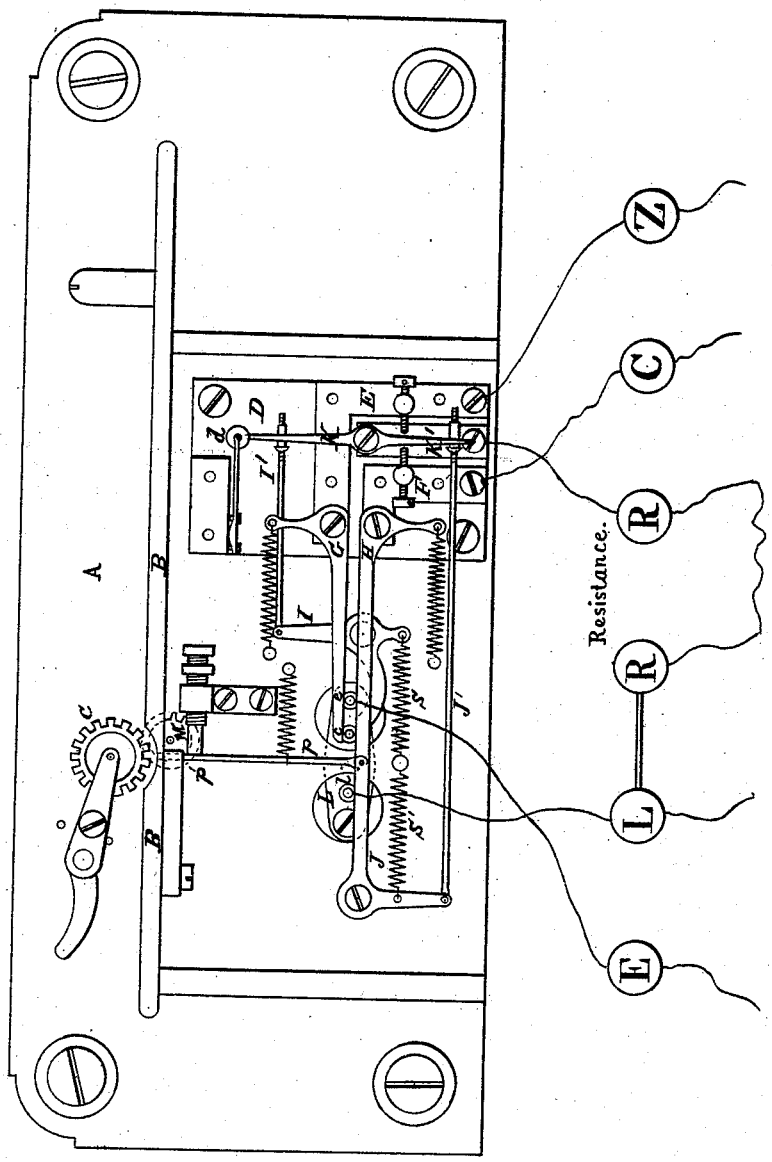
C. WHEATSTONE & J. M. A. STROH.

Automatic Telegraph.

No. 166,168. Patented July 27, 1875.



WITNESSES
Walter Allen
Henry Tanner

Sir Charles Wheatstone
John Matthias Augustus Stroh
By Knight Bros. Attys

UNITED STATES PATENT OFFICE.

CHARLES WHEATSTONE AND JOHN MATTHIAS AUGUSTUS STROH, OF LONDON, ENGLAND.

IMPROVEMENT IN AUTOMATIC TELEGRAPHS.

Specification forming part of Letters Patent No. **166,168**, dated July 27, 1875; application filed March 16, 1875.

To all whom it may concern:

Be it known that we, Sir CHARLES WHEATSTONE, of 19 Park Crescent, Regent's Park, knight, and JOHN MATTHIAS AUGUSTUS STROH, of 29 Tolmer's Square, Hampstead Road, mechanician, both of London, county of Middlesex, England, have invented certain Improvements in the Transmitters of Automatic or Fast-Speed Telegraphs, of which the following is a specification:

The present invention is an improvement on the transmitter of Sir Charles Wheatstone's automatic-telegraph system, which transmitter, as formerly constructed, was the subject of a patent granted to him in the United States on the 22d of December, 1874.

The present improvement consists in the introduction of a second commutating arrangement, by which, after the ordinary current (which determines either a dash or a space) has been transmitted, a weaker current in the same direction is sent after it. Certain irregularities of transmission which occur under the usual arrangements are in this manner obviated.

A front elevation of the improved transmitter is shown in the accompanying drawing.

