

(No Model.)

2 Sheets—Sheet 1.

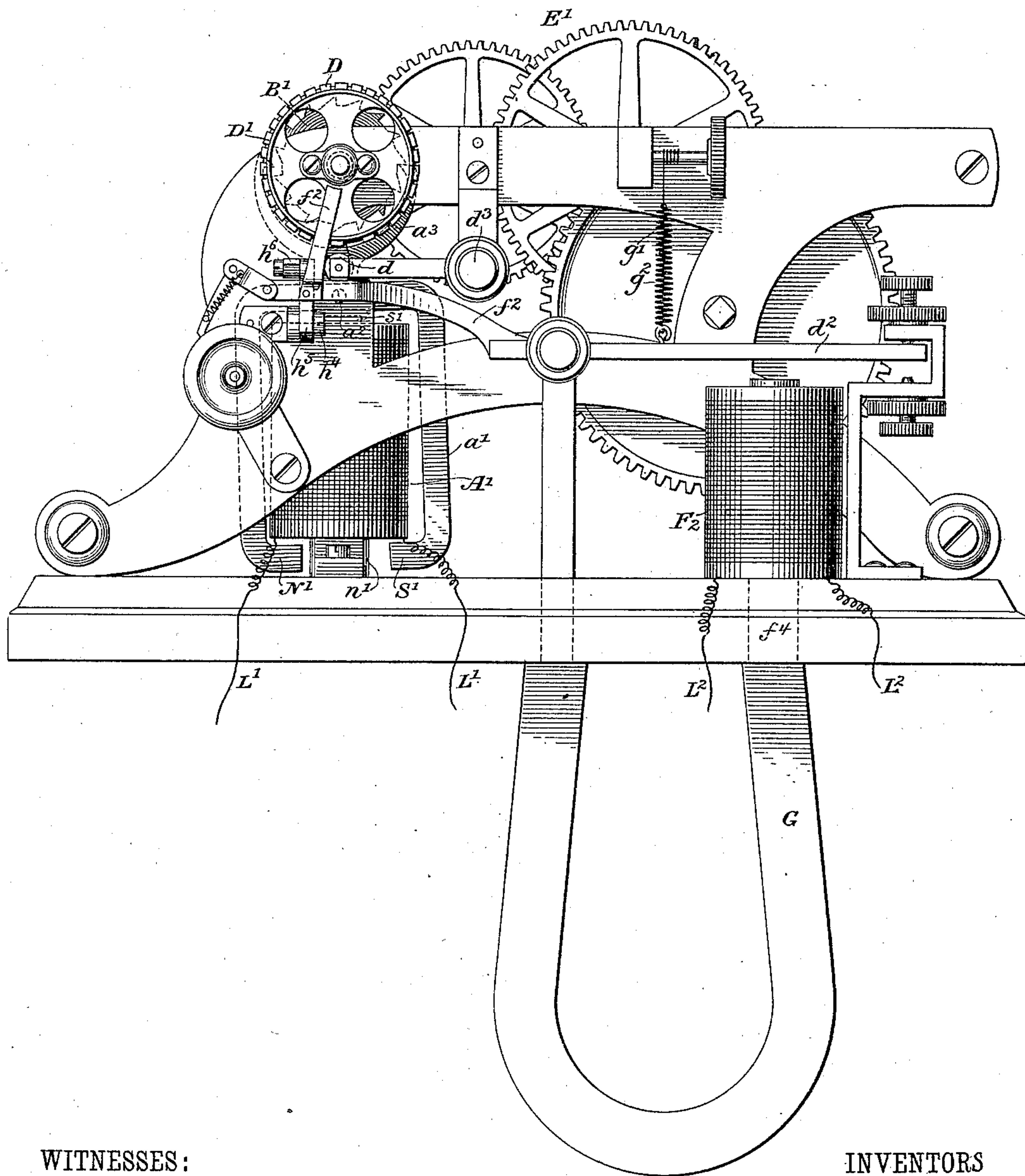
J. E. WRIGHT & J. H. LONGSTREET.

PRINTING TELEGRAPH.

No. 311,218.

Patented Jan. 27, 1885.

