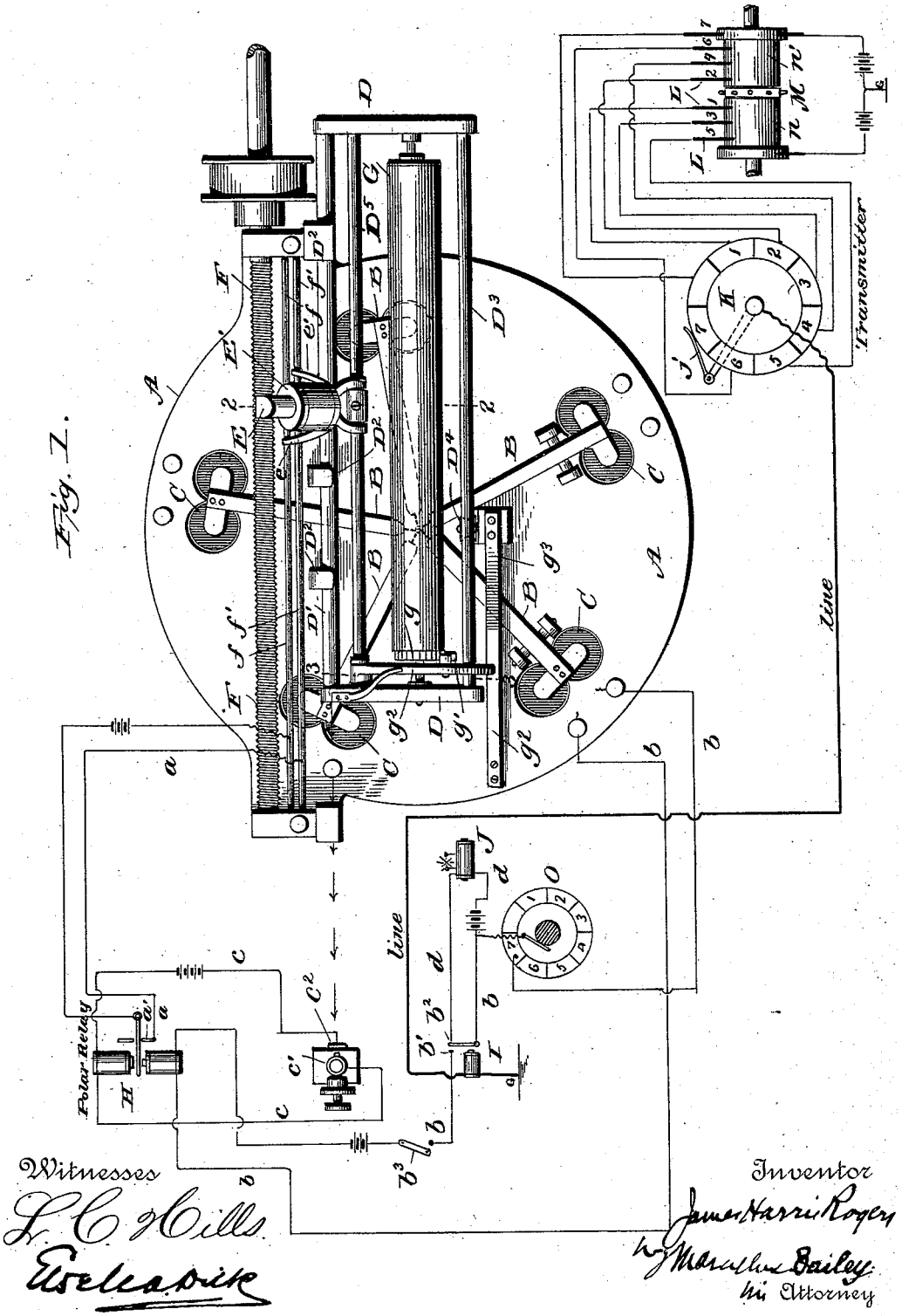
(No Model.) 2 Sheets—Sheet 1.

J. H. ROGERS.

PRINTING TELEGRAPH INSTRUMENT.

No. 524,118. Patented Aug. 7, 1894.



Witnesses
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Eselcadike

Inventor
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by Marcellus Bailey
his Attorney

(No Model.) 2 Sheets—Sheet 2.