The perforated paper strip is drawn with a uniform velocity between the fluted roller C and the circular depression in the horizontal ledge B by the spur-wheel M, the teeth of which enter into the central line of holes and hold it in position. The motion is effected by means of a spring or weight connected with a train of wheels. The vertical wires or pins *p p'*, which enter, respectively, into the upper and lower line of perforations of the paper strip, are connected with the bell-crank levers I and J, and are forced upward by the spiral springs *s* and *s'*. These levers are placed on opposite sides of the rocking beam L, and are alternately depressed by the arms *l* and *c*, which protrude from it at equal distances from its center. When a hole occurs in the paper strip, through which either of the vertical pins is free to enter, the lever attached to it follows the beam upward, remaining in contact with the arm of the beam on that side and the circuit remains unbroken; but if no hole occurs in the paper strip, the vertical pin rising against it is stopped, and the bell-crank lever is prevented following the beam upward. The protruding arm of the beam, therefore, separates from the lever, and the circuit is interrupted. When either of the vertical wires or pins rises up through a hole in the paper it engages with one of the grooves of the fluted roller C, which carries it forward until the opposite oscillation of the beam causes it to be withdrawn. The two bell-crank levers I and J are connected together electrically through the brass sides of the frame. The brass spiral springs *s* and *s'* tend to press those levers into contact with the pins *l* and *c* of the rocking beam. The arm *l* is in metallic connection with the line-terminal. The rocking beam, on its right-hand side, is furnished with a third projecting contact-arm, *e*, in metallic connection with the earth, and which, with the arm *c* on the same side of the center, makes (when the beam oscillates) alternate contact with the opposite faces of the two contact-levers G and H. The lever H is in permanent connection, through the slab F, with the copper pole. The lever G is in permanent connection, through the slab E, with the zinc pole of the battery. When the right-hand side of the beam is elevated the contact-arm *e* presses against the face of G and puts the zinc pole to earth. At the same time the arm *c* is pressed against H, which forms the metallic prolongation of the copper pole. If an aperture occur in the paper strip at this moment the ends of I and J are in contact with *c* and *l*, and the copper current passes from H, through *c*, I, the springs *s* and *s'*, J, to *l* and line. If, on the other hand, no aperture occurs in the paper strip, the end of I is prevented following the beam, and the line-circuit is interrupted on that side by the separation of the contact *c*. When the beam is in the opposite position a similar action takes place, with the difference that the other pole of the battery is then put to earth through *e*, and that the interruption of the line-circuit takes place between *l* and J in the event of no aperture occurring in the paper strip.

The arrangement for sending a weak current into the line at the end of a dash or space is effected by the insertion of an artifi-

cial resistance into the battery and line circuit. This is done by means of the contact-lever K, centered upon a slab, K′, between E and F, and which is in connection with the line-terminal through a resistance-coil. The contact-lever K is moved from side to side, against screw-points upon E and F, by the rods I′ and J′, coupled, respectively, to the ends of the bell-crank levers I and J. The ends of these rods pass through suitable holes in the opposite sides of the lever K, but they are supplied with ebonite adjusting-nuts, so that whenever either of the vertical pins enters alternately into an aperture in the paper strip one end of its lever follows the rocking beam L, while the other thrusts the lever K far enough to carry it over the center of the friction-wheel *d*, which holds it in place until its position is changed to the other side. When the contact-tongue K rests against the screw-point of E a zinc current passes from E through K, and through the resistance into the line, whenever the beam is depressed on that side, which puts the lever H and arm *e* in contact, and therefore copper to earth. The opposite takes place when the tongue rests against the screw-point of F, a copper current passing from F through K and the resistance R into the line whenever the rocking beam is in the other direction, which puts zinc to earth, and these currents can therefore only occur when the rocking beam returns to the same position it was in when the lever K was thrust over. Whenever a full current is sent into the line through the levers I and J and arms *c* and *l*, a parallel current is also sent through the duplicate circuit formed by the resistance and contact tongue, and whenever the beam returns to this position, while no aperture occurs in the paper, the lever remains unmoved, and a current in the same direction will be sent into the line through the resistance only. In this way, as the last position of the beam during a dash or space is the same as the position which determined the dash or space, although no aperture occurs just then in the paper strip, a weak current is sent in the same direction through the resistance and into the line, because during the formation of the dash or space the lever K has not been thrust from its first position. By thus causing a strong instantaneous current to be followed by a weaker one, in order to produce a dash or long space, a dot immediately following a long space, or a short space following a dash, is prevented from becoming unduly elongated, as without such compensation this defect occasionally happens.

Having thus described our said invention, we would have it understood that what we claim is—

The means for sending a weak current into the line at the end of a dash or space, for preventing an undue elongation of short currents, consisting of the lever K, operated from the transmitting-levers, the contact-points F E, and the resistance and branch circuit, substantially as set forth.

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