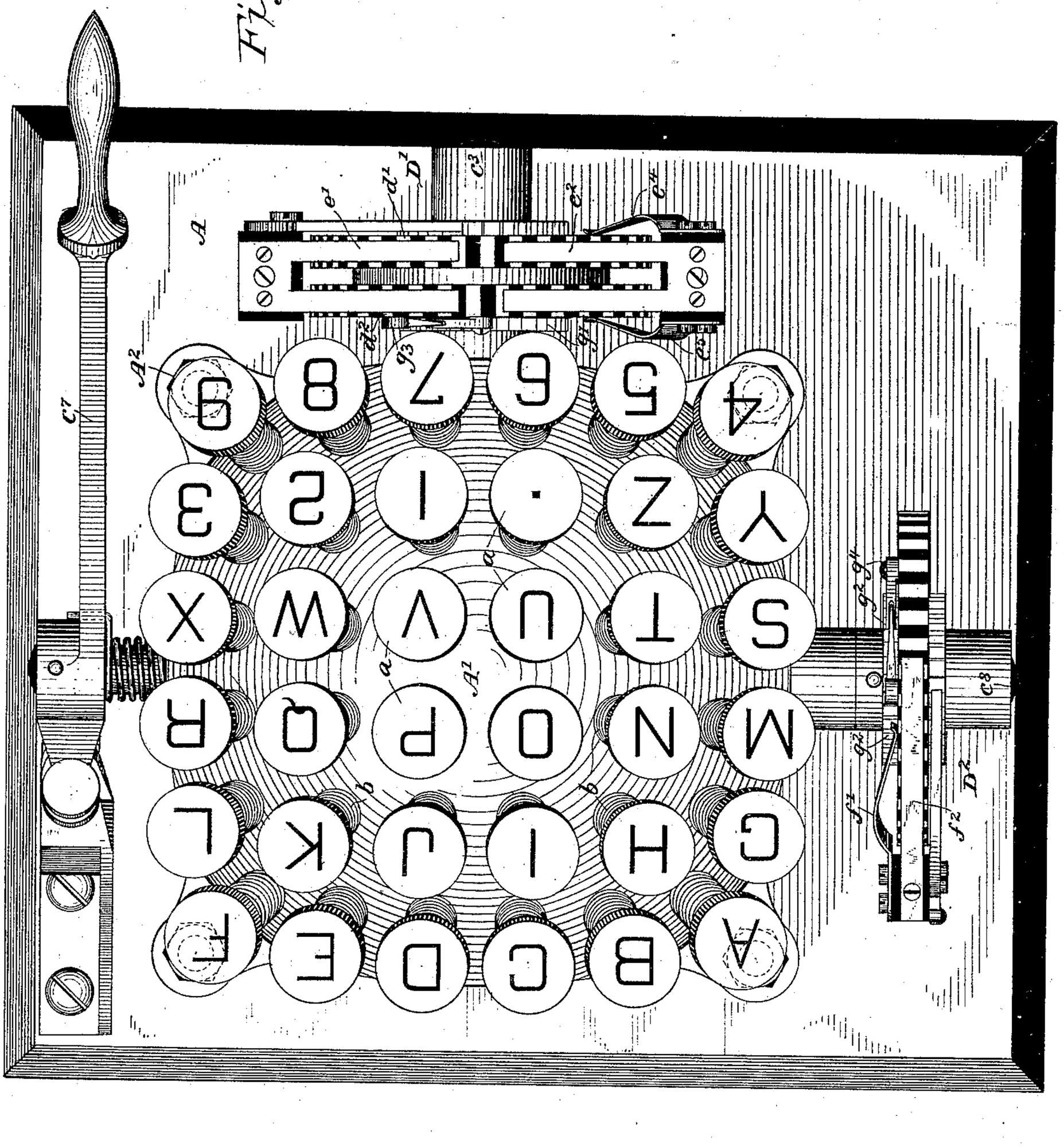
(No Model.) 5 Sheets—Sheet 1.

H. VAN HOEVENBERGH.

TRANSMITTER FOR PRINTING TELEGRAPHS.

No. 316,686. Patented Apr. 28, 1885.

Fig. 1.



Witnesses

Wm A. Skinkle.

Geo W. Young.

Inventor

Henry Van Hoevenbergh

By his Attorneys

Pope & Edgecomb

(No Model.) 5 Sheets—Sheet 2.

