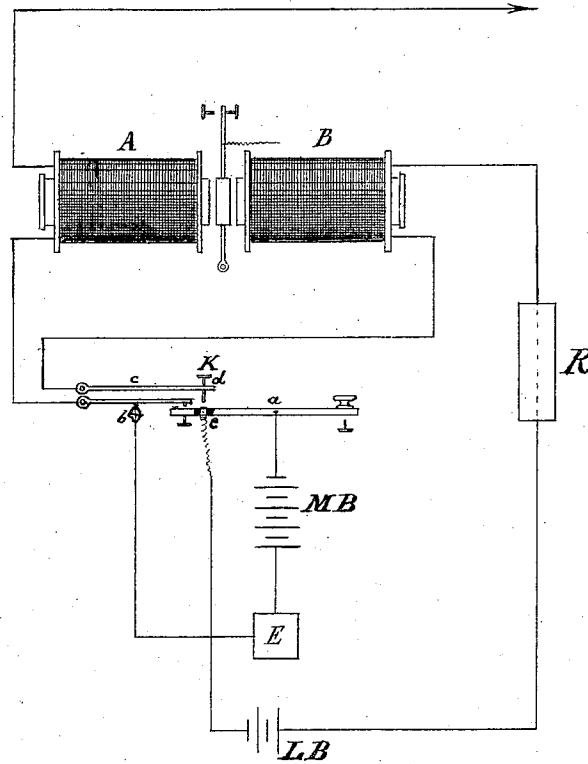


J. B. STEARNS.

Duplex Telegraph Instruments.

No. 136,274.

Patented Feb. 25, 1873.



Attest;

William A. Hayes jr
C. Brown.

Joseph B. Stearns,

Inventor;

UNITED STATES PATENT OFFICE.

JOSEPH B. STEARNS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN DUPLEX TELEGRAPH-INSTRUMENTS.

Specification forming part of Letters Patent No. **136,274**, dated February 25, 1873.

To all whom it may concern:

Be it known that I, JOS. B. STEARNS, of Boston, in the county of Suffolk, State of Massachusetts, have invented an Improvement in Telegraph Apparatus, of which the following is a specification:

This invention relates to apparatus for the simultaneous transmission of two signals from opposite ends of the same line-wire; and consists of a key of the peculiar construction hereinafter more fully explained, and of its combination with a magnet or coil excited by the main-line battery, a neutralizing or opposing magnet or coil excited by an equating battery, and a suitable resistance for the purpose of preventing the receiving magnet or relay, though always in the circuit, from being affected by currents transmitted from the home station.

The accompanying drawing, making part of this specification, represents the arrangement of the apparatus, in which A is the electro-magnet connected with the line; B, the opposing magnet; M B, the main battery; L B, the local or neutralizing battery; K, the key; *a*, a lever and contact-stop connected with the main battery; *b*, a lever and contact-stop connected with the line and receiving magnet; *c*, a lever connected with the circuit from the local or neutralizing battery through the opposing magnet; *d*, a contact-stop in said lever; *e*, a contact-stop inserted in the lever, but insulated therefrom; and R, a resistance inserted in the circuit from the local battery.

The method of operation is as follows: On depressing the key K the circuit from the main battery M B is completed through the levers *a* and *b* and their respective contact-stops, the electro-magnet A of the receiving instrument and the line, but at the same time the contact-stop *e* comes in contact with the stop *d* in the lever *c*, and the circuit from the local or neutralizing battery L B is completed through the

opposing magnet B and resistance R. The armature-lever, placed between these two magnets, is thus equally attracted on both sides, and consequently remains unmovable, so that no signal is given at the home station by currents sent from that station. When, however, a signal is transmitted from the distant station the magnet A is alone affected, and, consequently, the armature-lever is moved and a signal given.

I am aware that an apparatus for double transmission somewhat similar to this has been described by Gintle, but the apparatus was found impracticable for the reason that the circuit was opened at every movement of the key, which is avoided in this system by the use of a key so constructed that the circuit always remains closed either through the levers *a* and *b* to the line, or through the lever *b* and its back contact to earth.

I do not confine myself to the form of opposing magnet described herein, but propose to use other devices for neutralizing the effect of the main current—as, for instance, a magnet having two coils wound in opposite directions on the same coil, or other forms of magnet described by me in former patents.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. A key, consisting of the levers *a b c*, with their respective contact-stops, combined and arranged as and for the purpose set forth.

2. The combination of the key above described with a coil or magnet excited by the main-line battery, an opposing or neutralizing magnet or coil, local battery, and resistance, as and for the purpose as set forth.

JOSEPH B. STEARNS.

Witnesses:

WILLIAM A. HAYES, Jr.,
C. E. CRANE.