Fig. 1.



WITNESSES:

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(No Model.)

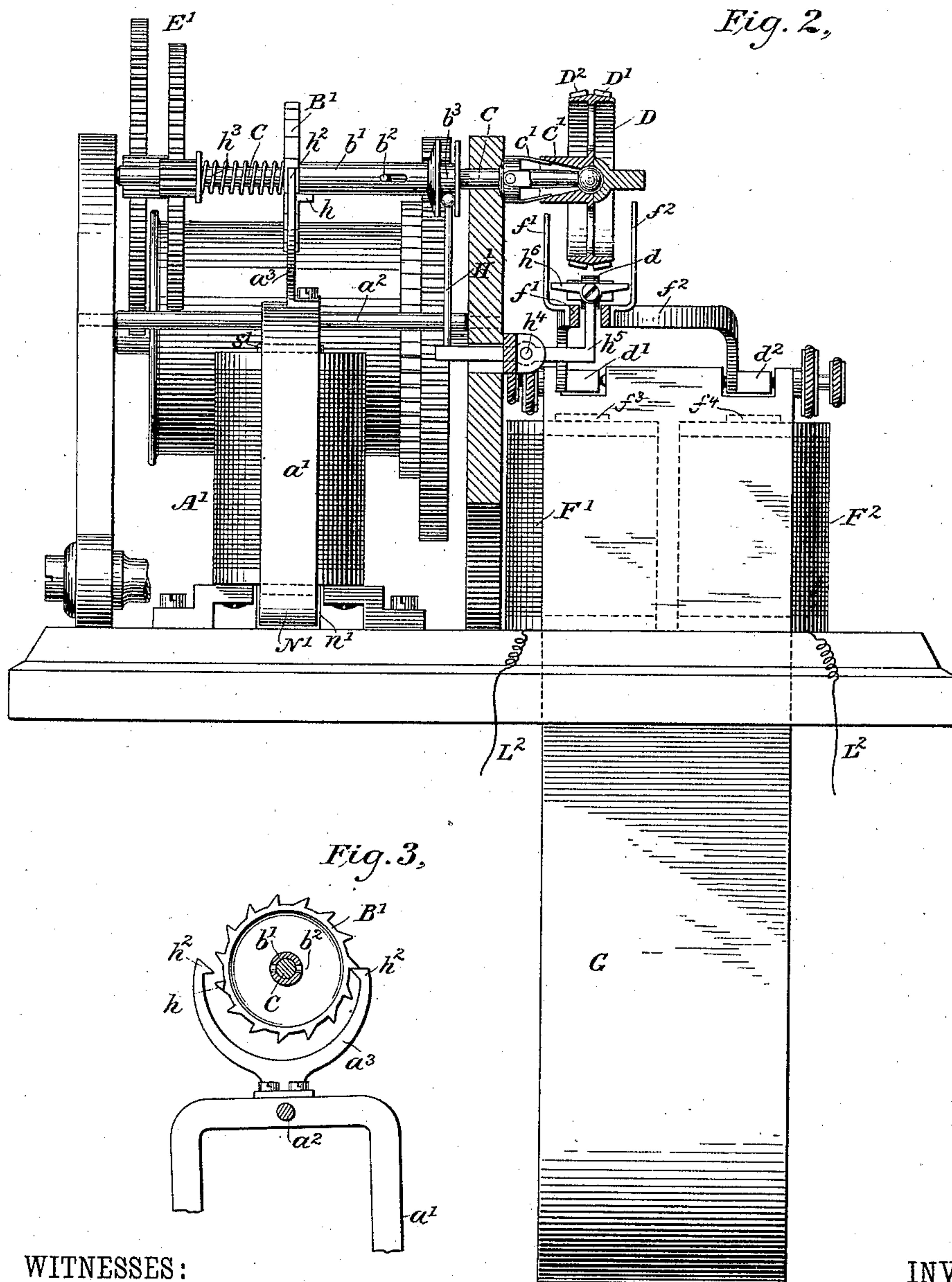
2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

JOHN E. WRIGHT, OF NEW YORK, N. Y., AND J. HOLMES LONGSTREET, OF
HOBOKEN, NEW JERSEY.

PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 311,218, dated January 27, 1885.

Application filed May 14, 1884. (No model.)

To all whom it may concern:

Be it known that we, JOHN E. WRIGHT and J. HOLMES LONGSTREET, citizens of the United States, residing, respectively, in the city, county, and State of New York, and Hoboken, county of Hudson, and State of New Jersey, have invented certain new and useful Improvements in Printing-Telegraphs, of which the following is a specification.

Our invention relates particularly to the class of printing-telegraph instruments in which the step-by-step movement is given to the type-wheels through the instrumentality of an escapement actuated by an independent electro-magnet, while the impressions are taken from the type-wheel or type-wheels through the agency of one or more electro-magnets included in an independent main-line circuit.

The object of the invention is to provide means for actuating the type-wheels rapidly, for the purpose of bringing the desired characters in position to print; to effect impressions of these characters, whether located upon one or the other of the type-wheels, or of the two independent faces of a single type-wheel, and to secure a unison of the type-wheel or type-wheels with reference to the transmitting-instrument in a convenient and efficient manner.

The invention consists in constructing the apparatus in substantially the following manner: A single permanent magnet is applied to the escapement-anchor, and the positive and negative poles of this magnet extend into proximity to one extremity of the core of an electro-magnet or to two polar extensions applied thereto. To the remaining pole of this electro-magnet the permanent magnet is pivoted at or near its neutral point. The effect of the last-named pole of the electro-magnet is, when the electro-magnet is vitalized by an electric current in a given direction, to increase the magnetism manifested at one pole of the permanent magnet and to diminish that manifested at the other pole. When the magnetizing-current is in the opposite direction, the poles of the permanent magnet to which this increase and decrease in magnetic intensity is applied are reversed. The combined action of the two poles of the electro-magnet is, therefore, to im-

pel the permanent magnet in one direction or the other, according to the character of the polarization induced in the electro-magnet, by reason of the attraction existing between the free pole of the electro-magnet and one of the poles of the permanent magnet and the repulsion between the pole of the electro-magnet and the remaining poles of the permanent magnet. The coils of the electro-magnet are included in a single main line, through which it is designed to transmit alternate positive and negative impulses, and at each reversal in the direction of the current transmitted the permanent magnet and the escapement-anchor are caused to move in one direction or the opposite, thus giving a step-by-step motion to the type-wheel through an ordinary scape-wheel. The type-wheel which we prefer to employ is constructed with two faces, which are respectively designed to carry letters and figures, and these two faces are placed in planes diverging slightly from each other toward the axis of the wheel. The type-wheel itself is carried upon or is coupled with the shaft by a ball and socket or other suitable form of joint, which permits of a slight movement of the type-wheel with reference to the type-wheel shaft in such a manner that either of its faces may be presented to the surface of the printing-platen, which is located in a plane parallel with the type-wheel shaft. For the purpose of effecting impressions from this type-wheel two electro-magnets are employed. Upon the armatures of these electro-magnets are respectively carried two arms, which are designed to place the type-wheel in position to print from one or the other of its faces, according as one or the other of the armatures is actuated. The printing-platen is carried upon an independent lever, and is so located with reference to the armatures of the electro-magnets that it will be forced in the direction of the type-wheel by the movement of either armature; but an impression will be effected only from the type-wheel face which is directly presented to the platen. The electro-magnets employed for actuating the platen are normally polarized by induction from a permanent magnet upon which the cores are mounted. The polarization thus received is, however, insufficient to draw the