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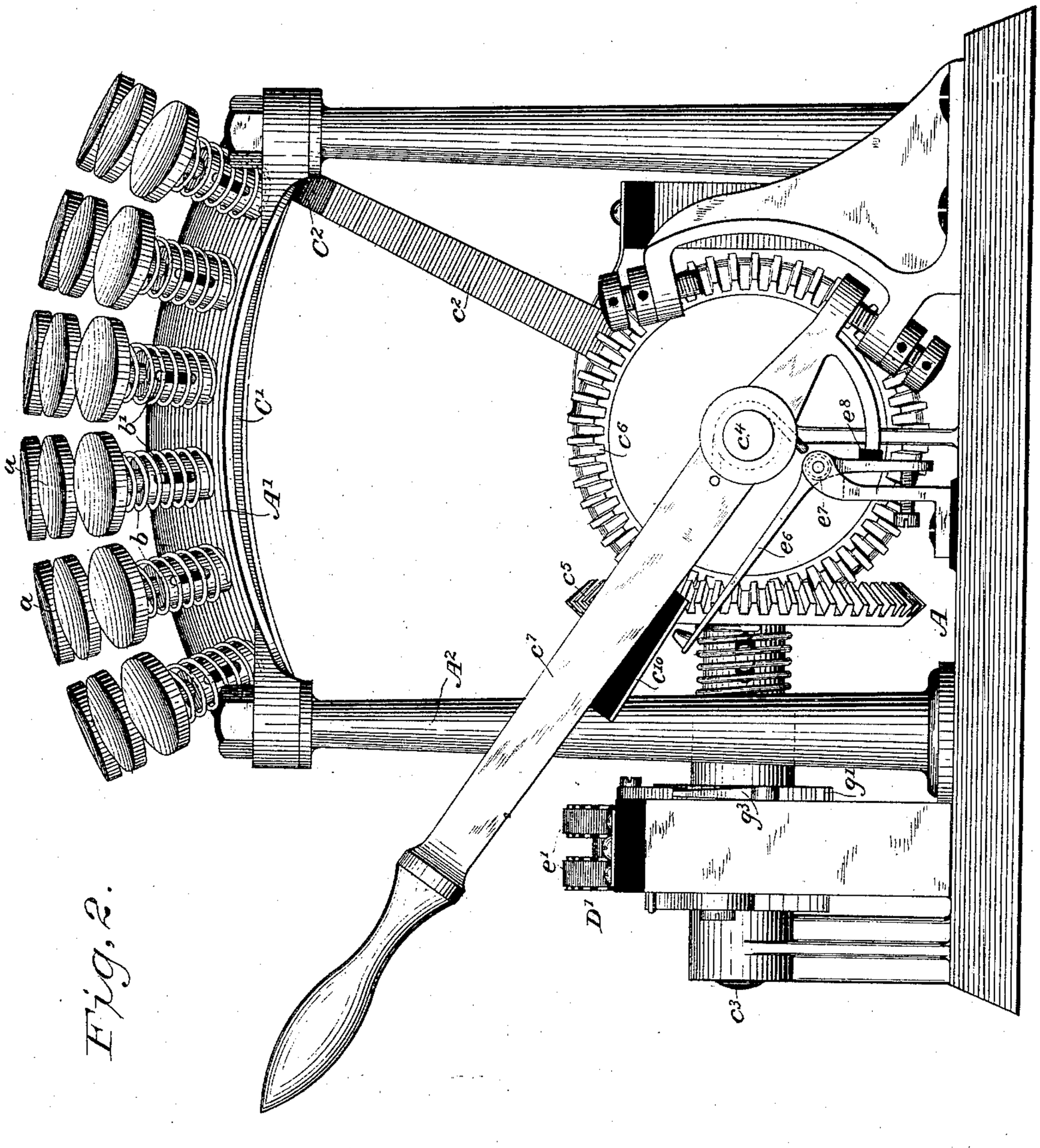

Fig. 2.

Witnesses
Wm A. Skinkle.
Geo W. Young.

Inventor
Henry Van Hoevenbergh
By his Attorneys
Pope & Edgecomb

(No Model.)

