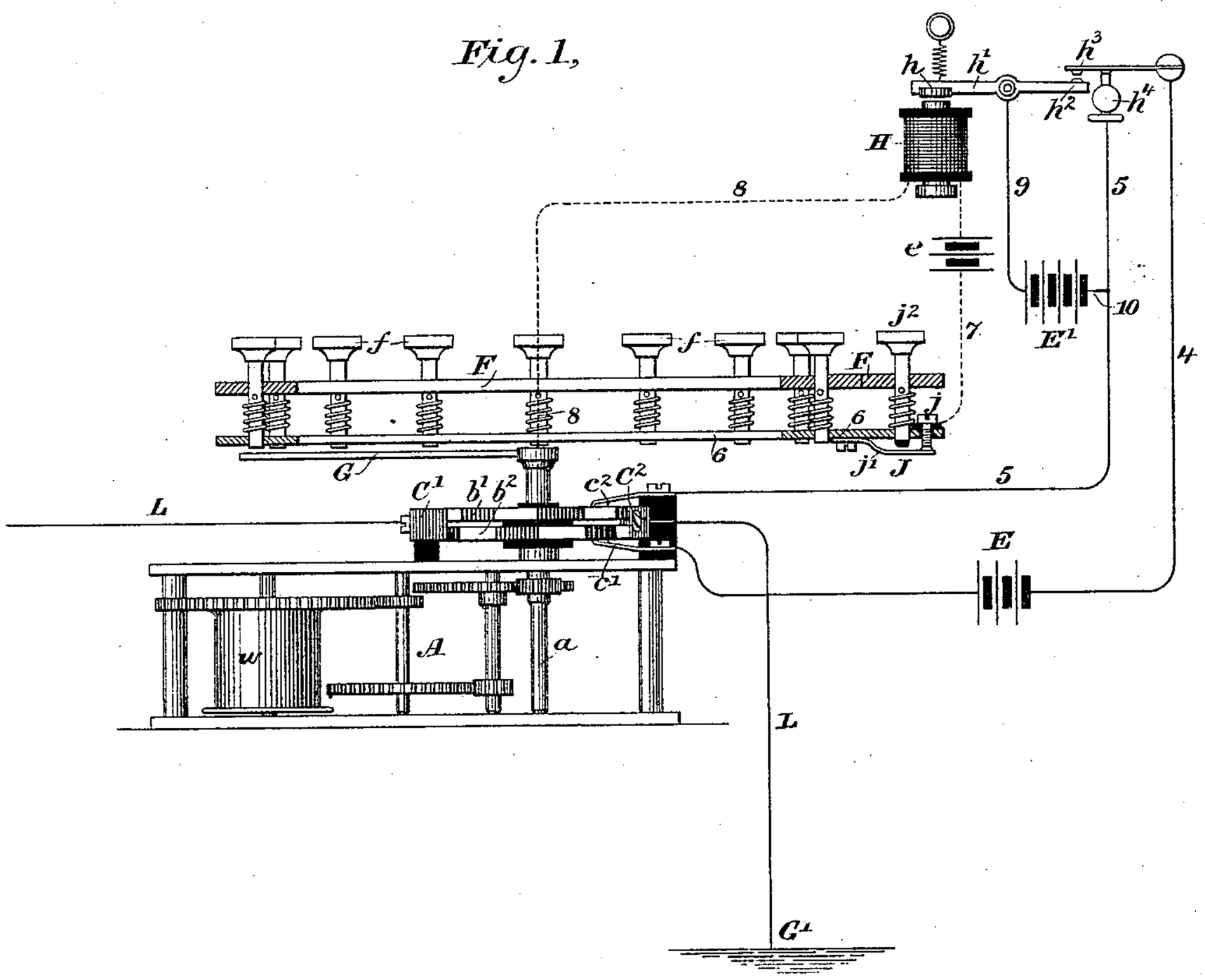
(No Model.) 2 Sheets—Sheet 1.

H. VAN HOEVENBERGH.

PRINTING TELEGRAPH.

No. 304,475. Patented Sept. 2, 1884.

