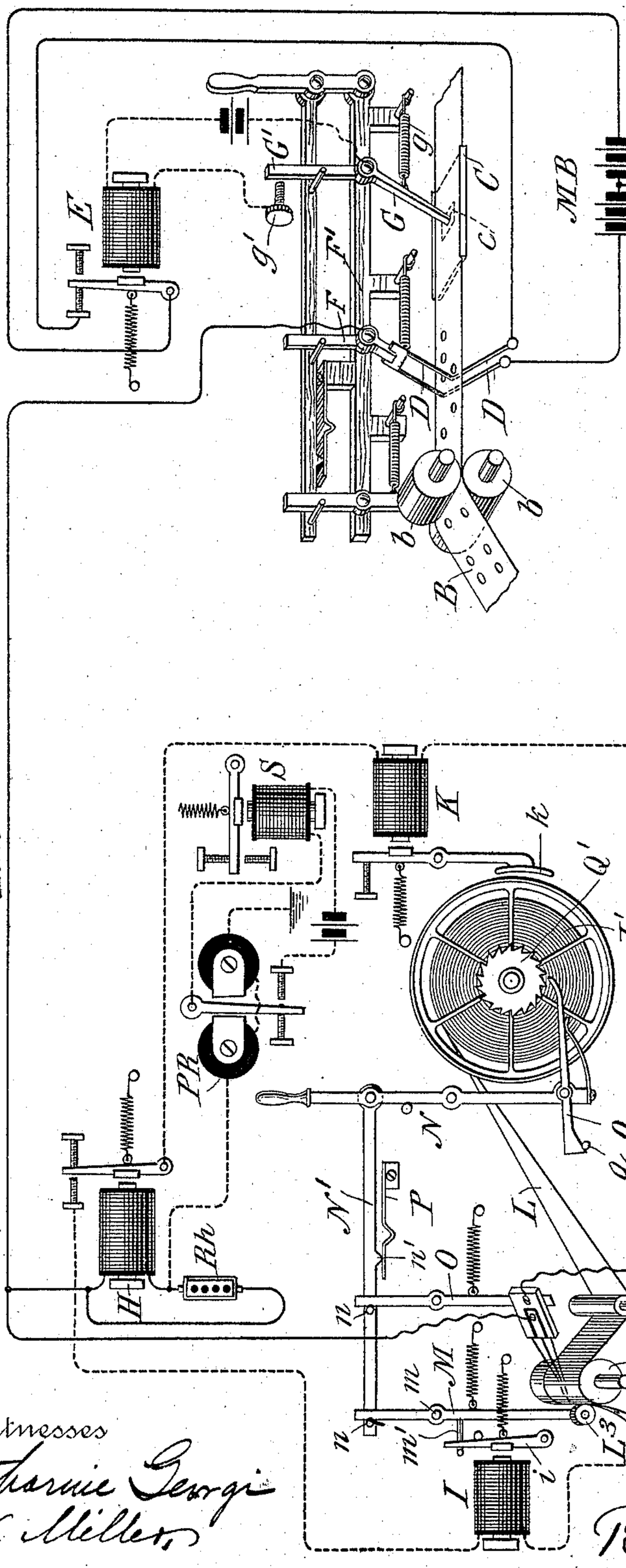
(No Model.)

P. B. DELANY.

TELEGRAPHY.

No. 575,419. Patented Jan. 19, 1897.



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TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 575,419, dated January 19, 1897.

Application filed April 21, 1896. Serial No. 588,481. (No model.)

To all whom it may concern:

Be it known that I, PATRICK BERNARD DELANY, a citizen of the United States, residing at South Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Telegraphy, of which the following is a specification.

My invention relates to automatic or machine telegraphy in which the sending of the transmitted impulses is effected by a tape or ribbon perforated, embossed, punctured, or slit according to any of the well-known methods that have been suggested in that respect, and in which such impulses are received upon a chemical recorder employing a ribbon or strip of paper or suitable material upon which the transmitted impulses in the form of dots, dashes, or other characters are developed or recorded. In the special embodiment of my invention herein illustrated and described I have shown it applied in connection with a system of transmission such as is shown in my Letters Patent No. 536,420, dated March 26, 1895, and a system of reception such as is disclosed in my Letters Patent No. 541,967, dated July 2, 1895.

The objects of my invention are to prevent the short-circuiting of the transmitting-battery when the transmitting-tape has run out of the instrument, to at such time automatically stop the feed of the receiving-tape and arrest the reel from which it is being drawn, and in starting the receiver to impart to the reel carrying the roll of receiving-tape an initial impulse of rotation, thus supplying at the commencement of the receiving operation a reserve of slack tape and eliminating from the action of the apparatus the inertia of the reel, which, if the receiver were running at relatively high speed, might cause the rupture of the chemically-treated tape.

