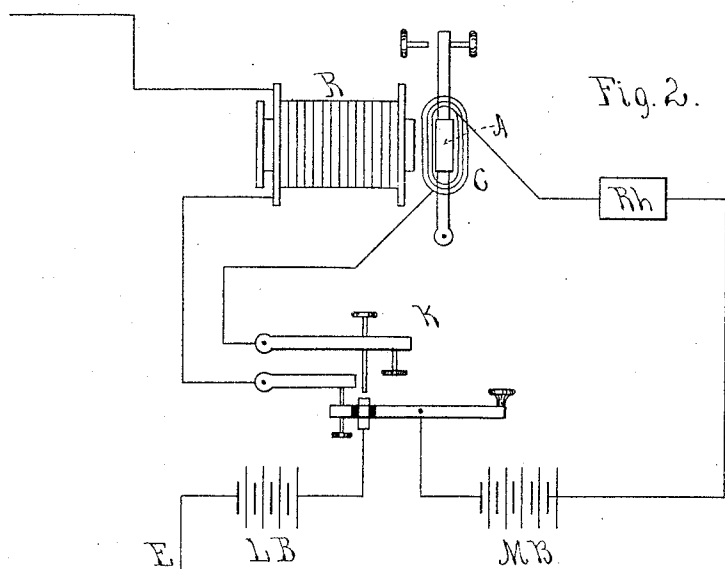
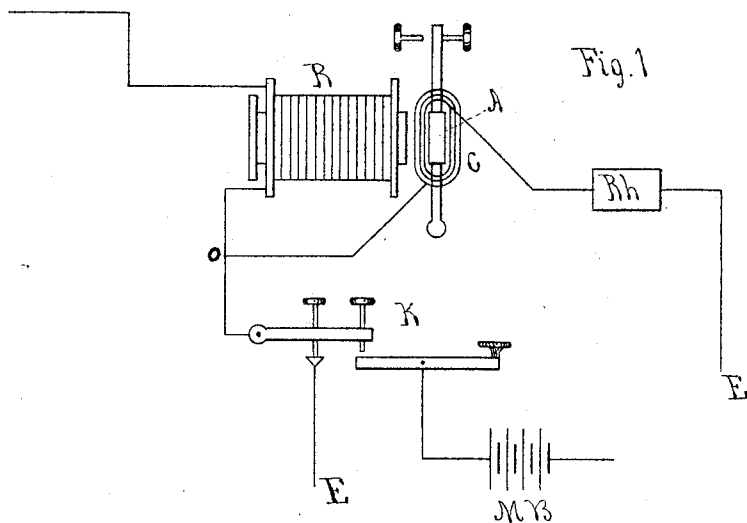


J. B. STEARNS.
Duplex Telegraphs.

No. 147,525.

Patented Feb. 17, 1874.



Witnesses.

Wm. A. Hayes
C. E. Graw

Inventor.

Joseph B. Stearns
by his attorney
A. L. Hayes

UNITED STATES PATENT OFFICE.

JOSEPH B. STEARNS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN DUPLEX TELEGRAPHS.

Specification forming part of Letters Patent No. **147,525**, dated February 17, 1874; application filed February 21, 1873.

CASE A.

To all whom it may concern:

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

The nature of this invention consists of an improved relay or receiving magnet for duplex telegraph apparatus, in which the neutralization of the outgoing current in the said relay or receiving magnet is effected by passing one portion of the outgoing current through the coils of the relay in the ordinary manner, and the other portion of the current through a coil surrounding the armature of said magnet.

In Letters Patent granted to me June 2, 1868, No. 78,547 and No. 78,548, the construction and operation of a duplex-telegraph apparatus for simultaneously transmitting two signals from opposite ends of the same line-wire is fully described; and it is there stated that the principle of operation of said apparatus consists in preventing the relay at the transmitting-station, though always in the circuit, from responding to the signals transmitted from that station by dividing the outgoing current into two portions and neutralizing one portion by the other. Various methods of accomplishing this result are given in the patents referred to. I have also described in another application filed by me in the Patent Office another apparatus for duplex transmission, in which the relay or receiving instrument at the transmitting station, though always in the circuit, is prevented from responding to the transmitted signals from the home station by simultaneously sending through it currents from two batteries—currents which neutralize each other.

The accompanying drawing, forming part of this specification, represents my invention, in which—

Figure 1 shows my improved relay or receiving magnet arranged with the first-named form of duplex apparatus, and Fig. 2 the relay arranged with the second-named form.

In these drawings, R is the relay-magnet; A, the armature; C, the surrounding coil; K, the key; Rh, a resistance or rheostat; and S B and M B, batteries.

In the apparatus represented in Fig. 1 the operation is as follows: On closing the key K the current from the battery M B divides at *o*, and one portion passes through the relay R in a direction, say, to produce north polarity in the armature A, and at the same time the other portion of the current passes through the coil C in a direction to produce an equal degree of south polarity in the same end of the armature, consequently these currents neutralize each other and the armature remains unaffected. When, however, the current arrives from the distant station it passes through the magnet R only, and not through the coil on the armature, on account of the resistance R, and consequently the armature is attracted, for the reason that the polarity given it by the inductive action of the magnet is not neutralized by a current of equal strength through the coil on the armature.

In the apparatus represented in Fig. 2 the operation is as follows: On closing the key K the currents from both batteries pass simultaneously—one to the relay-magnet R, the other to the coil C on the armature—with the same result as above. When, however, the current arrives from the distant station it passes only through the magnet R, and the armature is attracted for the same reason, as before explained.

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

The combination of the magnet R, armature A, and coil C, in the manner and for the purpose substantially as set forth.

JOSEPH B. STEARNS.

Witnesses:

A. L. HAYES,
WM. A. HAYES, Jr.