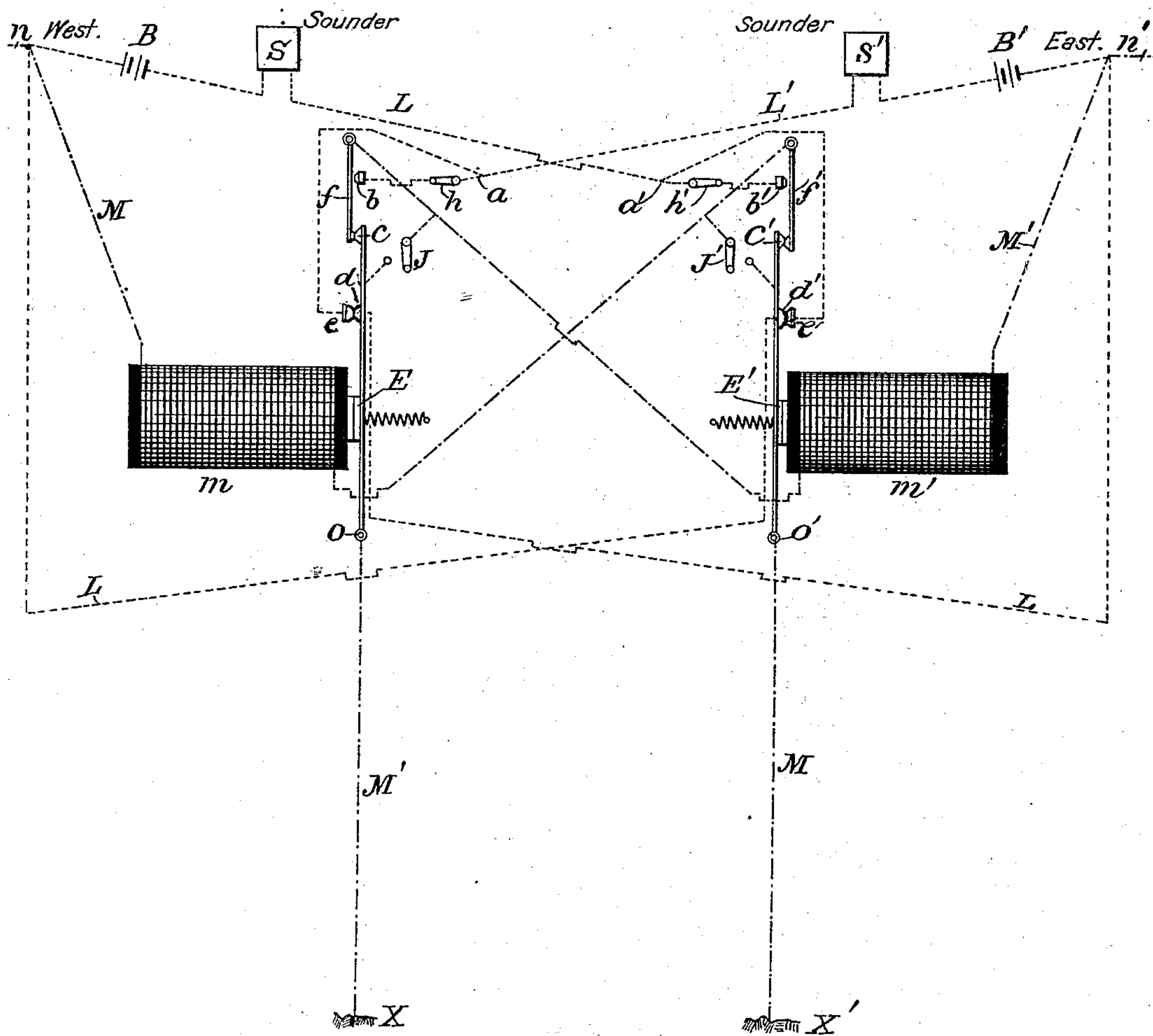


(No Model.)

L. RUSSELL.  
TELEGRAPH REPEATER.

No. 378,464.

Patented Feb. 28, 1888.



ATTEST:

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# UNITED STATES PATENT OFFICE.

LOUIS RUSSELL, OF CHEROKEE, KANSAS.

## TELEGRAPH-REPEATER.

SPECIFICATION forming part of Letters Patent No. 378,464, dated February 28, 1888.

Application filed June 4, 1886. Serial No. 204,123. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS RUSSELL, a citizen of the United States, and a resident of Cherokee, in the county of Crawford and State of Kansas, have invented certain new and useful Improvements in Telegraph-Repeaters, of which the following is a complete, clear, and exact description, setting forth in general and in detail my invention.

My invention consists of a simple form of telegraph-repeater which is designed to make and break the circuit of a second line, and is illustrated in the accompanying drawing, in which the figure is a general diagrammatic view.