respective armatures into proximity to the electro-magnets against the force of the retractile springs which are applied thereto. The coils of the electro-magnets are oppositely wound, so that a current transmitted through the same in a given direction will serve to increase the magnetism induced in the core of one of the electro-magnets by means of the permanent magnet, while it will, to a greater or less extent, neutralize that induced in the core of the remaining electro-magnet. The armature of the electro-magnet, the polarization of which is thus increased, responds to the additional force, and serves both to place the type-wheel in a position to print from the type-face corresponding thereto and to impel the platen toward the same. The remaining armature, however, remains in its position away from its electro-magnet. A current in the opposite direction will produce the opposite result, effecting an impression from the other type-wheel face. For the purpose of securing the unison of the type-wheel with reference to the transmitting apparatus, whenever it is so desired, the escapement-wheel is mounted loosely upon the type-wheel shaft; but it is connected therewith by means of a feather, which permits a longitudinal movement of the scape-wheel. Suitable means are provided for normally holding the scape-wheel in position to be engaged by the escapement-anchor; but under the influence of the proper force the scape-wheel may be moved laterally upon the type-wheel shaft out of engagement with its anchor. The scape-wheel and the type-wheel shaft are thus permitted to revolve under the influence of the actuating force of the instrument until the scape-wheel is arrested, with the type-wheels at the unison-point, by means of a pin or widened tooth of the scape-wheel striking against one pallet of the escapement-anchor. The required movement for thus actuating the scape-wheel is imparted thereto, by means of the armature-levers employed for effecting impressions from the type-wheel, in the following manner: A forked lever engaging the sleeve of the scape-wheel carries a pivoted rocking bar the ends of which extend above the armatures. This bar may be tilted in one direction or the other without actuating the forked arm when one armature or the other alone is actuated. If, however, both armatures be simultaneously impelled toward their type-wheels, both ends of the tilting bar will be simultaneously engaged and the forked lever actuated, thereby moving the scape-wheel laterally upon the type-wheel shaft. This movement of the scape-wheel releases the same from its anchor and secures the unison of the type-wheel, in the manner already described.

Instead of having the scape-wheel movable upon the shaft independently of the type-wheel, both may be constructed to move together, or the shaft may itself be made longitudinally movable in its bearings. For the

purpose of thus causing both armature levers to be simultaneously actuated, it is necessary not only to transmit a current of sufficient strength to attract one of the armatures to its electro-magnet, but also to overcome the magnetism normally induced in the core of the other electro-magnet, thereby actuating both armatures. The movement of the scape-wheel is then effected in the manner set forth.

In the accompanying drawings, Figure 1 is a side elevation of a printing-telegraph instrument illustrating our invention, and Fig. 2 is a front view of the same. Fig. 3 illustrates certain details in the construction of the escapement device.

Referring to the drawings, A' represents an electro-magnet which is designed to be included in the circuit of a main line, and to be vitalized by means of alternating electric impulses. Applied to this electro-magnet is an armature, a', consisting of a permanent magnet bent into such form that its respective poles N' and S' will extend into proximity to a widened pole, n', of the electro-magnet A'. The permanent magnet is pivoted at or near its neutral point to the remaining pole s' of the electro-magnet A'. An electric current transmitted through the coils of electro-magnet A' in one direction will render the pole n' of north polarity, and the pole s' of south polarity. There will, therefore, exist between the pole n' and the pole N' a certain amount of repulsion, and between the poles n' and S' a corresponding amount of attraction. This attractive force will be the greater by reason of the additional strength given to the pole S' by induction for the pole s'. The permanent magnet or armature will thus be turned upon its axis in a given direction. When the direction of the current is reversed, the permanent magnet will in like manner be impelled in the opposite direction. The arbor a'', upon which the armature a' is carried, will thus be vibrated. An escapement-anchor, a'', is carried upon the arbor a'', and this anchor engages the teeth of the scape-wheel B'. The scape-wheel B' is carried upon a sleeve, b', which is longitudinally movable upon the shaft C, which shaft also carries the type-wheel D. A feather, b'', formed upon the shaft C, engages the sleeve b' and prevents the scape-wheel from turning independently of the type-wheel shaft. When, however, the escapement-anchor is vibrated by means of the alternating electric current transmitted through the coils of the electro-magnet A', a step-by-step movement is given to the shaft and to the type-wheels in response to the force exerted by means of a spring, weight, or other driving-power through a suitable train of gear, E'. The type-wheel D is provided with two beveled faces, D' and D'', which are respectively designed to carry letters and figures or other suitable characters, as may be desired. Impressions are taken from these two type-wheel-faces by means of a platen, d, which may be actuated by means of either of

