantially such as described, for causing said pins to successively actuate said levers.

11. The combination, substantially as hereinbefore set forth, with a main line and a series of type-wheels, of an escapement-magnet, a battery, and a pole-changing key for vitalizing said escapement-magnet, a series of locking-levers and an electro-magnet responding to currents of increased strength and acting through means, substantially such as described, to actuate said locking-levers, a local circuit, a press-magnet included in the same, and an electro-magnet included in the main line for completing the connections of said local circuit through said press-magnet and causing it to be vitalized when the main-line circuit is interrupted, and keys respectively serving to cause an increase in the strength of the main-line current, and to interrupt the main-line connections.

In testimony whereof I have hereunto subscribed my name this 26th day of June, A. D. 1884.

HENRY VAN HOEVENBERGH. [L. S.]

Witnesses:

DANL. W. EDGECOMB,
CHARLES A. TERRY.