The invention further contemplates the use of a telltale at the receiver audibly indicating that a message is being received regularly and by its behavior showing any breaks of the circuit, accidental or otherwise, and the telltale is so organized and of such character as to be a self-induction generator that may be utilized to counteract the tailing effects of the transmitted signal impulses.

These features, so far as I am aware, are new with me, and it will be obvious to those skilled in the art that various ways of effecting such ends may be devised. I do not, therefore, limit myself to the specific mechanism or apparatus which I have illustrated herein, although such organization is the best now known to me and well adapted to meet the requirements of my invention.

The accompanying drawing is a diagrammatic view illustrating a main line and a transmitting and receiving station at the respective ends thereof.

At the transmitting-station A, I have shown a perforated transmitting-ribbon B, which is drawn by means of rolls *b* from any suitable storage-reel (not shown) through a guide or gutter C and between pairs of transmitting contact-fingers D. The upper contact-fingers are respectively opposite the lower contact-fingers, and the arrangement is such that when a perforation in the ribbon coincides with the ends of either pair of the contact-fingers such fingers come into contact through the perforation and effect the transmission of an impulse of electricity from the main battery MB, either of positive or negative polarity, as the case may be. Thus the upper fingers D are connected with the line and the lower fingers are respectively connected with the opposite poles of the main battery, one of them being so connected through the back-stop and armature-lever of a relay E. The upper contact-fingers D are movable, being carried by a lever F, pivoted on a frame F′, and drawn down, having an adjusting-spring that causes the fingers to bear upon the ribbon B. The upper roll *b* is similarly mounted. Pins on an endwise-movable bar engage the upper ends of these levers when the bar is moved to the right and lift the upper roll *b* on upper fingers D. The lower roll *b* may run continuously, if desired. In the rear of the fingers is an angular dog or lever, also pivoted in the frame, and one end of which, G, bears upon the upper surface of the transmitting-ribbon and is normally drawn downward by a spring *g*, and is also controlled in position by a pin on the endwise-movable bar. The upper end G′ of this lever works against a contact-stop *g′*. The lever is connected through the coils of the relay E to one pole of the local battery, the opposite pole of which is connected with the

stop g'. The general arrangement is such that when the paper is passing under the end G of the lever the opposite end G′ is held out of engagement with the stop g'. In the guide or gutter C, immediately beneath the end G of the lever, is a depression or perforation, (marked c and indicated by dotted lines.) When the transmitting-ribbon has run out of the instrument, the end G of the lever falls into the depression c and its opposite end G′ rises and makes contact with the stop g'. The local circuit of the relay E is thus closed and its armature is attracted from its back-stop, thus interrupting the normal path of the current from one of the lower contact-fingers to the main battery, and prevents the short-circuiting of this section of the battery. Of course the dog G G′ might be arranged to open the battery-circuit direct without the use of a local circuit and magnet E.

The transmitting-ribbon having run out of the instrument, the upper and lower contact-fingers D will for a moment (and until the operator has moved the bar F′ to elevate the fingers) be in contact, and consequently one pole of the main battery will be to line, (both of the upper contact-fingers being in the drawing shown as permanently connected with the line.) A prolonged impulse from one pole of the battery will therefore traverse the line. At the receiving-station the line runs to the styluses of the chemical recording device, and there is a branch or derived circuit through the coils of a relay H to ground. A rheostat Rh may be placed in shunt around the relay for adjustment. This relay is so adjusted as not to be responsive to the brief and rapidly-succeeding signaling impulses, but upon the prolonged impulse referred to the relay attracts its armature and closes a local circuit containing a local battery $l\,b$, in which are included two magnets I K, which, being energized and attracting their armatures, perform the functions hereinafter described. The chemically-prepared receiving-ribbon L is drawn from a reel L′ by a power-driven roll L^2, between which and a pressure-roll L^3 the paper ribbon passes. The pressure or feed roll L^3 is carried upon the end of a vertical lever M, pivoted at m and having a spring that normally draws the roll L^3 against the power-driven roll L^2. On the vertical lever M, below its pivot, is a yoke, bail, or hook m', between the inner side of which and the lever is located the pivoted armature-lever i of the magnet I, and when the apparatus is in condition for reception and the tape is passing between the rolls L^2 L^3 and the armature-lever i is drawn against its back-stop there is a space or free way between the armature-lever and the bail or hook m'. When upon the reception of the prolonged impulse, as above described, the armature-lever of the magnet I is attracted, it moves forward unobstructed until it strikes against the bail m', when the lever M is drawn forward by it and the roll L^3 lifted from the receiving-tape. The draft upon the tape is thus stopped and at the same moment the magnet K, attracting its armature-lever, applies the brake k to the reel and arrests its rotation. There is therefore no waste of paper and no accumulation of slack between the roll L^2 and the reel.