5 Sheets—Sheet 3.

H. VAN HOEVENBERGH.

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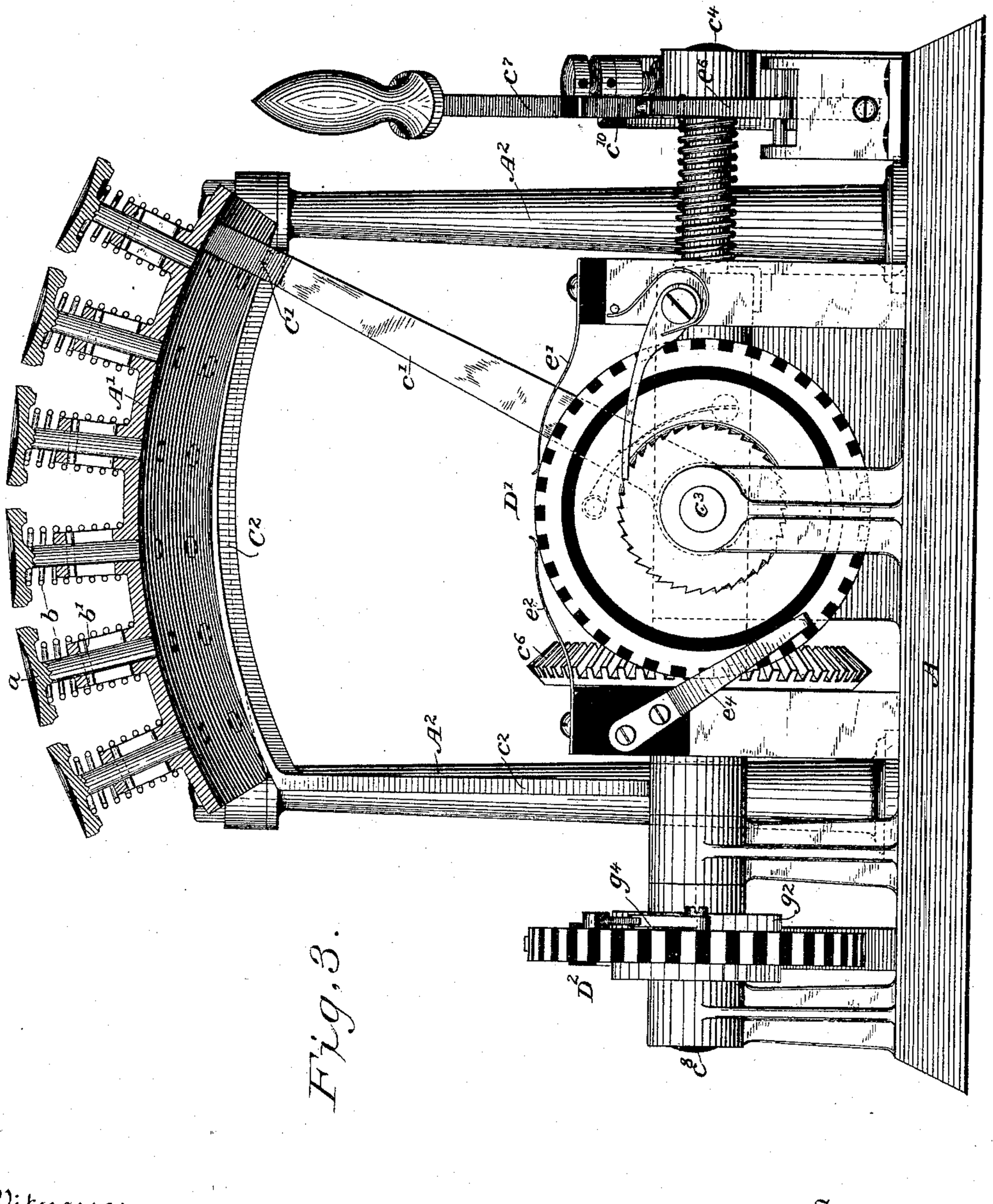

Fig. 3.

Witnesses
Wm A. Skinkle.
Geo W. Young.

Inventor
Henry Van Hoevenbergh.
By his Attorneys
Poole & Edgecomb

(No Model.)