two armatures, d' or d^2 , which are respectively applied to two electro-magnets, F' and F^2 . The printing-platen is mounted upon an independent support, d^3 , and it is designed to take impressions from only one face of the type-wheel at a time. For the purpose of securing this result, the type-wheel is mounted upon the shaft C by means of gimbals or a ball-and-socket joint, so that it is capable of a slight lateral movement. Thus, if it is desired to print from the type-wheel face D' , it is necessary to place the wheel in such position that the face D' lies parallel to the type-wheel shaft, while the face D^2 is turned at such an angle with reference to the printing-platen that a character upon its face will not be impressed upon the paper-tape. Likewise, if the character desired is upon the face D^2 , the type-wheel should be turned so that that face is parallel with the face of the printing-platen and with the shaft C. For the purpose of thus moving the type-wheel into proper position at the moment it is desired to effect an impression, two arms, f' and f^2 , are applied to the two armatures d' and d^2 of the electro-magnets F' and F^2 . These arms extend upon opposite sides of the type-wheel, and they serve, by striking against the part C' , by means of which the wheel is coupled with the shaft C, to turn the type-wheel upon its universal joint in the proper direction to cause it to print the character desired. When the type-wheel is again set in motion, it will resume its position parallel to the type-wheel shaft C by reason of the revolution given thereto. Suitable springs, c' , are, however, preferably applied to the sleeve C' , and these springs, by pressing against the shaft C, normally hold the type-wheel in the position shown in the drawings when it is not engaged by one or the other of the arms f' or f^2 . The electro-magnets F' and F^2 are provided with cores f^3 and f^4 , respectively, which receive by induction a certain polarization from a permanent magnet, G, upon which they are carried. The armatures themselves are also preferably pivoted to the opposite pole of the permanent magnet G, and they receive therefrom the opposite polarization. The tendency, therefore, of the two electro-magnets is to normally attract the armatures toward themselves, and thus to impel the platen toward the type-wheel faces. The tension of the retractile springs g' and g^2 , however, is normally sufficient to prevent the armatures from responding to the induced magnetism of the cores, and the platens are therefore held away from the type-wheel. The coils of the electro-magnets F' and F^2 are oppositely wound, and they are included in the circuit of a second main line, L^2 , which is provided with means for transmitting currents in one direction or the opposite, as desired. A current of one polarity—positive, for instance—transmitted through these electro-magnets will be of the character to increase the magnetism of the core of the electro-magnet F' sufficiently to attract the armature d' toward it-

self, thereby effecting an impression from the type-wheel face D' . This same current, however, tends to neutralize the induced magnetism of the core f^4 of the electro-magnet F^2 , and does not, therefore, cause its armature to respond. A current of the opposite polarity—that is to say, negative—transmitted through the coils of the electro-magnets F' and F^2 would tend to neutralize the magnetism in the core f^3 , while it increases that of the core f^4 sufficiently to actuate the armature f^2 and effect an impression from the type-wheel face D^2 . In this manner the type-wheel may be revolved until the desired character upon either face is brought above the printing-platen, and then a current of positive or negative polarity, accordingly as it is desired to print from the type-wheel face D' or D^2 , is transmitted through the line L^2 , and an impression is then effected from the corresponding type-wheel face.

For the purpose of bringing the type-wheel to the unison-point when desired for the purpose of insuring that they are in unison with the transmitter, we propose to move the scape-wheel B' out of engagement with the anchor a^3 , thereby permitting the scape-wheel to advance continuously until it is arrested by the engagement of an extended tooth or a pin, h , carried by the anchor, with one of the pallets, h^2 , of the escapement-anchor, a^3 . At this point the scape-wheel will be arrested and the blank or unison points of the type-wheel will be held above the printing-platen. The scape-wheel, being thereupon released, again moves into engagement with the escapement-anchor by reason of the pressure exerted by a spring, h^3 , which is applied thereto. For the purpose of thus moving the scape-wheel it is mounted, as already stated, loosely upon the shaft of the type-wheel, and is capable of a longitudinal movement thereon.