Fig. 1.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

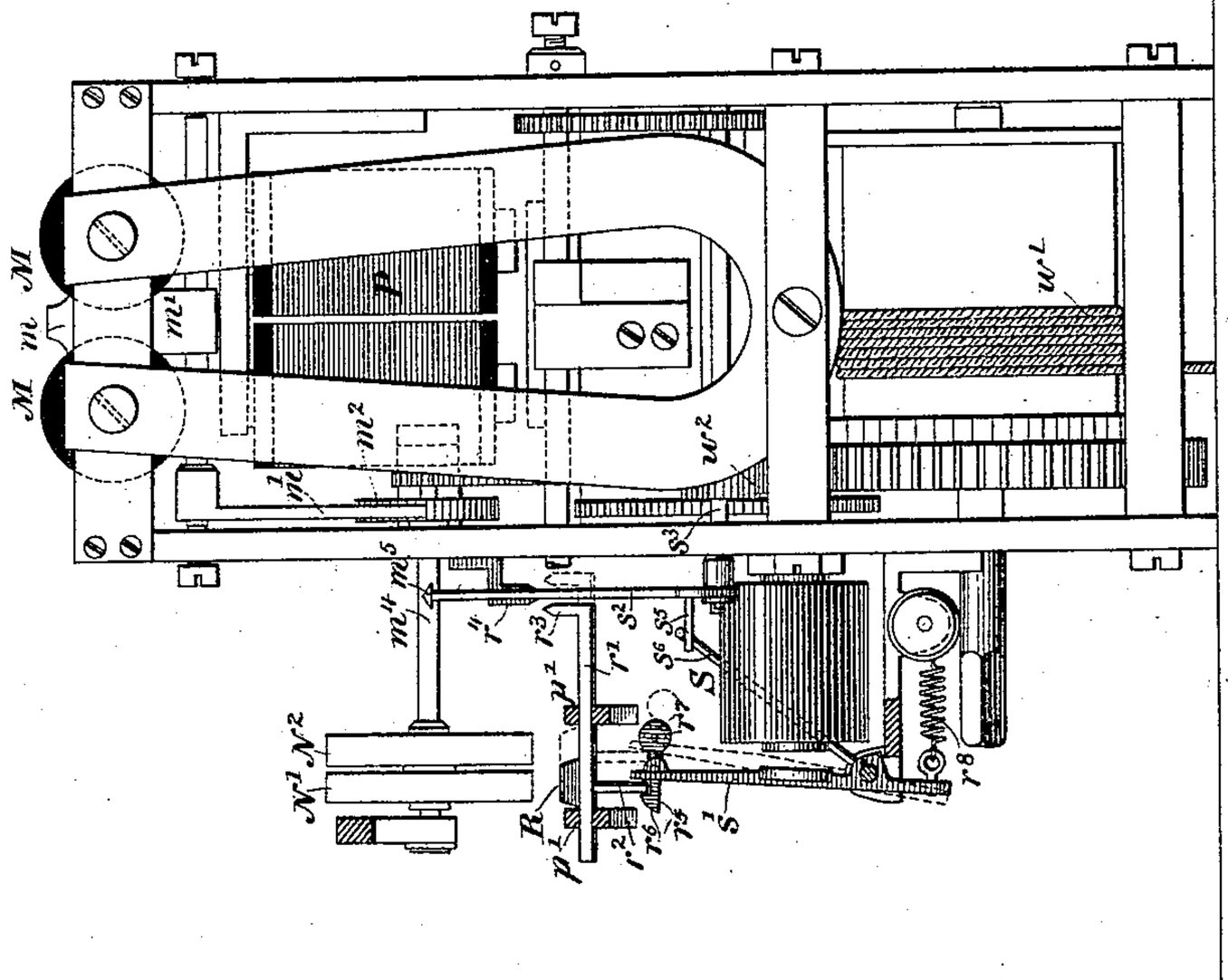
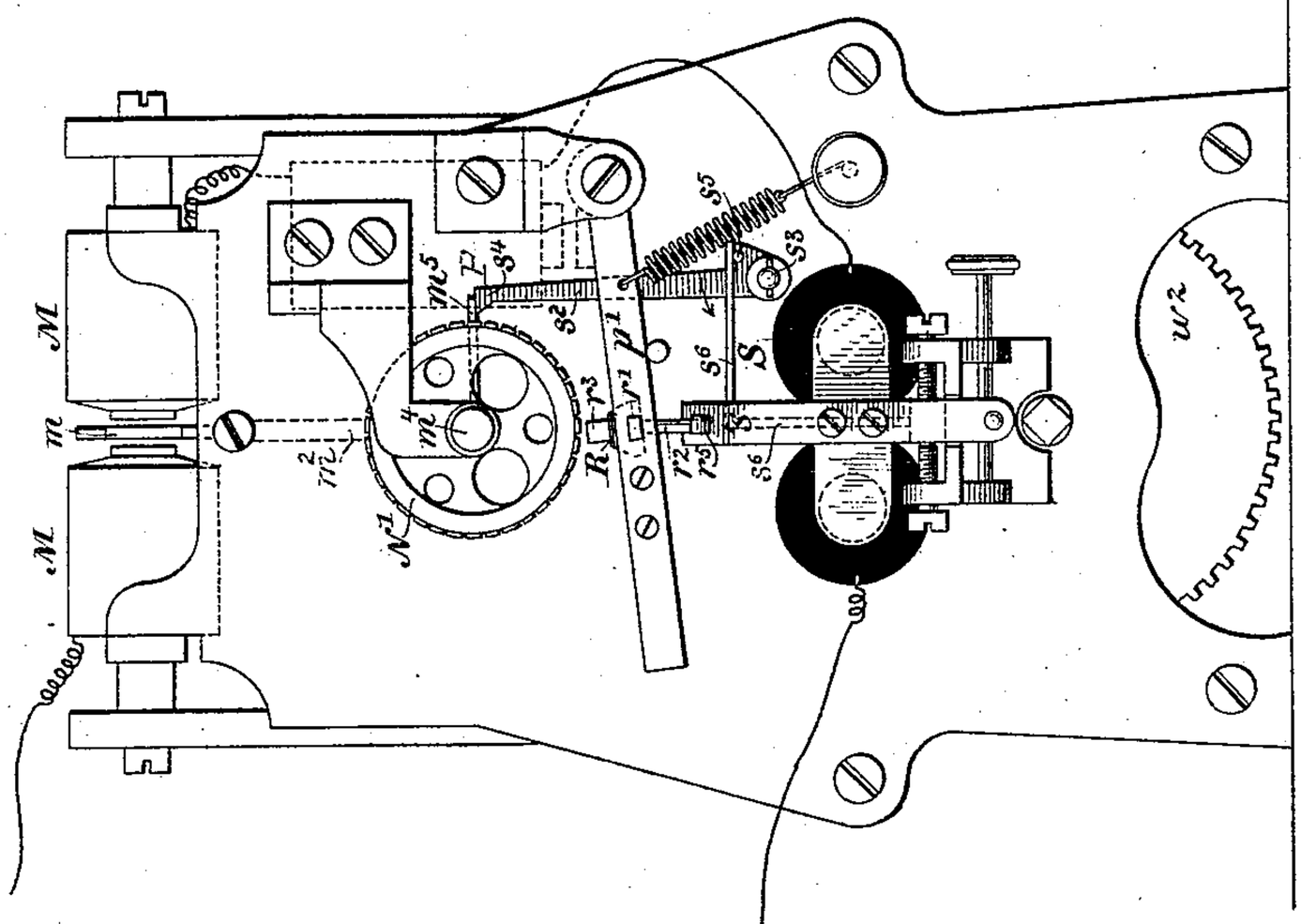


Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY VAN HOEVENBERGH, OF ELIZABETH, NEW JERSEY.

PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 304,475, dated September 2, 1884.

Application filed September 24, 1883. (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-Telegraphs, of which the following is a specification.

My invention relates to the class of electro-magnetic printing-telegraphs in which the receiving-instrument is provided with two type-wheels mounted in the same axial line, and producing a record in two parallel lines of characters on a slip of paper. Such instruments are especially adapted for receiving the quotations of the sales of stocks, bonds, and other financial and commercial transactions.

The principal object of my invention is to accomplish the double-line printing hereinbefore referred to through the medium of a single platen and impression-producing mechanism common to both type-wheels, thereby simplifying the mechanism and reducing the space occupied thereby, which end I accomplish by means of mechanism for transferring a common platen carried upon a printing-lever from the field of operation of one type-wheel to that of the other. This transfer is effected by the operator at the transmitting end of the line through the medium of mechanism, to be hereinafter more particularly described. The several offices of the complete transmitting mechanism are as follows: First, to establish upon the line alternating electric pulsations of a given strength for effecting the intermittent forward motion of the type-wheel shaft; second, to cause the arrest of the transmitting mechanism in a position dependent upon the character desired to be transmitted, and to simultaneously increase the strength of the current last transmitted, thereby causing the impression-producing device to be actuated; and, third, to occasion a prolongation of any one of the alternating pulsations irrespective of its polarity or direction, and without increasing its strength. The type-wheel shaft of the receiving-instrument is provided with two type-wheels, one of which may conveniently carry the letters and the other the numerals. The tendency of this shaft to rotate in one direction is maintained through the action of motor mechanism—as, for instance, a weight or spring controlled through the agency of a vibrating polarized armature acting upon an anchor-escapement, and moving to and fro under the influence of electric currents or pulsations of alternating polarity. The characters are imprinted upon the receiving tape or slip by suitable impression mechanism, (preferably actuated by a temporary increase in the normal strength of current,) a platen being thereby thrust against one or the other of the type-wheels, as required. A single platen serves for both type-wheels. It takes but one impression at a time, and that from the wheel it happens to confront when actuated. The movements of the platen from the field of action of one wheel to that of the other are effected by means of a device hereinafter called a "determining device." This determining device consists of an electro-magnet, included in the main circuit, an armature responding only to electric currents of considerable duration, as distinguished from the short alternating currents which control the intermittent advance movement of the type-wheels. Such currents may, however, be of the same strength as the alternating currents or of the strength employed for printing. A sliding mechanism is controlled by the armature just described, whereby the printing-platen may be instantly transferred from the field of one wheel to that of the other. The object of the third class of currents mentioned above is to actuate this determining device at the receiving-station. Thus a prolonged pulsation of normal strength directly succeeding an ordinary short pulsation of normal strength is availed of to cause the transfer of the platen from one type-wheel to the other. Such a prolongation, however, when it succeeds a prolonged current of the strength required for printing, will place the determining device in position for retransferring the platen to its original position, and the subsequent interruption of the prolonged current of normal strength transfers the platen to that position. The device may be actuated in any phase of the transmitter, and accordingly any desired letter or numeral may be impressed upon the receiving-slip. The instrument is also provided with a unison device for arrest-

ing the type-wheel in a predetermined position when the instrument is actuated in the proper manner for advancing the type-wheels without printing for any considerable period.

The invention also comprises certain details of mechanism, hereinafter fully explained.

My invention is illustrated in the accompanying drawings, in which Figure 1 is a vertical section of the transmitter, showing the circuits in diagram. Fig. 2 is a vertical transverse section of the receiving-instrument, and Fig. 3 is a side elevation of the same.

A description of the transmitting device which I prefer to employ will first be given.

Referring to Fig. 1, A represents a suitable train of clock-work adapted to revolve a shaft, *a*, under the stress of a weight or spring, *w*. Upon the shaft *a* are carried two insulated rings, *b'* and *b*². The peripheries of these rings are divided into alternate conducting and non-conducting segments, so arranged that the conducting-segments upon one ring are axially opposite the non-conducting segments of the other. Two contact brushes or springs, C' and C², rest simultaneously against the peripheries of both rings at such points that, while one brush is in contact with a conducting portion of one ring the other brush will rest upon a non-conducting portion of the same ring and a conducting portion of the other ring. The brushes C' and C² are respectively connected with the main line L, and with the earth at G', while the conducting-segments of the ring *b'* are connected with one pole—say the positive—of a battery, E, and in like manner the conducting-segments of the ring *b*² are connected with the other pole of the same battery. When, therefore, the shaft *a* is permitted to revolve, alternate positive and negative impulses will be transmitted from the battery E upon the line L, in a manner well understood. When the motion of the shaft A is arrested, the duration of the impulse last transmitted to line will be prolonged. For the purpose of arresting the shaft in any required angular position an annular key-board, F, is provided, a portion only of which is shown in the figure. This board carries any required number of vertically-movable keys, *f*, designed to be thrust at the will of the operator into the path of a rotating arm, G, carried upon the shaft *a*. These keys are all in electrical connection through conductors 6 and 7 and a device, J, hereinafter described, with one pole of a local battery, *e*, while the arm G is in like connection through a conductor, 8, with the remaining pole of the same battery. Whenever, therefore, any one of the keys *f* is depressed and the rotating arm G comes into contact therewith, the circuit of the battery *e* will be completed.

