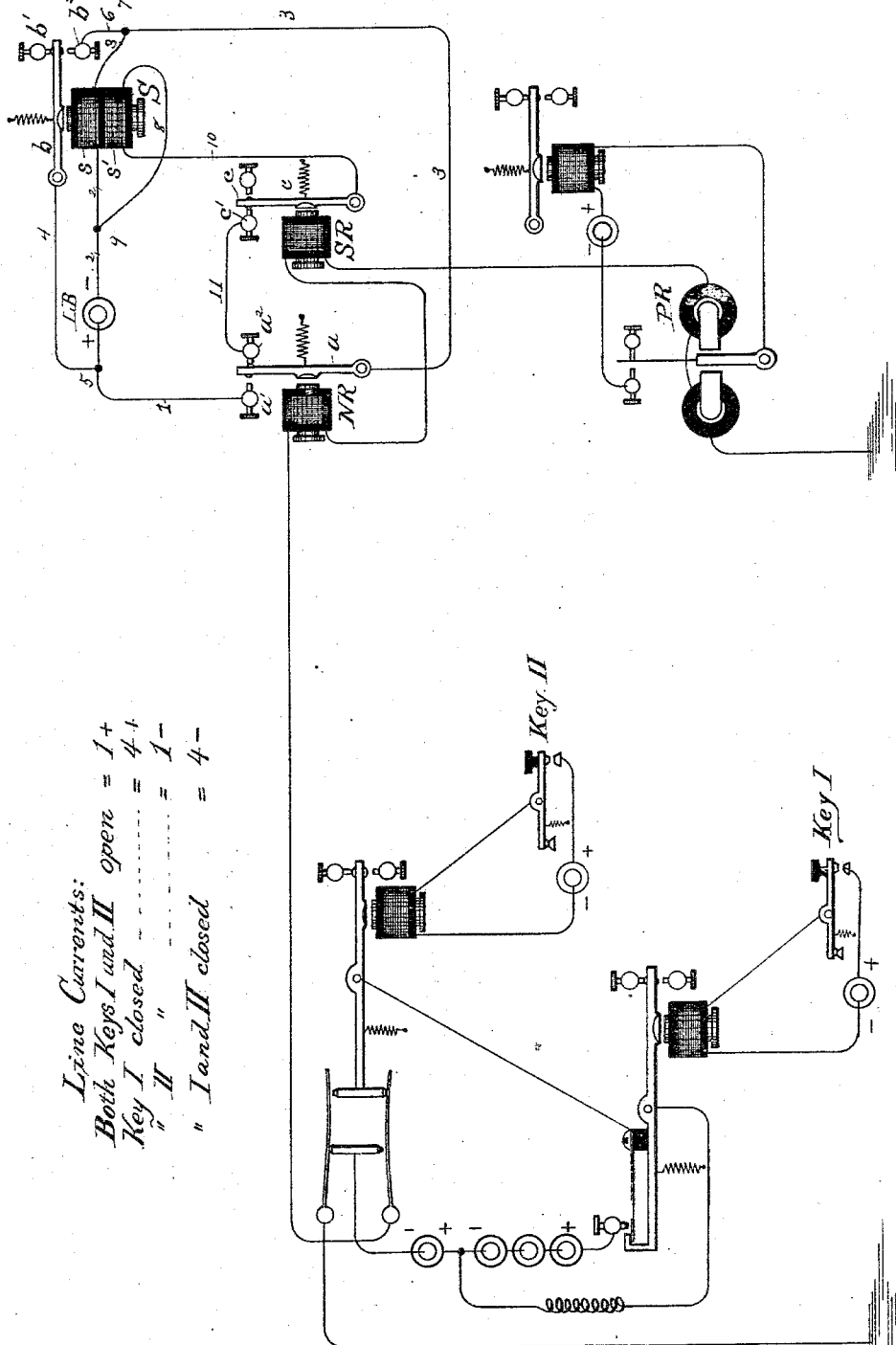


(No Model.)

B. E. J. EILS.
QUADRUPLEX TELEGRAPH.

No. 305,907.

Patented Sept. 30, 1884.



Line Currents:
Both Keys I and II open = 1+
Key I closed = 4+
" II " = 1-
" I and II closed = 4-

Witnesses:
E. J. Walker
W. M. Hannay

Inventor:
B. E. J. Eils

UNITED STATES PATENT OFFICE.

BETTE E. J. EILS, OF WASHINGTON, DISTRICT OF COLUMBIA.

QUADRUPLIX TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 305,907, dated September 30, 1884.

Application filed February 19, 1884. (No model.)

To all whom it may concern:

Be it known that I, BETTE E. J. EILS, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Quadruplex Telegraphs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention was primarily designed to adapt the invention described in my application for United States Letters Patent, filed January 28, 1884, Serial No. 118,999, for use on the neutral side of such diplex or quadruplex or multiplex telegraphs in which one message is received through a neutral relay subject to rise and fall of tension as well as to reversals of a normal line-current, and where the static discharge of the line or any other cause increases the period of momentary demagnetization of such relay during the reversals of the line-current to such an extent that the invention described in my aforesaid application cannot wholly bridge over such lengthened period of demagnetization.