5 Sheets—Sheet 4.

H. VAN HOEVENBERGH.

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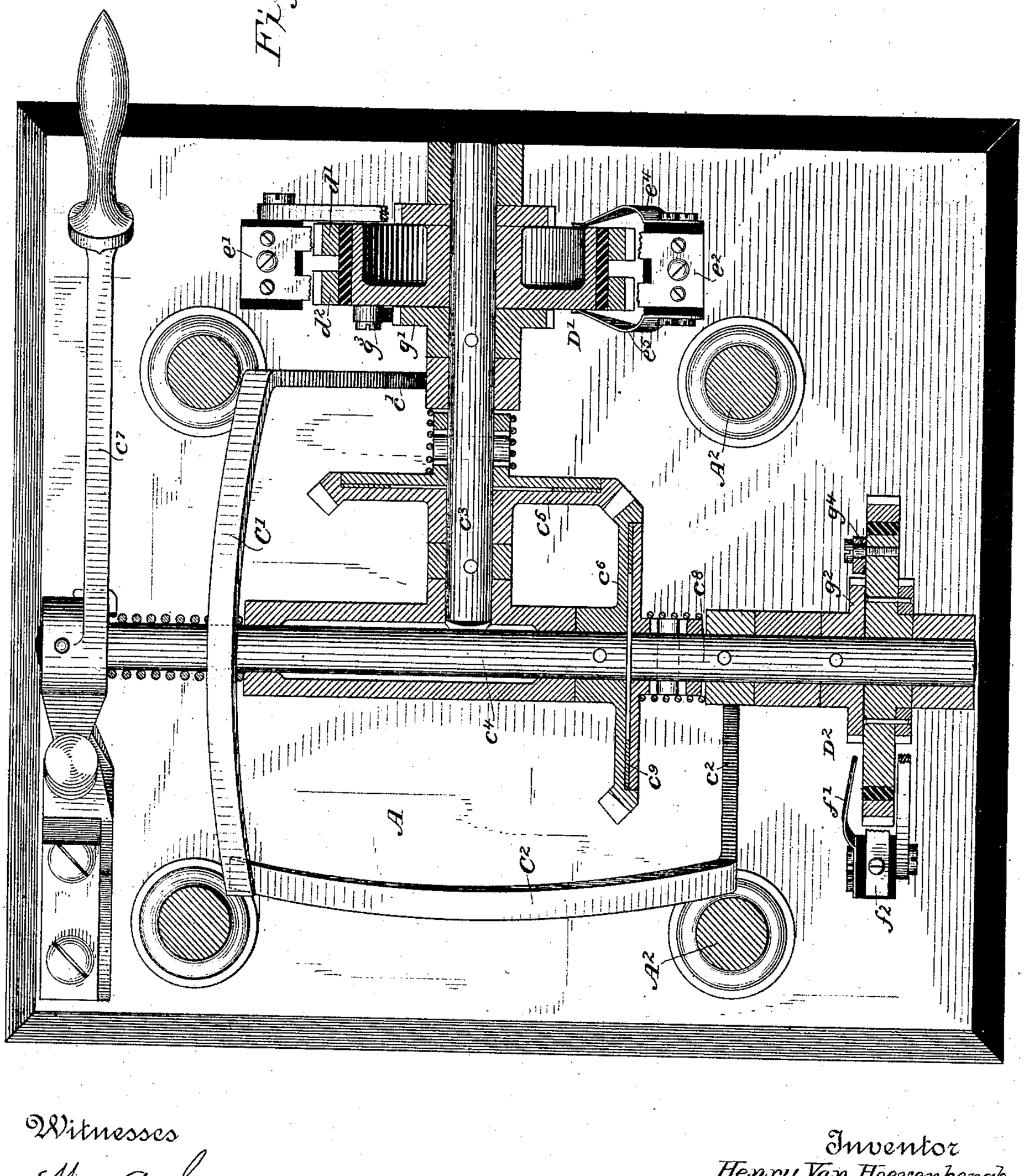
No. 316,686. Patented Apr. 28, 1885.

Fig. 4.



Witnesses
Wm A. Skinkle.
Geo W. Young.

Inventor
Henry Van Hoevenbergh
By his Attorneys
Popert Edgecomb

(No Model.)

