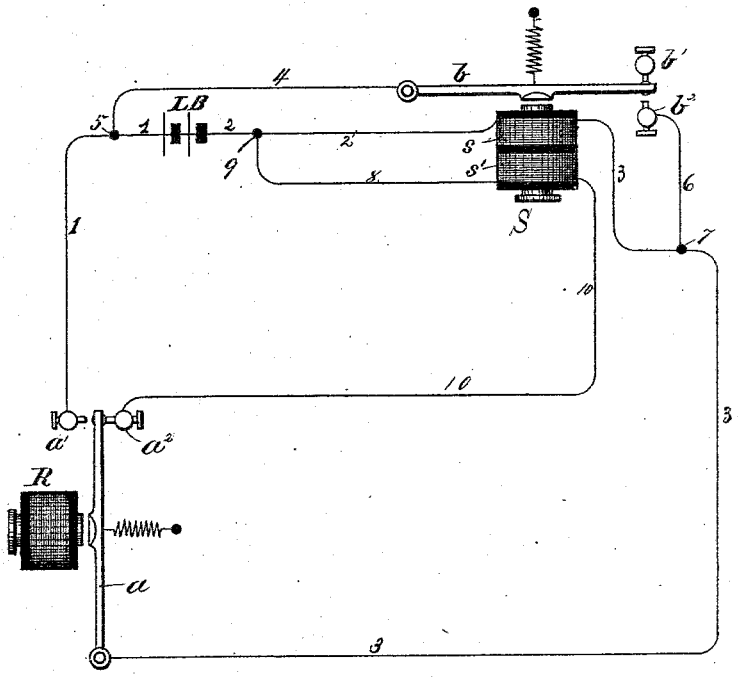
(No Model.) 2 Sheets—Sheet 1.

B. E. J. EILS.

LOCAL CIRCUIT FOR TELEGRAPHS.

No. 305,906. Patented Sept. 30, 1884.

Fig. 1.



Witnesses:
E. F. Walker
W. W. Hannay

Inventor:
B. E. J. Eils

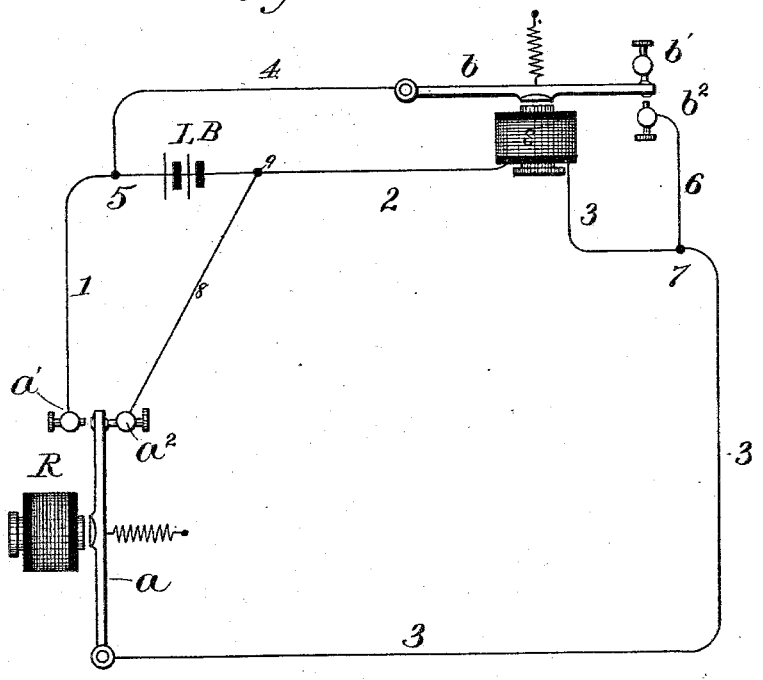
(No Model.) 2 Sheets—Sheet 2.

B. E. J. EILS.

LOCAL CIRCUIT FOR TELEGRAPHS.

No. 305,906. Patented Sept. 30, 1884.