J. H. ROGERS.

PRINTING TELEGRAPH INSTRUMENT.

No. 524,118. Patented Aug. 7, 1894.

Fig. 2.

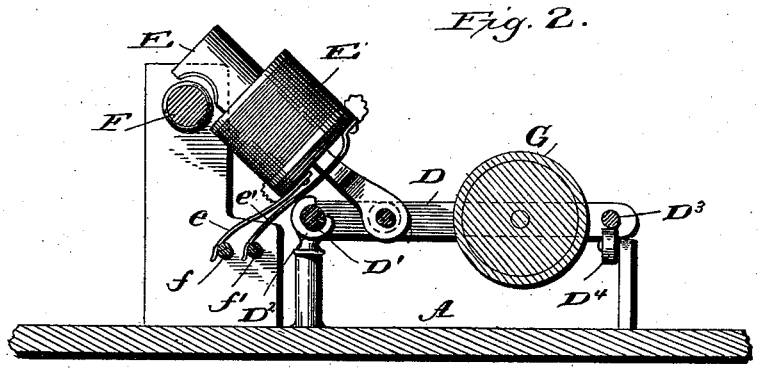


Fig. 3.

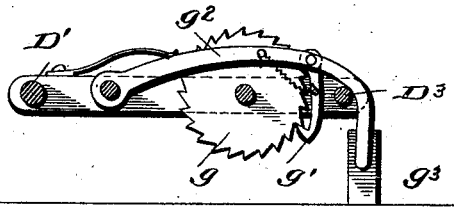
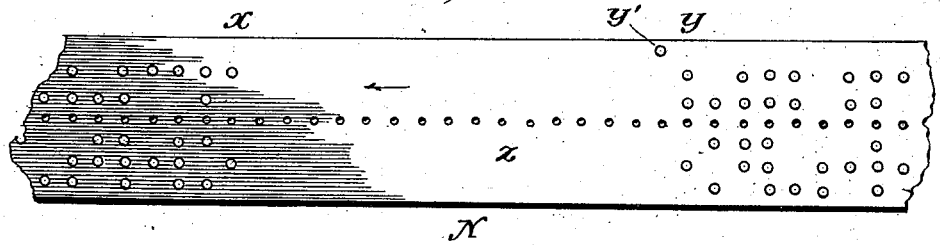


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES HARRIS ROGERS, OF BLADENSBURG, MARYLAND.

PRINTING-TELEGRAPH INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 524,118, dated August 7, 1894.

Application filed December 12, 1893. Serial No. 493,462. (No model.)

To all whom it may concern:

Be it known that I, JAMES HARRIS ROGERS, of Bladensburg, Prince George's county, in the State of Maryland, have invented certain new and useful Improvements in Printing Instruments or Apparatus for Telegraphic Uses, of which the following is a specification.

My invention has principally to do with the mechanism for receiving and reproducing a message sent over a telegraphic line.

The object is to reproduce the message in lines which extend one below and parallel with the other across the sheet of paper on which the printing is done, just as in ordinary written or type-written pages, as contradistinguished from a long fillet or tape on which the reproduced characters follow one another in a single line. I employ for this purpose a paper carriage which has a movement very much like that of the paper carriage of an ordinary typewriter, and like the latter is provided with an intermittent feed for advancing the paper a distance equal to that between one line and the next in the intervals between the printing of successive lines—all of the movements of the carriage being automatic and controlled through the agency of suitable mechanism and electrical connections, from the transmitting end of the line. The movement of the carriage which takes place while a line is being printed is occasioned by a motor with which the carriage is engaged through the intermediary of a clutch, which for this purpose is controlled by an electro-magnet included in a local circuit (which I term the clutch circuit) closed through the agency of a polar relay, one of the windings of which is included in the printing circuit of the receiver. The opposite winding of the polar relay is included in a second circuit (which I term the return circuit) upon the closing of which the armature of the polar relay is actuated to break the clutch circuit, thus releasing the clutch from the motor, and permitting the carriage to move back to its original position (this return movement being effected automatically by any of the spring actuated return mechanisms at present used in connection with such carriages). The closing of the return circuit is occasioned by the carriage which at the completion of its advance movement momentarily closes the normally open contacts in said circuit. The printing is effected by printing levers, operated by electro-magnets included in the printing circuit, and controlled in their operation by the transmitter in the manner indicated in my Letters Patent No. 420,358 of January 28, 1890. The motors which drive the receiver and transmitter respectively, can be synchronized in their movements in any suitable known way, as for example by the synchronizing method set forth in my Letters Patent No. 358,753 of March 1, 1887.