5 Sheets—Sheet 5.

H. VAN HOEVENBERGH.

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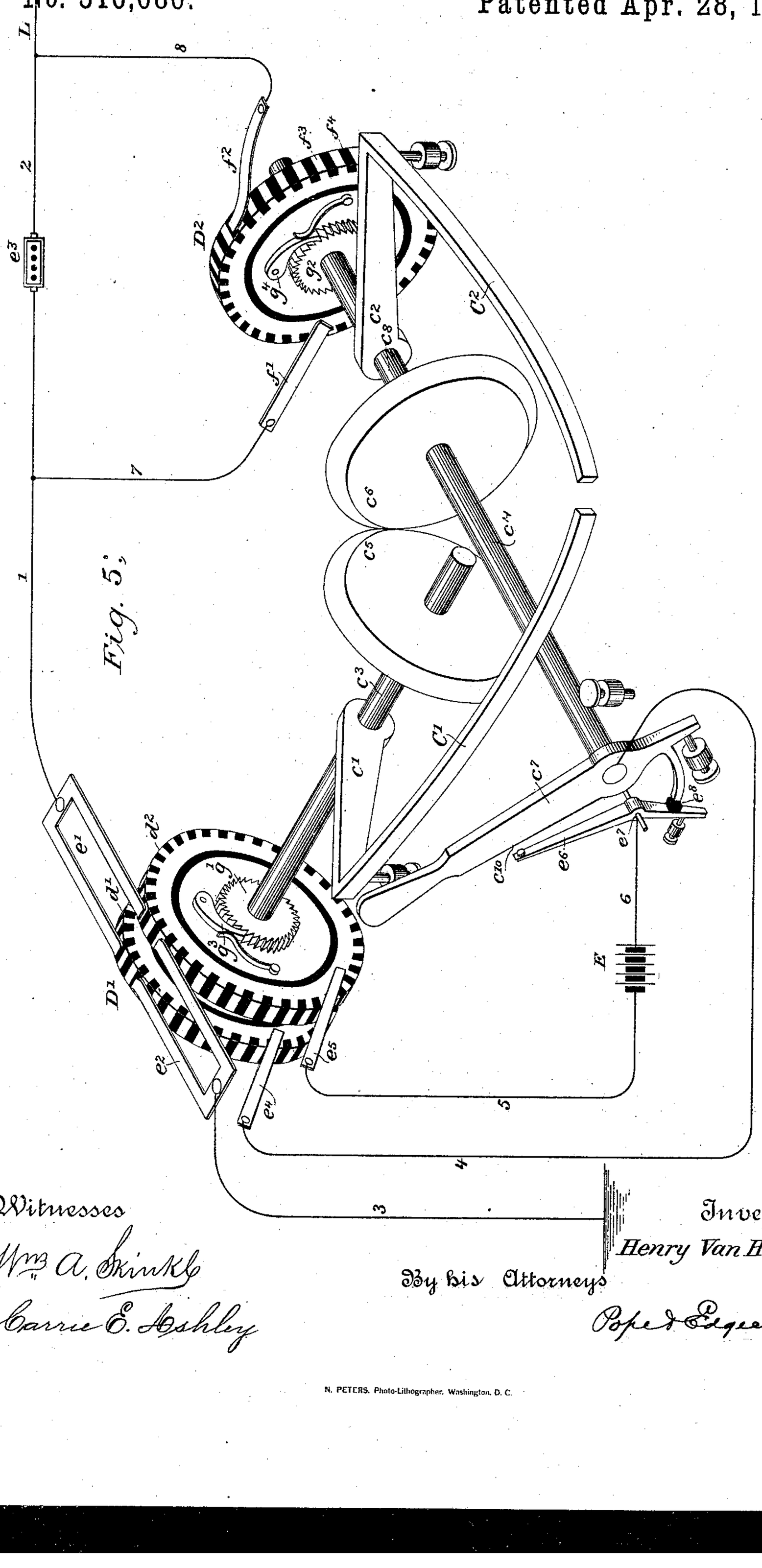

Fig. 5.

Witnesses

Wm. A. Skinkle

Carrie E. Ashley

Inventor

Henry Van Hoevenbergh

By his Attorneys

Pope & Edgecomb

UNITED STATES PATENT OFFICE.

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

TRANSMITTER FOR PRINTING-TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 316,686, 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 Transmitters for Printing-Telegraphs, of which the following is a specification.

My invention relates to the class of telegraphic apparatus employed for effecting by means of electric currents a record of communications which it is desired to transmit from one point to another by means of character-printing type. It has been customary for this purpose to employ type-wheels which are revolved by means of any suitable mechanism controlled by electric currents, the required type being thus successively brought into position to have impressions taken therefrom.

This invention is designed to provide a transmitter for a receiving-instrument in which type-wheels are dispensed with, and in place thereof there is employed a series of type arranged in a plane and supported upon a frame capable of being moved so that any one of the type which may be desired may be brought above the paper upon which the record is to be effected, and when in such position may be forced against the paper independently of the remaining type.

This application relates especially to the apparatus employed for transmitting the currents of the proper character, frequency, and duration for operating a receiving-instrument constructed upon such a plan, and in another application of even date herewith I have described and claimed such a receiving-instrument. In this application the receiving-instrument will be referred to and described to such an extent only as may be necessary for the purpose of fully setting forth the operation of the transmitter.

The general mode of operation of the receiver may be briefly stated as follows: The type are carried upon a flexible support, which is preferably rectangular in form, and they are arranged in longitudinal and transverse series, the faces of all the type standing in a plane. The parts are so constructed that the support may be moved so that the longitudinal series are successively brought above a printing-platen, or so that the successive transverse series may be brought in like manner above the platen, and it is further so organized that both movements may take place at once—that is to say, a resultant movement may be given to the type-support. When the proper type has been placed above the platen, an impression is effected therefrom by means of a hammer, which is forced downward against the flexible support by means of an electro-magnet, thereby causing the particular type desired to be struck against the paper.

