(No Model.)

C. D. HASKINS.

QUADRUPLEX TELEGRAPHY.

No. 455,398. Patented July 7, 1891.

Fig. 1.

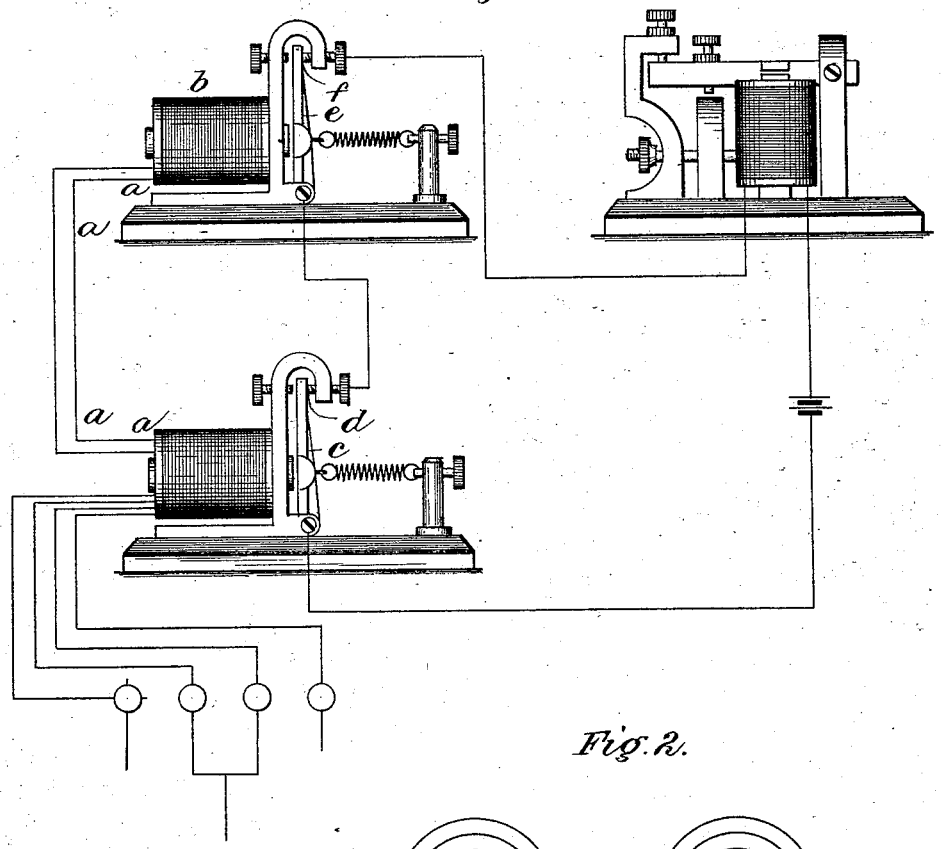
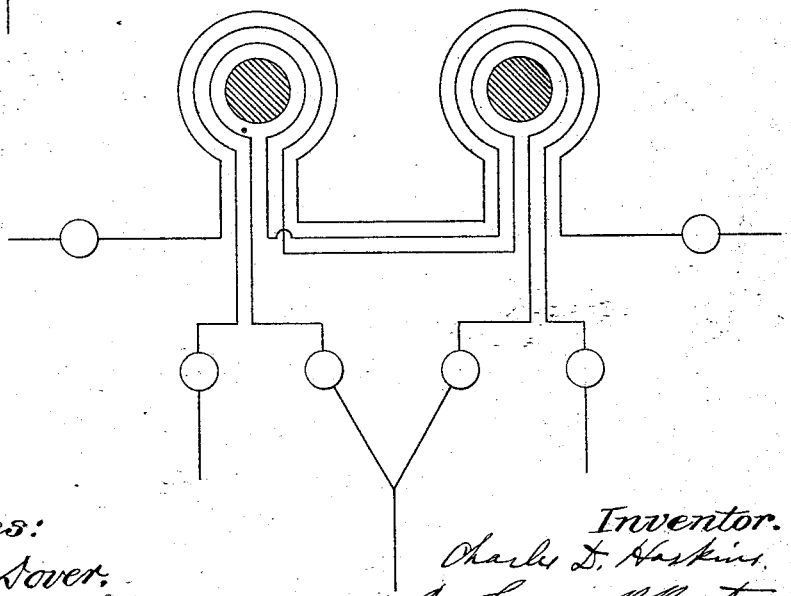


Fig. 2.



Witnesses:
Sam'l B. Dover.
Chas. G. Hawley.

Inventor.
Charles D. Haskins.
By George P. Barton
Attorney.

UNITED STATES PATENT OFFICE.

CHARLES D. HASKINS, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS.

QUADRUPLEX TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 455,398, dated July 7, 1891.