The message to be transmitted is upon a fillet or ribbon previously perforated with the combinations of perforations requisite to actuate the proper printing levers of the receiver. Inasmuch as the receiving carriage has a to and fro movement, and after every advance for the length of a line, must move back to its original position, no printing can be done during this return movement, although the transmitting ribbon still keeps in movement. I therefore so form the prepared transmitting ribbon, that between the characters of one line and those of the next there shall be left a space sufficient to permit the carriage, after one line is completed, to return to its original position in readiness to commence the following line by the time the transmitting ribbon has been fed along far enough to bring the perforations of that line under the transmitting styluses or brushes.

To enable others skilled in the art to make and use my invention I will now proceed to describe more in detail the manner in which the same is or may be carried into effect by reference to the accompanying drawings, in which—

Figure 1 is a plan view of the receiver with a diagrammatic representation of the circuit connections of the system in which it is used. Fig. 2 is a cross section of the reciprocatory paper carriage on line 2—2, Fig. 1. Fig. 3 is a like section on line 3—3, Fig. 1, of the feed mechanism for turning the paper roll of the carriage. Fig. 4 is an enlarged view of a portion of the prepared transmitting ribbon or fillet.

A is the base of the instrument. In it are mounted vibratory printing levers B, having upon their converging ends the characters to be produced, and controlled each by an elec-

tro-magnet C, which influences the armature of its printing lever. This arrangement is similar to that described in my Letters Patent No. 420,358, and is typical of any suitable printing mechanism to be used in connection with improvements about to be described. The printing carriage, consists of a rectangular frame D hinged by its rod D′ in bearings D^2 in which it can both rock up and down (for the purpose of lifting or lowering the carriage) and slide lengthwise (for the purpose of causing the carriage to travel along over the point where the printing levers act on the paper carried by the carriage). The carriage at its front or opposite edge rests by its front rod D^3 on a roller D^4 mounted on a suitable bracket or stand secured to the base.

The carriage is advanced in the direction required for printing a line by a clutch consisting in this instance of a half nut E hinged to vibrate upon the rod D^5 as an axis toward and away from an endless screw or worm F, mounted in suitable end bearings on the base A, and driven from a suitable motor. When the nut is forced down into engagement with the worm the carriage will advance in the direction of the arrows in Fig. 1. The return movement of the carriage (which takes place when the nut is lifted from engagement with the worm) is effected by means of a spring recoil mechanism similar to that used in the ordinary Remington typewriter for advancing the carriage. As this is a well known mechanism I have not deemed it necessary to represent it in the drawings.

The nut E is controlled by an electro-magnet E′, of which the stem of the nut forms the core, and the screw F the armature—the magnet being mounted on and moving with the hinged stem. Consequently when the magnet is energized the part E will be drawn toward and caused to engage the screw F.

The magnet E′ moves with the carriage, and as a convenient way of maintaining its connection with its energizing circuit (hereinbefore called the clutch circuit) during this movement, I provide it with two contact strips *e e′*, which rest upon and contact with the stationary conducting rods *f f′*, insulated from each other and included in the energizing circuit of the magnet. These contact strips are springs as well, and serve, when the magnet is inert to throw up the core nut E out of engagement with the screw F.

In the carriage frame is mounted the rotatable paper roll G. The sheet of paper to be printed passes under this roll, and over the front and rear rods D′ D^3. On one end of the roll is fixed a ratchet-wheel *g*, engaged by a feed-pawl *g′* hinged to the vibratory feed lever g^2 pivoted in the carriage, as shown in Fig. 3, and provided with a free end which overhangs and is adapted to be acted on by the stationary incline g^3 (Figs. 1 and 3) to cause a partial rotation of the paper roll G during the return movement of the carriage. In this way during the intervals when the carriage is moving back to get in position for printing a new line, the paper roll is moved to cause the paper to feed a distance equal to that which should separate adjoining lines of printing.