My improvement consists in employing as part of the second local branch used for discharging the sounder-magnet at the termination of each signal, as described in my aforesaid application, the front contact-screw and armature-lever of a subsidiary neutral relay in the line-circuit, the said armature-lever of which is held against the said front contact-screw under all line-currents, but is momentarily retracted during reversals of the line-current, so as to break said branch during the period of demagnetization of the neutral receiving-relay, and thus prevent the discharge of the sounder electro-magnet at times when a reversal occurs while the sounder is making a signal.

The annexed drawing is a diagram illustrating the embodiment of my improvement in the well-known diplex telegraph, where one message is transmitted by rise and fall of tension of a normal line-current and received through a neutral receiving-relay, NR, and the other message is transmitted by changes in the polarity of the line-current irrespective of its tension, and received through a polarized receiving-relay, PR.

My invention differs from the previously-known diplex telegraph of this character solely in the organization of the local circuit of the neutral receiving-relay, and further description may be confined to this new organization, because the general construction and mode of operation of the diplex telegraph illustrated will be readily understood from the diagram by any one skilled in the art.

The relay NR has a front contact-screw, a' , and a back contact-screw, a'' , which contact-screws are insulated from each other, and between which the armature-lever a of the relay plays, said lever being normally held against the back contact-screw, a'' , by its retractile spring, the tension of which overcomes the magnetic attraction of the armature by the relay-magnet due to the weak normal line-current. One pole of local battery LB is connected by wire 1 with the front contact-screw, a' , of this relay. The other pole of said battery is connected by wire 2 to one end of helix s of the sounder S, the other end of which helix is connected by wire 3 to armature-lever a of the relay. The armature-lever b of the sounder plays between the insulated back stop, b' , and the front contact-screw, b'' , and is connected by wire 4 with wire 1 at post 5. Front contact-screw, b'' , of the sounder is connected by wire 6 with wire 3 at post 7. The sounder-magnet is wound with a second helix, s' , one end of which is connected by wire 8 with wire 2 at post 9, while the other end is connected by wire 10 with the armature-lever c of the subsidiary neutral relay SR, which is included in the line-circuit. The front contact-screw, c' , of this subsidiary relay is connected by wire 11 with the back contact screw, a'' , of the receiving-relay NR. The subsidiary neutral relay is so adjusted that its armature-lever c will be held against the front contact-screw, c' , under all line-currents, and will be retracted by its retractile spring only when the line-current vanishes, momentarily, during reversals. The helices s and s' are wound on the core in opposite directions, and are of equal capacity, so that the sounder-magnet is what is usually termed a "differential electro-magnet."

It will be observed that the sounder-magnet cannot be discharged unless the armature-lever c of the subsidiary neutral relay SR is in

contact with its front contact-screw, *c'*. If, while the neutral relay NR is receiving a signal, the direction of the flow of the line-current is reversed, both relays NR and SR are momentarily demagnetized, and armature-lever *c* is retracted as well as armature-lever *a*; consequently the sounder-magnet cannot be discharged, but continues the signal. It will also be observed that the momentary retractions of armature-lever *c* at reversals when relay NR is not receiving have no injurious effect on the local circuit of said relay.

The use of helix *s'* provides for a prompt discharge of the sounder-magnet; but said helix and wire 10 may be omitted, as illustrated in my aforesaid application, and post 9 connected by wire 8 to armature-lever *c*, so as to merely shunt the local current around the helix *s*.

I do not limit myself to the herein-described special use of my invention. For instance, the subsidiary neutral relay may be used in connection with the local arrangement shown in United States Patent No. 274,112, for controlling the local branch connected with the back contact-screw of the receiving-relay.

I believe the feature of controlling a local branch by a subsidiary relay in the main-line circuit to be entirely new, and my first claim

is designed to cover this feature as broadly as is possible within legal bounds.

I claim as my invention—

1. The combination, substantially as before set forth, of a receiving-relay, a local circuit controlled thereby, a local branch for said local circuit, and a subsidiary relay in the main-line circuit for controlling said local branch.

2. The combination, substantially as before set forth, of a neutral receiving-relay subject to rise and fall of tension as well as to reversals of a normal line-current, a normally-open local circuit having a branch circuit which passes through the front contact and armature lever of an electro-magnet in said local circuit, and a second branch circuit which passes through a portion of the first branch circuit and the back contact and armature lever of said neutral receiving-relay, as well as through the front contact and armature-lever of a subsidiary relay in the line-circuit.

In testimony whereof I affix my signature in presence of two witnesses.

B. E. J. EILS.

Witnesses:

C. A. NEALE,
E. T. WALKER.