For the purpose of accomplishing the several results above stated it is necessary to employ electric currents of a given strength and of either positive or negative polarity for moving the type in one direction, and currents of the same or of less strength and of a given polarity for moving the support in the other direction. If, therefore, the currents transmitted be of the greater strength and of the particular polarity required for occasioning the second movement—say, for instance, positive—both movements will take place simultaneously—that is to say, a resultant movement of the type-support will be occasioned. If, however, a positive current of less strength is employed, a movement of the series of type in one direction will be occasioned; but if a current of the negative polarity be transmitted the movement will be in the other direction. A third class of currents is required for the purpose of effecting impressions. These currents are of either polarity, but of greater duration than those employed for moving the type. An entire cessation of the currents effects a return of the support to its normal or starting position. In this application it is designed to set forth and claim the apparatus employed for transmitting in the proper manner these several classes of currents.

Referring now to the transmitting devices, the general organization of the apparatus is as follows: A series of keys corresponding to the type carried upon the flexible plate of the receiving-instrument is supported in a suitable frame, beneath which two arms are adapted to move at right angles to each other. For the purpose of permitting the arms to be readily moved beneath the keys, the frame is preferably in the form of a section of a globe,

and the arms, which are placed adjacent to the concave surface, are curved to coincide therewith. These arms, when the transmitter is operated, move simultaneously toward any key which may be depressed, and each arm is designed to transmit the required number of impulses for moving the plate of the receiving-instrument a sufficient distance in the corresponding direction to bring the type corresponding to the key which is depressed into position to print. Each arm is for this purpose provided with circuit-controlling devices adapted to transmit to line currents of the character required to move the receiving type-plate in the corresponding direction, and both arms are impelled by the same force, they being connected with each other through a friction-gearing. A portion, at least, of the movements is accomplished simultaneously by the two arms, and when one arm has reached the key which is depressed it is arrested thereby and retained until the other arm is likewise arrested. A prolonged current is then sent to line, and this current effects the printing. The transmitter is then so operated that it will return the arms to their original positions, first interrupting the current transmitted to line, and thereby permitting the receiver to resume its normal position.

The invention involves certain details of organization and construction, which will be fully set forth in connection with the drawings.

In the accompanying drawings, Figure 1 is a plan view of the transmitting key-board and circuit-controlling devices. Fig. 2 is a side elevation, and Fig. 3 is a transverse section, of the same. Fig. 4 is a plan view, partly in section, of the instrument, the key-board being removed. Fig. 5 is a diagram showing the organization of the transmitting-arms and the circuit-closers, together with the arrangement of the circuits.

Referring to the drawings, A represents a suitable base, upon which the various parts of the instrument are supported. A supporting-frame, A′, for the type is carried upon pillars or posts A^2, extending from the base A. The plate A′ is constructed in the form of a rectangular section of a globe. In the plate A′ there is carried a series of transmitting-keys, *a*, which are designed to be normally held upward, in the position shown in the drawings, by means of suitable springs, *b*, which surround the same, and are compressed between the plate and the head of the key. Suitable pin-and-slot couplings, *b*′, prevent the keys from being pressed out from the plate, and at the same time permit them to be pressed downward when actuated by the transmitting operator. Any convenient number of keys *a* may be employed. In the drawings I have shown thirty-six, and these keys are arranged in series extending in both directions across the plate A′. Beneath these keys it is designed that two transmitting-arms, C′ and C^2, shall be moved. These arms are curved so as to conform to the inner or concave surface of the plate A′, and they are respectively carried upon arms *c*′ and c^2, extending from shafts c^3 and c^8, constituting a prolongation of a shaft, c^4. The shaft c^3 is coupled to the shaft c^4 by means of two beveled frictional gear-wheels, c^5 and c^6. A suitable lever or other equivalent device, c^7, is attached to the shaft c^4, and this lever is employed for rotating that shaft, and also the shaft c^3, when it is desired to transmit the impulses required to actuate the receiver. It is designed that the lever c^7 shall be operated by hand. The portion c^8, however, of the shaft c^4 upon which the arm C^2 is carried is separated from the portion carrying the wheel c^6, and coupled therewith by means of a frictional connection or clutch, as indicated at c^9 in Fig. 4. This permits the movement which is communicated to the shaft c^4 by the lever c^7 to be imparted to the shaft c^3, even though the arm C^2 may be arrested, and the frictional connection permits the arm C^2 to be moved by the revolution of the shaft c^4, even though the arm C′ be arrested. When, however, the paths of both arms are uninterrupted, they will both be advanced by the action of the lever c^7. It will be seen that if any given key, *a*, be depressed and the lever c^7 be then actuated, both arms will move toward that key and each arm will continue to move until it is arrested by contact with the key. Each arm will therefore move through a given distance before it is arrested by the key depressed, and there will be for each key a certain movement of the arm C′ and a certain movement of the arm C^2. The combinations of these two movements are employed for transmitting the currents required for operating the receiver, and the combinations of the two classes of currents transmitted are employed for placing the receiver in position to print the letter corresponding to the key depressed. For this purpose a pole-changing device, D′, is applied to the shaft c^3, and a circuit closing and interrupting device, D^2, to the shaft c^8. The pole-changing device D′ consists of two alternating series of contact-segments, d' and d^2, against which rest two contact-brushes, e' and e^2. The brush e' is connected with a main line, L, through conductors 1 and 2, in the latter of which is included an artificial resistance, e^3. The brush e^2 is connected with the earth through a conductor, 3. The contact-brushes e^4 and e^5 press against the lateral surface of the two insulated plates carrying the contact-segments d' and d^2 of the pole-changer D′, and these brushes are connected through conductors 4, 5, and 6, respectively, with the positive and negative poles of a battery, E. The conductor 5 leads to the brush e^5; but the conductor 4 preferably leads to a contact-point, c^{10}, carried upon the lever c^7, to which is applied a contact-arm, e^6. This contact-arm is connected by means of a conductor, 6, with the positive pole of the battery E, and it is normally held away from the lever c^7. For