Application filed November 19, 1887. Serial No. 255,601. (No model.)

To all whom it may concern:

Be it known that I, CHARLES DARWIN HASKINS, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Quadruplex Telegraphy, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

In quadruplex systems of telegraphy one line is provided at each end with two receiving and two transmitting instruments, with circuits so arranged that four messages may be simultaneously transmitted over the single line—that is to say, four operators are required at each end of the line, two for sending and two for receiving. Considering the apparatus at one end of the line we have two receiving-instruments, one a polarized relay and the other a neutral relay. The transmitting-instruments consist one of a double-current transmitter or pole-changer and the other of a single-current transmitter or continuity circuit-preserving key. The receiving-instruments are wound differentially in the well-known way, so that the current sent through their coils by the transmitting-instruments at the same end of the line will not operate either of them. This is accomplished in brief by sending current in branches through the differential windings, one branch going to ground and the other branch to line, the electrostatic capacity and resistance of the line being equalized by a condenser and rheostat in the well-known way.

In the working of quadruplex systems of telegraphy of this class a well-known defect exits. This defect is a false signal, which is caused at the neutral relay when the polarity of its current is changed by the double-current transmitter at the distant end during the time that the armature of said neutral relay should be held up by the operation of the single-current transmitter.

My invention is designed to avoid such false signals; and it consists in an extra helix on the neutral relay-magnets, the terminals of which are connected to the magnet-terminals of an ordinary back contact-relay, the local contact-points of both relays being connected consecutively in the local circuit with the sounder and local battery, thus making it necessary that both armature-levers should rest against the back contact-points to close the circuit—that is to say, when either relay is energized the local circuit is held open. By this means when the neutral relay gives a false signal by the falling away or kicking of its armature an induced current is generated in the extra coil, and this induced current passing through the coils of the ordinary relay energizes the same and its armature is attracted momentarily, and thus the circuit is opened at said ordinary relay local contact-points at the time the circuit is falsely closed at the neutral relay by the kick of its armature. The sounder being in the same circuit with the local contacts of both relays, it will not be actuated by the kick or false signals of the neutral relay, since the induced current sent, as before described, through the coils of the ordinary relay will cause said relay to hold the circuit through the sounder open during the time that the armature of the neutral relay is away from its poles.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view of the neutral relay with its attendant relay and sounder at one end of the line. Fig. 2 is a diagram illustrative of my method of winding a differential relay.

Like parts are indicated by similar letters of reference throughout both figures.

The magnet of the neutral relay, in addition to the differential or working coils, is provided with an extra coil *a*. This coil *a* is included in the circuit of the coils of the relay *b*. If now while the magnet of the neutral relay is energized its polarity be suddenly reversed, its armature *c* would drop back momentarily or kick, so as to close the circuit at *d*; but at the same time a current would be momentarily induced in the extra coil *a*, and this induced current sent through the coils of relay *b* energizes the same, thus moving the armature-lever *e* to open the circuit at *f*. Thus when the circuit is closed at *d* by the kicking of the armature the circuit will be broken at *f*, and hence no false signal will be given by the sounder. When the magnet of the neutral relay is demagnetized by dimin-

ishing the strength of the current, as is done in case of true signals, the armatures *e* will remain back, so as to close the circuit at *f* during the time the armature *c* closes the circuit at *d*. Thus the local circuit is opened and closed at the will of the operator who is working the single transmitter at the distant end, and no false signals can be transmitted.

The method I have illustrated in the drawings I consider the best manner of carrying out my invention.

Any manner of connecting the armature *e*, which is operated by the extra current, with the circuit of the local sounder, so as to prevent magnetizing said local sounder at the time the extra current is generated, I consider within my invention.

The method of differential winding illustrated in Fig. 2 forms the subject-matter of another application filed of even date herewith.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The local circuit of a neutral quadruplex relay, in combination with the contact-points *d* of said relay, a battery, a signaling device, and the contact-points of the relay *b*, the electro-magnet of said relay being included in circuit, with a third winding or helix upon the magnets of the quadruplex neutral relay, whereby the local circuit through the signaling device is closed when the armature-levers of both relays are simultaneously on their back contacts,

2. A local circuit containing a battery, a sounder, and the contacts of two relays, one of said relays being a quadruplex neutral relay and the other being a relay with its coils included in circuit with a special helix or third winding upon the electro-magnet of the quadruplex neutral relay, whereby the local circuit through the sounder is closed when the armature-levers of both relays are simultaneously on their back contacts.

In witness whereof I hereunto subscribe my name this 5th day of October, A. D. 1887.

CHARLES D. HASKINS. [L. S.]

Witnesses:
JOHN J. CARTY,
MILLS H. LANDON.