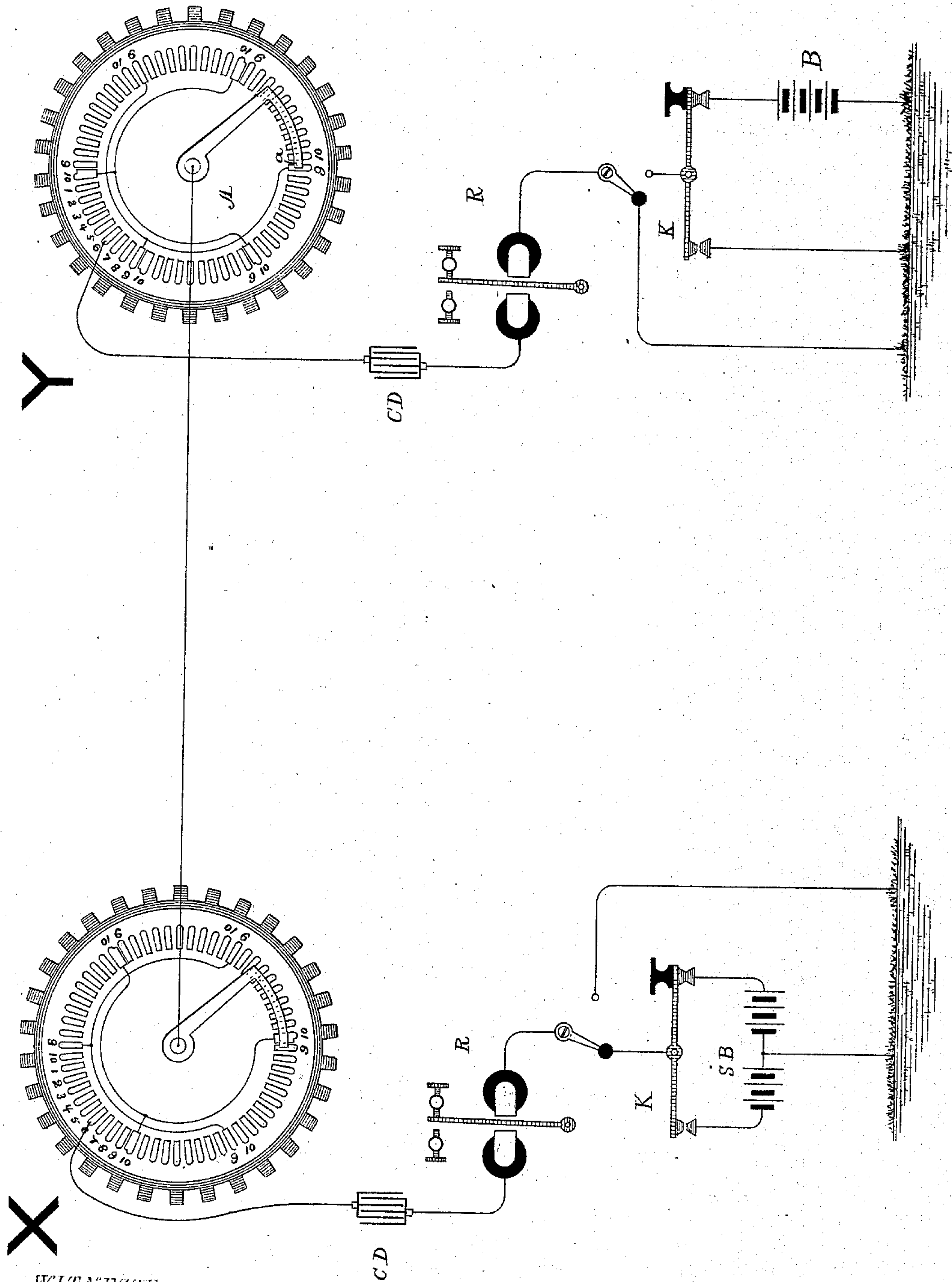


(No Model.)

P. B. DELANY.
SYNCHRONOUS TELEGRAPHY.

No. 322,427.

Patented July 21, 1885.



WITNESSES

Wm A. Shunk
Henry A. Lamb

INVENTOR

Patrick B. Delany
By his Attorneys
Baldwin, Hopkins & Peck

UNITED STATES PATENT OFFICE.