Ordinarily in mechanism of this class the receiving operator must determine by observation of the tape when the message is finished, and consequently there has always been a large waste of the prepared tape, and of course the waste is relatively greater as the speed of transmission and reception is increased.

The receiving operator, noticing that the feed of the receiving-tape is arrested, immediately manipulates the vertical pivoted lever N, which has pivotally connected with it a horizontal arm N′, having thereon two pins $n\,n$, which normally respectively engage the upper ends of the vertical lever O, to which the recording-styluses are attached. The movement of the lever N to the right therefore elevates the styluses from the paper tape and brings the pin n, that engages the lever M, up against that lever, so that it is retained in the position it has been caused to assume by the draft of the armature-lever i. A tooth n' on the horizontal arm N′ on this latter engages a notch in the horizontal plate or spring P and retains all the parts in the position they are caused to assume when the lever N is moved to the right, and thus upon the demagnetization of the magnet I the roll L^3 is prevented from coming in contact with the tape, and the reel and tape are at rest. The lower end of the lever N carries a pawl Q, that is normally pressed toward a ratchet-wheel Q′ on the reel by a suitable spring, and is formed with an inclined face at its outer end, that runs upon a pin q, so that in the normal condition of the apparatus, when the receiving-tape is being drawn forward, that is, when the parts are in the condition illustrated in the drawing, the pin q depresses the pawl Q and holds it out of engagement with the ratchet-wheel on the reel, thus permitting the free rotation of the wheel under the draft of the tape.

Assuming that the operations described have taken place and that the receiving operator has moved the vertical lever to the right, and that the receiving apparatus is at rest, except the roll L^2, which is preferably constantly driven, the incline on the end or heel of the pawl will have passed out of engagement with the stop-pin q and the end of the pawl will engage the ratchet-wheel on the shaft of the reel. If now upon the reception of a signal from the station A indicating that a message is to be sent the receiving operator throws the lever N to the left, the following things occur: The pawl Q, acting upon the ratchet-wheel, imparts an impulse of rotation to the reel of the receiving-tape, and then the inclined heel of the pawl runs upon

the pin q and the pawl is thrown out of engagement with the ratchet, permitting the further free revolution of the reel. The pin n having been carried away from the end of the vertical lever O, the recording-styluses are lowered upon the tape, and similarly the feed or pressure roll L^3 is permitted to descend upon the tape, which is lying upon the face of the constantly-revolving roll L^2. The instrument is therefore thrown into operation, but there has been an accumulation of slack tape and an impulse of rotation is imparted to the reel, so that at any speed that it may be overtaken there is a minimum strain upon the tape and breakage of it is avoided.

In order that the operator in charge of the receiver may know that the transmission of a message is continuing regularly, I provide a telltale that audibly indicates such regular transmission and shows any break or interruption therein. The arrangement to this end may be as follows and as indicated at the receiving-station in dotted lines, such mode of illustration being adopted to avoid confusion: The circuit after passing through the neutral relay or magnet H, as shown by the dotted lines, passes to a polarized relay PR and thence to earth. The local circuit of the sounder S is controlled by the polarized relay. The transmitted impulses are of varying polarity to cause the operation of the polarized relay and the sounder to audibly indicate to the operator that the signaling impulses are arriving in proper regularity. Should the circuit be interrupted for any cause, the cessation of action of the polarized relay or sounder will indicate to the operator that there is some break or disturbance in the circuit. The sounder may of course be dispensed with and the relay be relied upon to give the necessary indication. This arrangement I have called a "telltale" device. The self-induction of the magnet H and of the polarized relay PR may be regulated by shunts and resistances, so as to neutralize the tailing effects of the signaling-current, as is well understood, and these devices in that sense I have termed a "self-induction generator."

I claim as my invention—

1. In an automatic transmitter adapted to be operated by a prepared tape or ribbon to send successive signaling impulses into the line, the combination of the contact devices controlled by the tape, to make and break connection of the battery with the line and to close the circuit of the battery after the passage of the tape, the main battery, and means for automatically preventing the short-circuiting of the battery at the transmitting-station when the transmission of the message is completed.