An electro-magnet, H, is included in the circuit of the local battery *e*. This magnet is provided with an armature, *h*, and lever *h'*, carrying at its remote extremity a contact-point, *h*². A contact-spring, *h*³, projects into the path of the armature-lever, but so long as the armature is away from the poles of its electro-magnet it rests upon a contact-stop, *h*⁴, and does not make contact therewith. The conductor 4, leading from the negative pole of the battery E, is connected with the spring *h*³, while the stop *h*⁴ is connected with the conductor 5. The armature-lever *h'* is connected, through a conductor, 9, with one pole (in this instance the positive) of an auxiliary battery, E', the negative pole of which is connected, by a conductor, 10, with the conductor 5. When the electro-magnet H is vitalized, the contact-point *h*² will be raised, lifting the spring *h*³ from the point *h*⁴, the circuit of the battery E will then be complete through the conductors 9 and 10 instead of through the conductor 5, thus connecting the two batteries E and E' in series. An impulse of increased strength will thus be transmitted to line having a polarity the same as that last transmitted by the battery E alone, and the duration of the current will be long or short according to the time the key *f* remains depressed.

For the purpose of at any time obtaining a prolonged current from the battery E alone which shall be of the same polarity as the current last transmitted from both batteries combined, the device J before referred to is employed. This device consists of a contact-point, *j*, with which the conductor 7 is connected, and a contact-spring, *j'* connected with the conductor 6. The spring *j'* normally rests against the point *j* by virtue of its resilience, thereby completing the connections of the conductors 6 and 7. An insulated key, *j*², is fixed in the board F above the spring *j'*, but normally out of contact therewith. When, however, this key is depressed, it strikes against the spring *j'* and forces the latter out of contact with the point *j*. It will thus be seen that when the circuit of the local battery *e* has been completed by the contact of the arm G with one of the keys *f*, the electro-magnet H vitalized, and a current from the combined batteries E and E' transmitted to line, the current from the battery E may be continued independently of the battery E' by depressing the key *j*², provided the particular key *f* with which the arm G may be in contact remains depressed. By depressing key *j*² simultaneously with one of the keys *f*, the prolonged current of normal strength may be caused to succeed the alternating currents directly. In this manner currents of the following character may be transmitted: Alternating pulsations having a strength derived from the battery E alone; currents having a strength derived from both batteries E and E' united and possessing the polarity of the alternating current last transmitted; or currents of the strength derived from the battery E alone and having the polarity of the preceding current or impulse. These currents are employed for actuating the receiving-instrument in a manner which will be hereinafter explained.

Referring, now, to the receiving-instrument, as illustrated in the figures, M M represent a

double electro-magnet constructed with confronting poles, between which a polarized armature, *m*, is caused to vibrate under the influence of alternating electrical pulsations traversing the coils of the said magnet. The lever *m'* of the armature *m* carries an ordinary anchor-escapement, m^2, acting to permit a step-by-step advancement of the wheel under the influence of a weight attached to the cord, *w'*, and train of wheels w^2. The shaft m^4 of the scape-wheel carries two parallel type-wheels, N' and N^2, the peripheries of which may, for convenience, be considered as bearing figures and letters, respectively. A printing-magnet, P, is provided for effecting impressions from one or the other of these type-wheels under the influence of a current of greater strength than those employed for vibrating the escapement m^2—that is to say, a current from both batteries E and E'. This magnet is provided with an armature-lever, *p'*, carrying at its extremity, beneath the type-wheels, a movable platen, R. The platen R is adapted to print from one of the type-wheels or the other, accordingly as it is in the plane of one or the other when the armature-lever is actuated.