The clutch magnet E′ through the rods *f f′* and strips *e e′* is included in the clutch circuit *a* which is completed through the tongue and front stop *a′* of the polar relay H. This relay has two windings one included in the printing circuit *b* (through the agency of which the tongue of the relay is moved in a direction to close the clutch circuit) and the other included in a local circuit *c* (hereinbefore termed the return circuit) through the agency of which the tongue of the polar relay is moved in a direction to break the clutch circuit at *a′*. The return circuit includes normally open contacts *c′*, c^2—c^2 being a spring contact which is struck by the carriage at or near the completion of its advance movement and is thereby caused to contact with *c′* with the result of closing the return circuit *c*, thus moving the tongue of the polar relay in a direction to break the clutch circuit—the result being that the nut E rises out of engagement with the worm, and the carriage, being released, is caused by its spring recoil mechanism to automatically return to its original position. The printing circuit *b* is closed through a contact *b′* which is the front stop of the neutral magnet I. The back stop b^2 of the said magnet is a contact in a circuit *d* which includes the primary of the induction coil J through whose secondary is produced the spark by which visual synchronism is effected in accordance with the method described in my Letters Patent No. 358,753, of March 1, 1887. This it will be understood is merely typical of any known synchronizing method and mechanism by which the movements of transmitter and receiver can be brought into accord.

This completes a description of the circuits at the receiving end. To a complete understanding however of the invention a brief description of the transmitting instrumentalities and circuits is essential.

The neutral magnet I is in the line circuit which passes from the transmitter to the magnet I at the receiving station and thence to ground. The line circuit at the transmitting end leads from the trailer J of the sunflower or segment wheel K, the segments of this wheel being electrically connected each to its own brush L—these brushes being arranged over and so as to contact with the feed wheel M between which and the brushes is interposed the perforated transmitting fillet or ribbon N a portion of which on enlarged scale is shown in Fig. 4. The whole arrangement at the transmitting end is substantially like that described in my Letters Pattent No. 420,358, and contains nothing new with the exception of the transmitting ribbon or fillet N, which in the special form in which it is prepared—having reference more particu-

larly to the space interval z between the end x of one line and the beginning y of the next—I believe to be new with me. It is through the space interval z that the transmitting ribbon N travels, while the reciprocatory carriage at the receiving end is returning to its normal position after one line of printing has been completed and before the next has been started.

Returning now to the line circuit—from the brushes it goes through the feed wheel M thence to battery and thence to ground. In the particular arrangement represented in the drawings the feed wheel is composed of two parts n n' insulated from each other. Part of the brushes, say those connected to segments 1. 3. 5, are in contact with one part n of the wheel, and the other, say those connected to segments 2, 4 (and also to the starting segment 6) contact with the other part n'; grouped with the latter is the brush 7 which makes contact with the segment wheel once in each revolution irrespective of the transmitting ribbon and is intended to control the means by which the visual synchronizing spark is produced. The line battery is a split battery as shown; and one pole of it is connected to the part n of the feed wheel, while its opposite pole is connected to the other part n'. The object of this arrangement is to provide for the clearing of the line by insuring a sufficient frequency of impulses thereover of opposite polarity during the transmission of the message. There are seven active segments on the transmitting sunflower wheel, and one idle segment. Of the seven active segments, 1 to 5 inclusive are for the five printing magnets at the receiving end, 6 is what I have called the starting segment, and 7 is the synchronizing segment. Segment 6 is connected to a brush 6, which is in a position where it will always meet a perforation y' (Fig. 4) in the transmitting fillet placed just in advance of the beginning y of a line, with the object of causing the paper carriage of the receiver to be fairly clutched to the endless feed screw, before the character perforations meet their brushes, thus insuring that the carriage shall start by the time the first character has been printed. This is effected by setting the starting segment and brush as well as the perforation y' in the position indicated. As soon as the brush 6 meets the feed wheel through the perforation y', an impulse is sent over the line, with the effect of momentarily closing the printing circuit and thus energizing the polar relay H in a sense to cause its tongue to close the clutch circuit a at a'.

I may here remark that the movement of the carriage during the printing operation is not intermittent but continuous. This however practically has no bad effect. The action of the printing lever is instantaneous so that there is no drag (and consequent blur) between them and the paper.