2. In an automatic transmitter, the combination of the opposed contact-fingers, which come in contact through openings or perforations in the transmitting-tape, and also after the passage of the tape, the main battery connected with such contact-fingers, and means for automatically preventing the short-circuiting of the main battery at the transmitting-station when the transmission of the message is completed.

3. The combination of the opposed contact-fingers adapted to make contact through the openings or perforations in the transmitting-tape and also after the passage of the tape, one set of the fingers being connected with the line and the other set respectively with the opposite poles of the split main battery, and means for preventing the short-circuiting of the main battery at the transmitting-station when the transmission of the message is completed.

4. In an automatic transmitter, the combination, substantially as set forth, of the main battery, the contact devices controlled by the transmitting-tape, the magnet included in the local circuit, and means for causing such magnet to effect the opening of one side of the circuit of the main battery at the transmitting-station when the transmission of the message is completed.

5. In an automatic transmitter, the combination of a transmitting-tape having two lines of perforations, one for transmitting impulses of one polarity representing dots, and the other for transmitting impulses of another polarity representing dashes, a divided main battery, two contact-fingers on one side of the tape and respectively in line with the lines of perforations and respectively connected with opposite poles of the divided battery, a contact upon the opposite side of the tape connected with the line and with which either of the first-named contact devices is adapted to make contact through the perforations in the tape, and also after the passage of the tape, and means for preventing the short-circuiting of the battery through the local circuit established after the passage of the transmitting-tape.

6. In an automatic telegraph, the combination of the transmitter adapted to send successive signaling impulses, and at the termination of the transmission of the message a prolonged impulse over the line, of a receiving instrument having means for drawing the paper receiving-tape independently of received signaling impulses and means for automatically stopping the strain upon the receiving-tape and arresting the reel thereof on the reception of such prolonged impulse.

7. In an automatic telegraph, the combination of a transmitter adapted to send successive signaling impulses, and at the termination of the transmission of a message a prolonged impulse over the line, means for drawing the paper receiving-tape independently of the received signaling impulses of a relay or magnet irresponsive to such signaling-currents, but responsive to such prolonged currents, a local circuit controlled by said magnet, and electromagnetic devices therein for stopping the strain upon the receiving-tape and arresting the rotation of the reel.

8. In a telegraph-receiver in which the received message is recorded upon a tape, the combination of means for imparting an impulse of rotation to the reel, and means for at the same time throwing into effective action the drawing or feeding devices by which the tape is drawn from the reel.

9. In an automatic telegraph, a receiving instrument having a magnet irresponsive to the rapid signaling impulses, but responsive to a prolonged impulse received over the line, means for drawing the paper receiving-tape independently of the received signaling impulses and means for stopping the strain or draft upon the receiving-tape and arresting the rotation of its reel upon the actuation of the magnet by such prolonged impulse.

10. In an automatic telegraph, a receiving instrument having a magnet irresponsive to the rapid signaling impulses, but responsive to a prolonged impulse received over the line, and means for stopping the strain or draft upon the receiving-tape and arresting the rotation of its reel upon the actuation of the magnet by such prolonged impulse, in combination with means for imparting an impulse of rotation to the reel of the receiving-tape and at the same time throwing into effective operation the draft or feeding devices that draw the tape from the reel.

11. In an automatic telegraph receiving instrument, the combination of the receiving-tape and its reel, the drawing or feeding devices for drawing the tape from the reel, means for automatically stopping the effective strain of the drawing or feeding devices upon the tape, and at the same time arresting the rotation of the reel, and means for throwing the receiving-tape again into operation, consisting of devices whereby an impulse of rotation is imparted to the reel and the feeding or drawing devices thrown into effective action, substantially as set forth.

12. In a chemical telegraph system in which signaling-currents of both polarities are transmitted, a receiver, comprising the combination with separate styluses for recording dots and dashes and the circuit in which they are located, of a polarized relay in shunt-circuit therewith, and responding to the changes in polarity of the transmitted signaling impulses to serve as a telltale or indicator.

13. In a chemical telegraph system in which signaling-currents of both polarities are transmitted, a receiver, comprising the combination with separate recording-styluses for recording dots and dashes and the circuit in which they are included, of a polarized electromagnetic device in derived or shunt circuit to the stylus-circuit of such character as to be responsive to the changes in polarity of the transmitted signaling impulses, and therefore to act as a telltale or indicator, and of such self-induction as to neutralize the tailing effects of the received signaling impulses.

In testimony whereof I have hereunto subscribed my name.

PATRICK BERNARD DELANY.

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