The sleeve b' , upon which the scape-wheel is carried, is provided with an annular groove, b^3 , into which fits the forked extremity of a lever, H' , which is adapted to move the sleeve and scape-wheel longitudinally upon the type-wheel shaft in the following manner: The lever H' is pivoted at a point, h^4 , and the arm h^5 extends between the two armature-levers f' and f^2 , and carries a tilting bar, h^6 , the respective ends of which extend above the two armature-levers d' and d^2 . One end or the other of this tilting lever may be elevated, according as one or the other of the armatures is actuated, without moving the lever H' . If, however, both levers be simultaneously actuated, both ends of the tilting lever will be engaged at once, and the arm h^5 of the lever H' will therefore be raised. The movement thus given to the lever H' causes the scape-wheel B' to be moved laterally upon the shaft C a sufficient distance to carry it out of engagement with the escapement-anchor, whereupon it revolves to its unison-point, at which it is arrested in the manner described. For the purpose of thus obtaining the simultaneous movement of both armature-levers it

is necessary only to transmit through the main line L^2 and the coils of the electro-magnets F^1 and F^2 a current of either polarity having sufficient strength not only to cause the armature applied to the electro-magnet having normally the same polarity as that induced by the current transmitted to respond, but also of sufficient strength to overcome the normal magnetism of the core of the other electro-magnet and to induce therein sufficient magnetism to attract its armature. Both armatures will thus respond to this current of increased strength, and the unison will be effected.

We claim as our invention—

1. The combination, substantially as hereinbefore set forth, of an electro-magnet, a permanent magnet the poles of which extend in proximity to one pole of said electro-magnet, an escapement-anchor actuated by means of said permanent magnet under the influence of electric currents of alternating polarity, a scape-wheel to which said escapement-anchor is applied, two type-wheel faces moving with said scape-wheel, a printing-platen applied to said type-wheel faces and two electro-magnets, two armature-levers applied thereto and each adapted to actuate said printing-platen, and means, substantially such as described, for causing one or the other of said type-wheel faces to be placed in position to print accordingly as one or the other of said electro-magnets is vitalized.

2. The combination, substantially as hereinbefore set forth, with a type-wheel shaft, of a scape-wheel, an escapement-anchor, a permanent magnet for actuating said anchor, and an electro-magnet to one pole of which said permanent magnet is pivoted at its neutral point, while the respective poles of said permanent magnet extend into proximity to the remaining pole of said electro-magnet or extensions thereof.

3. The combination, substantially as hereinbefore set forth, with the scape-wheels of a printing-telegraph, of an escapement-anchor applied thereto, means, substantially such as described, for actuating the same, two type-wheel faces revolving with said scape-wheel, a printing-platen applied to said type-wheel faces, two electro-magnets and their armatures for actuating said printing-platen, means, substantially such as described, for normally inducing in the cores of said electro-magnets polarization of a given character, and means, substantially such as described, for causing one or the other of said armatures to impel said platen toward said type-wheel faces under the influence of an electric current accordingly as it is transmitted in one direction or the other.

4. The combination, substantially as hereinbefore set forth, with two type-wheel faces of a printing-telegraph instrument, and means, substantially such as described, for revolving the same, of two actuating-armatures upon a permanent magnet inducing in said arma-

tures a given polarization, two electro-magnets, to which said armatures are applied, in the cores of which said permanent magnet normally induces magnetism of the opposite polarity, and retractile springs applied to said armatures having tension sufficient to normally hold said armatures away from their electro-magnets.

5. The combination, substantially as hereinbefore set forth, with a type-wheel and a printing-platen, of an electro-magnet and its armature for actuating said platen, and permanent magnet for normally inducing in said electro-magnet and its armature a given amount of magnetism, a retractile spring of sufficient force to overcome the attractive force normally existing between said electro-magnet and its armature, and means, substantially such as described, for increasing the polarization of said electro-magnet sufficiently to cause its armature to respond.

6. The combination, substantially as hereinbefore set forth, of two type-wheels or type-wheel faces, a printing-platen applied thereto, and two armatures for actuating the same, two electro-magnets applied to said armatures, either one or the other of which may be caused to attract its armature and to thereby effect an impression from the corresponding type-wheel or type-wheel faces, and means, substantially such as described, for causing both of said armatures to respond when desired.