PATRICK B. DELANY, OF NEW YORK, N. Y., ASSIGNOR TO THE STANDARD
MULTIPLEX TELEGRAPH COMPANY, OF SAME PLACE.

SYNCHRONOUS TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 322,427, dated July 21, 1885.

Application filed February 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, PATRICK B. DELANY, of the city, county, and State of New York, have invented certain new and useful Improvements in Telegraphy, of which the following is a specification.

My invention relates, generally, to that class of telegraphic systems in which the transmitting-current is made up of a series of rapid vibrations or impulses, and in which each signal is made by the action of a number of such impulses or vibrations, or in which such rapid impulses are utilized to actuate step-by-step mechanism, as in printing-telegraphs. It specially relates to the system of synchronous telegraphy disclosed in Letters Patent granted to me on the 9th of October, 1883.

The object of the invention is, primarily, to prevent chattering or vibration of the receiving-armature on its contacts; and this I accomplish by the use of condensers.

I am aware that on long cables condensers have been employed and placed between the cable and the receiving-instruments and between the cable and the transmitting-instruments, and I therefore make no claim to such broad ground.

I am also aware of the British patent of Varley, No. 1,044, of April 8, 1870, in which condensers are used in connection with undulatory or vibratory currents, each receiving-instrument being thrown into vibration by the fundamental sympathy of that instrument for the particular group of vibrations transmitted over the line for the purpose of actuating it.

The subject-matter of my invention is fully set forth below.

The accompanying drawing is a diagram view illustrating two connected stations organized according to my invention.

In several Letters Patent of the United States granted to me October 9, 1883, I have shown an arrangement of correcting contacts such as illustrated in the drawing. I have also in said patents fully described and illustrated means by which the trailing finger *a* at each station is caused to rotate synchronously over the table A of contacts.

The several Letters Patent above referred to illustrate several different ways of maintain-

ing the synchronous movement of the circuit-completers at each end of the line, any one of which may be adopted in the present case.

In Letters Patent No. 286,278, of October 9, 1883, I have shown a table of sixty contacts, numbered, in six series, from 1 to 10, the 9's and 10's being devoted to synchronous correction, thus leaving six groups of eight contacts each devoted to telegraphic purposes. In that patent I have also illustrated and described the manner in which these contacts could be connected up into independent circuits for multiplex transmission, so that as the trailing fingers rotate synchronously at each station each independent circuit would be completed about thirty-four times a second, so that the transmitting-current for each circuit was made up of a series of rapid impulses or vibrations. In the present case I have shown a table of sixty contacts, and they may be connected in the same way. It is therefore unnecessary to elaborate the drawing or enter into any detailed description of that arrangement.

It has been deemed sufficient to show in the drawing telegraphic apparatus connected with one contact at one station and telegraphic apparatus connected with the corresponding contact at the other station. It will of course be understood that any desired number of working-contacts may be connected in circuit with this contact at each station, so that as the trailing fingers rotate at each station the circuit from the instruments at one station to those at the other will be rapidly made and broken at the rate of about thirty-four impulses (more or less) per second. Signals transmitted over such a vibratory circuit, when received upon ordinary instruments, or even upon polarized relays, are liable to be imperfect on account of the chattering or singing of the receiving-armature on its contact, caused by the makes and breaks in the circuit.

The object of my invention is to overcome this difficulty, and provide an effective means whereby the signals may be received distinctly and sharply and with perfect accuracy.

While, as above remarked, this invention is designed by me for use specially in connection with my improved system of synchronous telegraphy, it may be used in any system in which signals or impulses of electricity are

transmitted by means of a vibratory current or one made up of fine impulses.