The device for determing from which of the two type-wheels the platen R shall cause an impression to be taken consists of a sliding bar, r', carried by armature-lever, *p'*. The platen R is carried upon the bar r' in such a manner that, when the bar is moved from one limit of its excursion to the other, the platen will be carried from the position required to print from one type-wheel to a corresponding position relative to the other type-wheel. An arm or stop, r^2, projects from the rod r' into the path of the extremity of the armature-lever *s'* of an electro-magnet S. The electro-magnet S is constructed to respond only to prolonged currents, and its armature is so arranged that its movement is at right angles to the plane of the type-wheels. A latch, r^5, is pivoted at the extremity of the arm *s'* in such a manner as to normally engage the arm r^2. This latch, together with the armature-lever, serves to move the platen from one type-wheel to the other. It is apparent, however, that each time the platen is lifted for the purpose of printing, the arm r^2 will be raised from its position between the latch r^5 and the lever *s'*, and when it descends it is liable to fall outside the space between the lever and latch. Thus, if the platen is employed for printing from the type-wheel N', it is evident that the armature-lever *s'* will be attracted into its forward position each time the platen is raised, and at the interruption of the current the arm r^2 might return to its downward position before the lever *s'* had fallen away from its electro-magnet. For this reason I construct the latch r^5 with a beveled face, r^6, which causes the latch to be pressed downward in opposition to a counterpoise, r^7, when caused to impinge against the arm r^2 through the influence of the retractile spring r^8 of the lever *s'*. The latch will thereupon engage the arm r^2. If, when the platen has been placed in the position required for printing from the type-wheel N^2, a current of the character required for printing should be directly succeeded by alternating impulses of normal strength, or by an interruption of the current, the armature-lever *s'* would be allowed to fall away from its electro-magnet before the platen R had descended far enough to place the arm r^2 upon the left-hand side of the lever *s'*, and the arm r^2 would therefore fall upon the right-hand side of the lever. In practice, such a succession of currents is transmitted when it is desired to print, successively, from the type-wheel N^2, and the arm r^2 therefore descends each time upon the right-hand side of the armature-lever, and the platen will not be moved from beneath the type-wheel N^2. When it is desired to again print from the wheel N', a prolonged current of normal strength is caused to directly succeed a current of sufficient strength to actuate the platen R. The lever *s'* will thus be held in its forward position while the platen R descends, and the arm r^2 will thus fall upon the left-hand side of the lever *s'*. It is necessary, then, only to interrupt the prolonged current of normal strength or to resume the alternating impulses. Such action will cause the lever *s'* to fall away from its electro-magnet and the platen R to be pushed back to its original position beneath the type-wheel N'.

For the purpose of preventing the platen R from being thrown away from its proper position beneath one type-wheel or the other when several characters are being printed therefrom, I provide a beveled extension, r^3, at the end of the rod *r*, adjacent to the frame of the instrument, and a like projection, r^4, is secured to the frame itself. When the platen R is raised, the projection r^3 must pass either upon the right hand or upon the left of the arm r^4, and if by chance the platen should be thrown slightly to one side when it descends after printing, the contact of the inclined surfaces will cause it to be replaced at the next upward movement of the platen.

The device whereby the position of the type-wheels may be at any time corrected for any error consists of an arm, s^2, carried upon an extension, s^3, of one of the arbors of the train mechanism. The direction of motion of this arbor is that indicated by the arrow, and its tendency is therefore to move the arm s^2 toward the shaft m^4 of the type-wheels. Upon this shaft is carried a stop, m^5, into the path of which a detent, s^4, is thrust when the arm s^2 is in its forward position. The function of the stop and detent is thus to arrest the type-wheels at a predetermined unison-point when the arm s^2 is in its forward position. For the purpose of preventing the detent from being thus at all times in the path of the stop, the arm s^2 is attached to the extension s^3, by means of a spring or frictional connection, which serves to normally advance the arm, but at the same time permits it to be thrust backward at any time by

means of an external force. Such force is applied to the arm s^2 by means of an arm, s^6, extending from the armature-lever s', and an extension, s^5, of the arm s^2. When the lever s' is in its backward position, the arm s^6 is held out of the path of the extension s^5; but when attracted into its forward position it will engage the extension and force the same downward, thus turning the arm s^2 backward upon its axis. Each time the lever s' is actuated the arm s^2 will be moved backward, and if the movements of the lever s' be frequent enough the detent will be kept out of the path of the stop. When, however, a sufficient number of alternating impulses are transmitted successively, the arm will be carried by the continued movement of the arbor into its extreme forward position, and the type-wheel shaft will be arrested when the stop m^5 strikes the detent s^4. After the wheels have thus been arrested at their unison-point, it will be necessary to throw the arm s^2 back before they can be again actuated. This is accomplished by transmitting a current which may be either of the strength required for printing or a current of normal strength, accordingly as it is desired to print from one type-wheel or the other.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, with means for producing alternating electric impulses of a given strength, and for prolonging or increasing the strength of any one of said impulses, of two type-wheels, escapement mechanism common to both type-wheels, controlled by said alternating currents, a printing-platen, an armature responding only to said currents of increased strength, for actuating said printing-platen, and an armature acting to transfer said platen from the field of one of said type-wheels to the field of the other only when said platen is remote from said type-wheels, which armature responds to prolonged currents, whether of normal or increased strength.