Fig. 2



Witnesses:
E. F. Walker
W. M. Hanmay

Inventor.
B. E. J. Eils

UNITED STATES PATENT OFFICE.

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

LOCAL CIRCUIT FOR TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 305,906, dated September 30, 1884.

Application filed January 28, 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 Local Circuits for Telegraphic and other Electrical Circuits; 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, although it may be applied to electric telegraphs in general, as well as to other electric circuits, is more especially designed for use on the so-called "neutral side" of such diplex, quadruplex, or multiplex telegraphs in which one message is transmitted by changes in the polarity of the line-current and received through a polarized relay, and another message is transmitted by changes in the strength of the line-current irrespective of its polarity, and received through a Morse or neutral relay, the polarized relay and the local circuit controlled thereby being commonly called the "polar side" of such telegraphs, while the neutral relay, in connection with the local circuit controlled by it, is commonly called the "neutral side." In these telegraphs the neutral relay is subject to reversals of the direction of the line-current, which cause a momentary demagnetization of such relay, and result in mutilations of the signals passing through the relay at the time unless some means is provided in the local circuit or connections to bridge over these moments of demagnetization.

My improved local circuit is peculiarly valuable when applied to the neutral side of such telegraphs for the simultaneous transmission of several messages, because it is capable of bridging over the moments of demagnetization due to reversals of the direction of the line-current.

My invention consists, primarily, of a normally-open main local circuit provided with a branch circuit, which is automatically closed by the sounder on the closing of the main local circuit by the armature-lever of the relay, and by which the magnetization of the sounder-magnet is maintained after the opening of the main circuit by the relay.

It further consists of a local circuit organized as just explained and provided, in addition, with a second branch circuit, which is closed, at the end of each signal, through the back contact of the relay, to neutralize the current in the first branch circuit, but is immediately opened again by the armature-lever of the sounder.

Figure 1 of the annexed drawings is a diagram of my invention, showing a neutral relay of a telegraph controlling my improved local circuit. Fig. 2 shows a modification of my invention.

The relay R has a front contact-screw, a', and a back contact-screw, a^2, which 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^2, by the usual retractile spring. One pole of the local battery L B is connected by wire 1 with the front contact-screw, a', of the relay. The other pole of said battery is connected by wire 2 to one end of the 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^2, and is connected by wire 4 with wire 1 at post 5. Front contact-screw, b^2, 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 back contact-screw, a^2, of the relay. 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." When the armature-lever of the relay rests against the back contact-screw, a^2, the main local circuit is open, as well as its two branch circuits. When the relay attracts its armature, and thus puts lever a in contact with the front contact-screw, a', the main local circuit is closed and a current flows through helix s of the sounder. Its armature-lever b promptly moves forward, and on striking front

contact-screw, b^2, closes the branch which extends from post 5 to post 7, and includes both said armature-lever and said contact-screw. When the relay-magnet releases the armature, the first effect is to break the main local circuit; but a closed circuit is still maintained through the branch from post 5 to post 7, and the sounder remains unaffected until the relay armature-lever establishes contact with the back contact-screw, a^2. At that moment the second branch, which extends from post 2 to back contact-screw, a^2, and includes helix s', is closed. Immediately the current flowing through helix s is neutralized by the current flowing through helix s' in a reverse direction, the sounder-magnet releases its armature, and simultaneously both branch circuits are broken by the retraction of the sounder armature-lever.

The use of the helix s' provides for a prompt discharge of the sounder-magnet; but my invention is not limited, primarily, to the use of such helix, as my first claim indicates. Other means may be employed instead. For instance, said helix s' and wire 10 may be omitted and post 9 connected by wire 8 directly to the back contact-screw, a^2, of the relay, so as to merely shunt the current around helix s. This modification is illustrated in Fig. 2.

I claim as my invention—

1. The combination, substantially as before set forth, of a relay in the main line and 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.

2. The combination, substantially as before set forth, of a relay, 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 includes a separate helix on said electro-magnet and passes through a portion of the first branch circuit and the back contact and armature-lever of the relay.

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

B. E. J. EILS.

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