There is a receiving segment wheel O with its co-operating trailer, similar and corresponding to the transmitting segment wheel K. I have however shown but one of the receiving segments connected up to a printing magnet—this being to avoid obscuring the parts by delineating circuit connections which will at once suggest themselves to any competent operator.

In the printing circuit b, is a switch b^3, which is not closed until the receiver is in synchronism with the transmitter. When synchronism is reached, the switch is closed and the local circuits at the receiving end and the instrumentalities thereby controlled are then brought into play.

In the operation of the machine, when the transmitting fillet has reached the end x of a line, the paper carriage of the receiver will have completed its advance movement, and in so doing will have brought up against the movable spring contact c^2, with the result of closing it against its fellow contact c'. The line having been finished, the transmitting ribbon is a blank so far as transmitting perforations are concerned, and consequently the closing of the contacts c', c^2, will complete the local return circuit c, with the effect of energizing the polar relay H in a sense to cause the clutch circuit to be broken at a'. The clutch magnet thus becomes de-energized, the clutch nut E consequently is thrown by the spring strips e e', up out of engagement with the screw, and the carriage is at once returned to its starting point. This return movement takes place while the space interval z on the transmitting ribbon is passing over the feed roller, and during such movement the paper is fed the space of one line by the pawl and ratchet and incline plane mechanism already described. By the time the carriage gets back to the starting point the starting perforation y' in the transmitting ribbon has met its brush 6, and the carriage starts anew to advance.

It will of course be understood that between the printing levers and the paper, there is to be interposed an inked ribbon or the like, such as employed in manually operated typewriters now in use.

Having described my invention and the best way now known to me of carrying the same into effect, I desire to be understood that I do not restrict myself to the mechanical details hereinbefore described in illustration of the invention. These can be widely varied without departure from the principle of my invention. But

What I claim, and desire to secure by Letters Patent, is—

1. The combination with a printing mechanism of a reciprocatory paper carriage, a motor therefor and an electro-magnetically controlled clutch for connecting the carriage to the motor, substantially as hereinbefore set forth.

2. The combination of the reciprocatory carriage, the power driven endless screw or

worm, the vibratory clutch nut to engage said worm, the electro-magnet for moving the nut, the contact strips *e*, *e'*, and the conducting rods *f f'*, under the arrangement and for joint operation substantially as hereinbefore set forth.

3. The combination with a printing mechanism, of a reciprocatory paper carriage, a motor for advancing the carriage, an electro-magnetically controlled clutch for connecting the carriage to the motor, a paper roll mounted on the carriage and mechanism whereby the said roll is automatically operated during the return movement of the carriage to effect the feed of the paper, substantially as and for the purposes hereinbefore set forth.

4. The combination of the reciprocatory paper carriage, a motor therefor, a clutch for connecting the carriage to the motor, an electro-magnet for moving said clutch to engage the motor, a clutch circuit including said magnet, a polar relay controlling contacts through which said circuit is completed, and circuit connections whereby the relay is operated to open and close said contacts at the time and in the manner substantially as hereinbefore set forth.

5. The combination of electro-magnetic printing mechanism and the printing circuit and connections therefor; the reciprocatory paper carriage; a motor therefor; a clutch for connecting the carriage to the motor; an electro-magnet for moving said clutch to engage the motor; a clutch circuit including said magnet; a polar relay controlling contacts through which said circuit is completed, having one of its windings included in the printing circuit; and a return circuit including the opposite winding of the said relay and completed through normally open contacts, closed by the paper carriage at or near the completion of its advance movement—the combination being and acting as hereinbefore set forth.

6. In a system of telegraphic transmission, the combination with a printing mechanism, a reciprocatory paper carriage, and operating mechanism therefor substantially as described at the receiving end, of a transmitter electrically connected to the receiver, and a controlling transmitting ribbon or fillet, having the character marks upon it divided into groups each corresponding to one line of characters to be reproduced upon the paper at the receiving end, the one line group being separated from the other by an interval *z* sufficient to permit the return movement of the carriage after the completion of a line, to the starting point for the next line, while the said portion *z* of the ribbon is passing through the transmitter, substantially as hereinbefore set forth.

In testimony whereof I have hereunto set my hand, before two subscribing witnesses, this 12th day of December, 1893.

JAMES HARRIS ROGERS.

Witnesses:
EWELL A. DICK,
G. M. COPENHAVER.