2. The combination, substantially as hereinbefore set forth, of a main line, a battery, a pole-changing device for transmitting electric pulsations from said battery upon said main line, a series of keys for arresting the operation of said pole-changing device at the will of the operator, a second battery which is automatically added to the first-named battery when said pole-changing device is arrested, and means, substantially such as described, whereby the automatic addition of said second battery may be prevented.

3. The combination, substantially as hereinbefore set forth, of two type-wheels, a printing-platen, an electro-magnet acting, when vitalized, to impel said platen in the direction of said type-wheels, a movable rod upon which said platen is carried, a second electro magnet operated in conjunction with the first-named electro-magnet to transfer said platen from the field of one of said type-wheels to that of the other, and an automatically-detachable connection between the armature of said second electro-magnet and said movable rod.

4. The combination, substantially as hereinbefore set forth, of two type-wheels advancing simultaneously in response to alternating electric impulses of a given strength, a movable printing-platen for taking impressions from either of said type-wheels, an armature responding to electric currents of increased strength to impel said platen toward said type-wheels, and a second armature responding only to a prolonged current of either normal or increased strength, whereby said platen is transferred from the field of one of said type-wheels to that of the other, and acts to restore said platen to its original position only when an interruption of a prolonged impulse or current of normal strength succeeds a current of the strength employed for impelling said platen toward said type-wheels.

5. In a printing-telegraph receiving-instrument, the combination, substantially as hereinbefore set forth, of a movable printing-platen, an armature and its lever adapted to engage with the support of said platen, and to normally move it in a given direction, and a latch pivoted upon said lever and acting, in the manner described, to impel said rod in the opposite direction.

6. The combination, substantially as hereinbefore set forth, of two type-wheels, a printing-platen, an electro-magnet for causing said platen to effect impressions from said type-wheels, a movable support for said platen, adapted to transfer the same from the field of one of said type-wheels to that of the other, and a second electro-magnet, its armature and armature-lever, the path of which lever is intercepted by said support only when said platen is remote from said type-wheels.

7. The combination, substantially as hereinbefore set forth, of two type-wheels, a platen, an electro-magnet, its armature and armature-lever, a latch pivoted upon said lever, a movable rod constituting a support for said platen, and adapted to be engaged by said armature lever and latch, and impelled thereby from one limit to the other of its excursion, and means, substantially such as described, whereby said rod or support may be withdrawn from engagement with said armature lever and latch.

8. The combination, substantially as hereinbefore set forth, with two type-wheels and movable platen adapted to be placed in the field of either of said type-wheels, of an electro-magnet adapted to impel said platen toward said type-wheels, and two beveled-faced contact-edges, r^3 and r^4, the former of which moves with said platen and is adapted to pass beneath the contact-edge r^4, which is carried upon a stationary arm secured to the frame of the mechanism.

9. The combination, substantially as hereinbefore set forth, of two type-wheels, means for advancing said type-wheels, a printing-platen for effecting impressions from said type-

wheels, an electro-magnet and its armature-lever for transferring said platen from the field of one of said type-wheels to that of the other, a stop moving with said type-wheels, a detent mounted upon and having a frictional connection with one of the arbors of the train mechanism of said type-wheels, and having a constant tendency to move into the path of said stop when said type-wheels are advanced, and means, substantially such as described, for preventing said detent from intercepting said stop when said armature-lever is actuated.

In testimony whereof I have hereunto subscribed my name this 21st day of September, A. D. 1883.

HENRY VAN HOEVENBERGH.

Witnesses:

DANIEL W. EDGECOMB,

CHARLES A. TERRY.