this purpose it is carried upon an arbor, e^7, and the friction between the lever and this arbor is sufficient to hold the arm in whatever position it is placed. When the lever c^7 is pressed downward for the purpose of actuating the transmitter, the contact-point c^{10} strikes against the arm, and the two conductors 4 and 6 are connected with each other by the contact of the lever with the arm, and the latter turns upon its arbor. The circuit of the battery E is thus completed from the positive pole, through the conductors 6 and 4, to the brush e^4, thence through the brush e' or e^2, accordingly as the one or the other rests upon a conducting-segment of the same. The negative pole of the battery is connected at the same time through the conductor 5 and brush e^5 to the section b^2, and thence through the remaining brush e^2 or e'. These two brushes are at the same time connected with each other, the brush e' being connected through the main line and with the earth at the distant station, while the brush e^2 is, as already stated, connected with the earth at the transmitting-station. When, therefore, the lever c^7 is actuated, the arm C′ will be advanced, and positive and negative impulses will be transmitted to line in number depending upon the position of the key which is depressed. The parts are preferably so organized that one positive impulse will be transmitted for each series of keys passed by the arm C′. These currents may, for convenience, be considered as reaching the main line through the conductor 2, including the resistance e^3, which serves to decrease the effective strength of the currents.

The second class of currents are derived by means of the circuit-interrupter D^2, which serves to complete and interrupt the connections of a shunt-circuit around the resistance e^3. For this purpose a contact-brush, f', is applied to the conducting-surface of the circuit-interrupter D^2, and this brush is connected with the conductor 1 upon one side of the resistance e^3 by a conductor, 7. A second brush, f^2, resting upon the periphery of the circuit-interrupter, is connected by a conductor, 8, with the conductor 2 upon the other side of the resistance e^3. When, therefore, any one of the conducting-segments f^3 of the interrupter D^2 passes beneath the brush f^2 or is in contact therewith, a shunt-circuit is formed around the resistance. When, however, a non-conducting segment, f^4, is in like position, this circuit will be interrupted. During the movement of the arm C^2, therefore, the resistance e^3 will be successively shunted, and the strength of the current transmitted to the line will be increased. The parts are so adjusted that the number of completions thus occasioned will be equal to the number of transverse series of keys which are passed by the arm C^2 before it is arrested. The two circuit-controlling devices D′ and D^2 are also preferably so organized relatively to each other that the reversals of polarity occasioned by the former will coincide in time with the completions and interruptions of the shunt-circuit around the resistance e^3. When, therefore, both arms C′ and C^2 are being simultaneously advanced, positive currents of the increased strength and negative currents of less strength will be transmitted to line. If, however, the arm C^2 be arrested and the arm C′ alone actuated, then only positive and negative currents of less strength will be transmitted to line. When, on the other hand, the arm C^2 alone is operated, currents of a constant polarity but of increased strength will be transmitted to line, and the parts are so organized that these currents will be of negative polarity, the arm C′ being so placed with reference to the keys that when arrested thereby the brush e' will be in contact with a conducting-segment of the negative portion d^2 of the pole-changer D′. When both arms C′ and C^2 have been arrested by contact with a depressed key, a prolonged current will be transmitted to line, and this current is employed for actuating the printing-magnet of the receiver.