Between the contacts at each station and the receiving polarized relay R, I place a condenser, C D. Each line is also equipped with an ordinary reversing transmitting-key, battery, and switch. Assuming that on the circuit illustrated a message is being transmitted from X to Y, the manipulation of the key K alternately puts the opposite poles of the split battery S B to line, thus creating alternating electrostatic conditions in the condensers and operating the polarized relay at station Y, causing it to respond to the working of the key at X. While the key K is on one pole of the battery in the operation of making a signal the circuit will be completed from the same pole of the battery a number of times; but the impulses after the first will not affect the receiving-relay armature, which remains in the position into which it is drawn until a reversal of the current is effected, because no change in the electric condition of the line can take place until the opposite pole of the battery is put to the line. The succeeding impulses, therefore, beyond the first one required to affect the condensers and the receiving-relays, being of the same polarity, will not occupy the line to any extent. On the contrary, in the ordinary system, in the formation of a letter over an interrupted circuit, ten or twelve pulsations (more or less) might be transmitted direct from the battery—that is, successive pulsations would be transmitted so long as the operator's key remained closed upon the front stop, and also on the back stop when working with reversed batteries, thereby loading the line with numerous impulses. By the use of condensers, owing to the conditions above mentioned, the ordinary static charge of the line is lessened, and effects of earth or other currents are greatly or entirely overcome, for the reason that there is no metallic continuity of the line. The intensity of the current from the condenser is greater than the ordinary battery-current, and manifests its charge more quickly at the distant end of the line. The "variable period" of the line is therefore lessened, and the armatures of the receiving-relays move with great quickness and precision.

At station Y, I have shown an ordinary arrangement for transmission from a single pole of the battery B. Under this arrangement the electrostatic conditions created by the condensers are alternated by the alternate connection of the line with the ground and battery. In practice I would of course prefer to have the organization at each station alike.

The two arrangements have been shown in the diagram for convenience of illustration merely.

The condensers are shown as located between the main line and the receiving-relays. They might, however, be located between the instruments and the ground. The mere location is immaterial, so far as my invention is concerned.

My invention may be worked with advantage with a condenser placed at either end of the line or somewhere in the circuit. I prefer, however, to place condensers at both ends of the line, as described.

I claim as my invention—

1. The combination of an electric circuit, a condenser or condensers therein, a source of electric energy, means, substantially such as described, for rapidly interrupting the circuit or subdividing the transmitting-current into a number of distinct impulses, transmitting devices, and receiving devices consisting of a magnet or magnets and a rocking or vibrating armature, each actuation of which constitutes a distinct signal or determinate portion thereof, the arrangement being such that each of said unitary signaling movements occurs while a group of said distinct electrical impulses is sent into the line.

2. The combination, with a system of telegraphy in which during the formation of each signal a number or group of distinct impulses are sent into the line, of one or more condensers in the circuit, transmitting-instruments, and a receiving-instrument consisting of a magnet or magnets and a rocking or vibrating armature which makes one unitary movement in response to each group of impulses sent into the line.

3. The combination, in a system of telegraphy in which the transmitting-current is divided into a number of distinct impulses, of an electric circuit, one or more condensers therein, transmitting devices, and means whereby a number or group of said distinct impulses are sent into the line for the transmission of a unitary signal, and receiving devices consisting of a magnet or magnets and a rocking or vibrating armature which makes one unitary movement in response to each group of impulses sent into the line.

4. The combination, in a system of telegraphy in which the transmitting-current is divided into a number of distinct rapid impulses, of an electric circuit, one or more condensers therein, telegraphic transmitting-instruments, and receiving polarized relays.

5. The combination, in a system of telegraphy in which the transmitting-current is divided into a number of distinct rapid impulses, of an electric circuit, telegraphic transmitting-instruments and polarized relays at each end of the line, and a condenser at each end of the line interposed between said relays and the main line.

6. The combination, substantially as set forth, of a main line, synchronously-actuated apparatus at each end of the main line, a table of contacts with which the line is successively momentarily connected by the rotation of said synchronous apparatus at each end of the line, telegraphic transmitting-instruments at one station connected with one or more of said independent contacts, receiving-instruments at the other station connected with the corresponding one or more contacts at that station,

and one or more condensers in the circuit of said transmitting and receiving instruments.

7. The combination, substantially as set forth, of a main line, synchronously-actuated
5 apparatus at each end of the main line, a series of independent contacts with which the main line is successively momentarily connected by the rotation of the synchronous apparatus at each station, telegraphic transmitting
10 apparatus at one station connected with one or more of said contacts, a condenser in circuit with said transmitting-instruments and

polarized receiving-relay at the other station connected with the one or more corresponding contacts at that station, and a condenser 15 in circuit with said receiving-relay.

In testimony whereof I have hereunto subscribed my name this 20th day of February, A. D. 1884.

PATRICK B. DELANY.

Witnesses:

EDWD. A. CALAHAN,
FRANK W. JONES.