7. The combination, substantially as hereinbefore set forth, of two electro-magnets and their armatures, means, substantially such as described, for causing one or the other or both of said electro-magnets to attract their armatures, a scape-wheel, and means, substantially such as described, for causing said scape-wheel to be moved out of engagement with its anchor when both of said armatures are actuated.

8. The combination, substantially as hereinbefore set forth, of two type-wheel faces, two levers for effecting impressions from said type-wheel faces, respectively, means, substantially such as described, for actuating either one or the other of the same, a scape-wheel controlling the movements of said type-wheel faces, an anchor applied to said scape-wheel, and means, substantially such as described, for causing said scape-wheel to be disengaged from said anchor when both of said levers are actuated simultaneously.

9. The combination, substantially as hereinbefore set forth, with two type-wheel faces, of a scape-wheel and its anchor, two electro-magnets, their armatures, means, substantially such as described, for causing both of said armatures to be actuated simultaneously and to thereby cause said scape-wheel to be disengaged from its anchor, and a pin or detent moving with said scape-wheel which is engaged by said anchor at given point in the revolution of said type-wheels when said scape-wheel is out of engagement with said anchor.

10. The combination, substantially as here-
inbefore set forth, of two movable levers,
means, substantially such as described, for
moving either one or the other or both at will,
5 a tilting lever and its support, the respective
ends of which tilting lever may be engaged by
the first-named levers independently of each
other without interrupting their movements,
while both ends when simultaneously engaged
10 cause the said support to be moved and a uni-
son-stop for printing-telegraphs brought into
action through the instrumentality of said le-
vers.

11. A type-wheel for printing-telegraph in-
15 struments, constructed with two type-faces the
planes of which incline from each other, sub-
stantially as described.

12. A type-wheel for printing-telegraph in-
struments, having two type-bearing faces in
20 planes diverging from each other, in combina-
tion with a shaft to which said type-wheel is
coupled by a universal joint, substantially as
described.

13. The combination, substantially as here-
25 inbefore set forth, of a type-wheel having two
beveled bearing-faces, a shaft to which it is
coupled by a universal joint, and means, sub-
stantially such as described, for causing said
type-wheel to normally stand with its axis in
30 line with said shaft.

14. The combination, substantially as here-
inbefore set forth, of a type-wheel having two
beveled faces, a shaft to which it is coupled by
a universal joint, a printing-platen for effect-
35 ing impressions from the same, and means,
substantially such as described, for turning
said type-wheel so that it will present one or
the other of its faces to said platen.

15. The combination, substantially as here-
40 inbefore set forth, of a type-wheel having two
beveled faces carrying type, a printing-platen
for effecting impressions from one or the other
of said faces accordingly as one or the other
is presented thereto, two levers either of which

may be employed for actuating said platen, 45
and means, substantially such as described, for
causing said type-wheel to present one or the
other of its faces to said platen accordingly as
one or the other of said levers is actuated.

16. The combination, substantially as here- 50
inbefore set forth, of a type-wheel having two
beveled faces carrying type, a printing-platen
for effecting impressions from one or the other
of said faces accordingly as one or the other
is presented thereto, two levers either of which 55
may be employed for actuating said platen,
and means, substantially such as described,
for causing said type-wheel to present one or
the other of its faces to said platen accordingly
as one or the other of said levers is actuated, 60
and means, substantially such as described,
for causing one or the other or both of said
levers to be actuated at will.

17. The combination, substantially as here- 65
inbefore set forth, of a type-wheel having two
beveled faces carrying type, a printing-platen
for effecting impressions from one or the other
of said faces accordingly as one or the other
is presented thereto, two levers either of which
may be employed for actuating said platen, 70
and means, substantially such as described,
for causing said type-wheel to present one or
the other of its faces to said platen accordingly
as one or the other of said levers is actuated,
a unison device for said type-wheel which is 75
brought into action when both of said levers
are actuated, and means, substantially such
as described, for actuating either one or the
other or both of said levers at will.

In testimony whereof we have hereunto sub- 80
scribed our names this 10th day of May, A. D.
1884.

JOHN E. WRIGHT.
J. HOLMES LONGSTREET.

Witnesses:

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CHARLES A. TERRY.