For the purpose of obtaining an interruption of the current it is necessary only to release the lever c^7, which immediately falls away or is moved back from the contact-lever e^6, thereby interrupting the connections of the battery E. The arm e^6 is returned to its normal position by the contact of the lever c^7 with an insulated point, e^8, carried upon the extension of the arm or lever e^6.

It will be understood that it is necessary that the arms C′ and C^2 be returned to their starting-points without transmitting to line a series of impulses, as would be done by a backward movement of the circuit-controlling devices D′ and D^2. For this purpose the two devices are respectively coupled with their supporting-shafts by means of ratchet-wheels g' and g^2, which are secured to the shafts and are normally connected with the devices D by engaging pawls or clicks g^3 and g^4. These pawls cause the circuit-controllers to be advanced when the corresponding shafts are driven forward; but they permit the shafts to be returned to their normal positions without actuating the devices D′ and D^2 when the shafts are rotated in the opposite direction by sliding over the teeth of the corresponding ratchet-wheels.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of a series of transmitting-keys, two transmitting-arms respectively moving in directions at right angles to each other beneath the same, and a plate for supporting said keys, which plate is in the form of a section of a globe, means for arresting both of said arms either together or independently by any one of said keys, and means, substantially such as described, for transmitting impulses by the movements of said arms.

2. The combination, substantially as hereinbefore set forth, with a series of transmitting-keys and two transmitting-arms applied thereto and respectively moving in directions

at right angles to each other, of a pole-changing device moving with one of said arms, and a circuit completing and interrupting device moving with the other of said arms, a battery from which positive and negative impulses are transmitted by means of the first-named device, and an artificial resistance around which the second device serves to complete and interrupt a shunt-circuit, and means, substantially such as described, for permitting both of said arms to move simultaneously, or either to move independently of the other.

3. The combination, substantially as hereinbefore set forth, of a series of transmitting-keys, two circuit-closing arms, and means, substantially such as described, for moving said arms beneath said keys either independently of each other or both simultaneously, means, substantially such as described, for transmitting positive electric currents by the movement of one of said arms and currents of increased strength by the other, and means, substantially such as described, for determining the number and relation of the said currents by the key depressed.

4. The combination, substantially as hereinbefore set forth, with a series of transmitting-keys, of means, substantially such as described, for transmitting alternating positive and negative impulses of a number depending upon the lateral position of the respective keys, and means, substantially such as described, for transmitting currents of increased strength of the number dependent upon the longitudinal position of said keys.

5. The combination, substantially as hereinbefore set forth, with a series of keys, two circuit-controlling arms, and means, substantially such as described, for moving the same beneath said keys and for arresting the same by contact with any one of said keys which may be actuated, of means, substantially such as described, for transmitting currents of different characteristics by the movements of said arms, respectively, and for determining the number of such impulses of either characteristic by the position of the key which is actuated.

6. The combination, substantially as hereinbefore set forth, with a series of keys, of a plate for supporting the same, which plate is in the form of a segment of a globe, two curved arms extending at right angles to each other beneath said plate, two shafts respectively supporting said arms, and means, substantially such as described, for rotating said shafts both simultaneously until one or the other or both are arrested by contact with any one of said keys which may be depressed.

7. The combination, substantially as hereinbefore set forth, with a series of keys and two transmitting-arms extending beneath the same, of two revolving shafts frictionally connected with each other, carrying said arms, a pole-changing device moving with one of said shafts, a circuit-interrupting device moving with the other, a battery from which positive and negative impulses are transmitted by the action of said pole-changing device, and means, substantially such as described, for causing an increase in the strength of the current at any time transmitted through the action of said circuit pole-changing device.

8. The combination, substantially as hereinbefore set forth, with the arms C′ and C² and the frictional gearing between the same, of the pole-changing device D′, the circuit completing and interrupting device D², means, substantially such as described, for actuating said devices, the actuating-lever c^7, the contact-arm e^6, the battery E, the resistance e^3, and the circuit-connections for the same, substantially such as described.

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

HENRY VAN HOEVANBERGH. [L. S.]

Witnesses:
DANL. W. EDGECOMB,
CHARLES A. TERRY.