Referring to the drawing by letter,  $m$   $m'$  are two relays having armatures  $E$  and  $E'$ , which carry contact-points  $c$   $d$  and  $c'$   $d'$ , respectively. The armatures are normally drawn up, and contacts  $c$   $d$  touch corresponding contacts,  $e$   $f$ , and the contacts  $c'$   $d'$  touch corresponding contacts,  $e'$   $f'$ . The contacts  $f$   $f'$  are spring-contacts, forming part of spring-levers, indicated by the same letters.

$B$  and  $B'$  are two local batteries, the circuits  $L$  and  $L'$  of which are indicated by dotted lines, while the main lines are represented by alternate dashes and dots.

$S$   $S'$  are sounders in the local circuits.

The east main line  $M'$  enters normally at  $n'$  and passes through the helix  $m'$ , thence to the spring-lever  $f$ , thence to contact-point  $c$ , and finally through lever-armature  $E$  to earth at  $X$ . The west main line  $M$  similarly enters normally at  $n$ , passes successively through helix  $m$ , lever  $f'$ , contact-point  $c'$ , armature  $E'$ , and earth  $X'$ . The local circuit  $L'$  passes from battery  $B'$  normally through sounder  $S'$ , contact  $d$ , and finally again to the battery  $B'$ . Similarly the local circuit  $L$  normally passes from battery  $B$  through  $d'$ , and again to the same battery. The local circuits have permanent electrical connection with the main-line circuits, as shown, at the intersections near  $n$  and  $n'$ , so that when the contacts  $d$  and  $d'$  are separated and  $b$  and  $f$  and  $b'$  and  $f'$  are touching the local circuits may pass through the helices.

When the east main line is broken by the operation of a key at a distant station in the usual manner, or if it is broken at  $n'$ , the helix  $m'$  no longer retains the armature  $E'$ . In the

backward motion of the said armature the local circuit  $L$ , containing sounder  $S$ , is broken at  $d'$ , the main line  $M$  is broken at  $c'$ , and the local circuit  $L$  is again and practically instantaneously closed at  $b'$ , (since the rod or lever  $f'$  is a spring and normally presses upon  $c'$ ), through the helix  $m$ , so that it holds the armature  $E$  in position, and thereby the east main-line circuit is prevented from being opened at  $c$ . When the east main line is closed again at the distant station by the release of the key, or, for instance, at  $n'$ , armature  $E'$  closes the west line at  $c$ . At the same time the local circuit  $L$  is broken at  $b'$  and again closed at  $d'$ , operating sounder  $S$ . The west main line is operated similarly. When  $M'$  is open, the local circuit  $L$  is through the point  $a'$ , the contact  $b'$ , the spring  $f'$ , and the helix  $m$ ; but on account of the added resistance of  $m$  the sounder  $S$  is not operated—i. e., the sounder  $S$  operates only when its circuit is closed through  $d'$ .

The invention is not limited to the precise construction hereinbefore described, as it is evident that many modifications may be made therein without departing from the spirit of the invention.

When it is desired to use the repeater as two independent relays, open the switches  $h$  and  $h'$  and close the switches  $J$  and  $J'$ . By opening the switches  $h$  and  $h'$  it prevents the local circuits from holding the armatures in position—i. e., it prevents the local circuits passing through the helices. The operation is simply that alternately breaking and closing the main circuit  $M'$ , for instance, alternately operates the sounder  $S$  and the main circuit  $M$ . The helices  $m$  and  $m'$  may be considered as representing any form of magnet.

Having now stated the title, object, and nature of the said invention, having described its practical realization by reference to the accompanying drawing, having particularly ascertained the manner in which the same operates to accomplish the said object, what I claim is—

1. In a system of telegraphy, the combination of two normally-closed main circuits, two normally-closed local circuits, a helix in each main circuit, an armature to each helix, a retractile spring to each armature, a contact-point mechanically connected to each arma-



ture, but electrically insulated therefrom, and each in one of said local circuits, spring contact-levers in each main circuit and pressing upon contacts mechanically connected with  
5 said armatures and electrically connected to earth, and contact-points forming branch circuits to said local circuits and normally out of contact with said spring contact-levers, the said local circuits being electrically connected  
10 to said main circuits.

2. In a system of telegraphy, the combination of an east main line normally including at any way-station a helix, a spring contact-lever, the east main line containing also a contact-point  
15 having operating-connection with the armature of a helix which is located in the west main line and with an earth-terminal and pressing upon said lever, a second helix, a second spring contact-lever, both located in a west main line, a  
20 second contact-point having electrical connection

with the armature of the first-named helix and with an earth-terminal, and pressing upon a spring contact-lever which is in said west main line, two normally-closed local circuits, each passing through a contact having operating-connection the one with one  
25 helix and armature and the other with the other helix and armature, one local circuit being electrically connected with one main line and the other with the other main line, and  
30 branch circuits from each local circuit terminating in contact-points normally separated from said contact spring-levers.

In testimony whereof I have hereunto signed my name, in the presence of two subscribing  
35 witnesses, this 27th day of May, 1886.

LOUIS RUSSELL.

Witnesses:

W. B. MULKS,

G. W. H. LUCAS.