

(No. Model.)

F. W. JONES.
QUADRUPLEX TELEGRAPHY.

No. 360,528.

Patented Apr. 5, 1887.

Fig. 1.

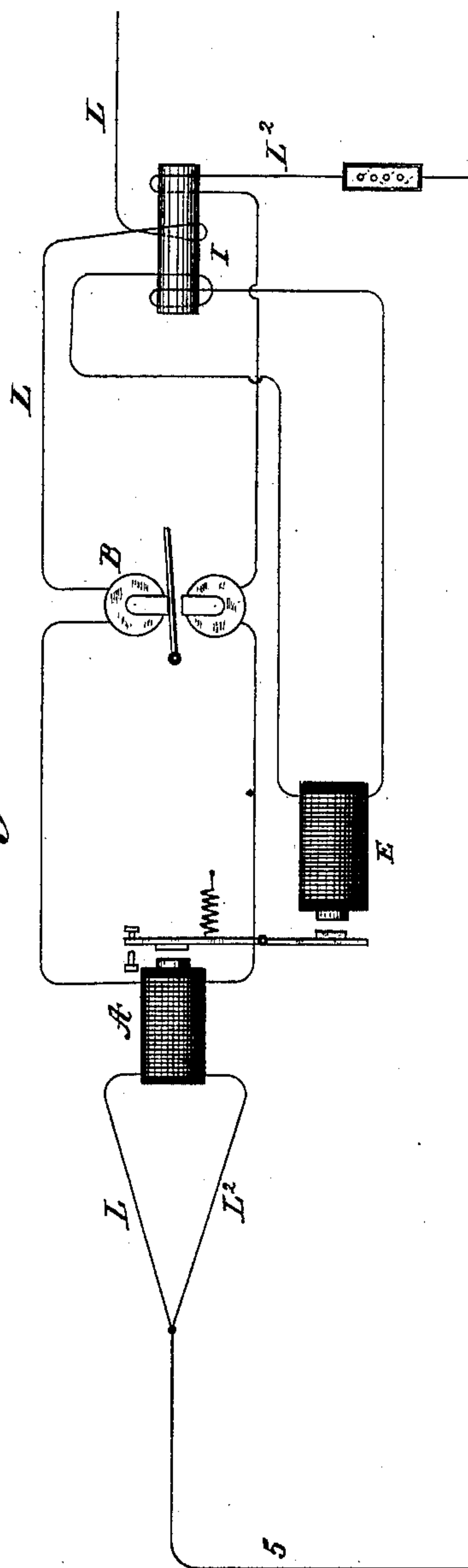
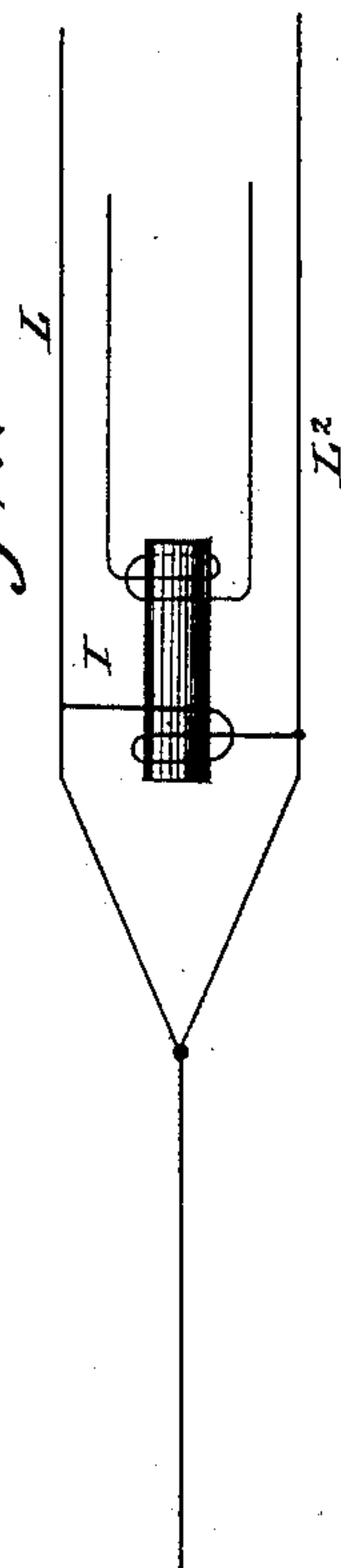


Fig. 2.



WITNESSES:

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QUADRUPLIX TELEGRAPHY.

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To all whom it may concern:

Be it known that I, FRANCIS W. JONES, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Means for Bridging Reversals in Quadruplex Telegraphy, of which the following is a specification.

The object of my invention is to provide a simple and effective device for preventing false signals in the receiving apparatus of a duplex or quadruplex telegraph, when, through reversal of the line-current to affect a polar relay or instrument, the neutral relay or instrument, which is at the same time receiving a signal, may momentarily lose its power, so as to allow its armature-lever to fall back and make a false movement.

It is well known that in the operation of duplex or quadruplex telegraphs neutral relays are subjected to the difficulty mentioned, owing to the fact that at the instant of reversal they momentarily lose their power.

My invention consists, essentially, in the combination, with the armature-lever of a neutral relay, of a supplemental electro-magnet acting on the same in proper way to hold the armature-lever up, and an induction-coil whose secondary is connected to said supplemental electro-magnet, while its primary is connected to the line-circuit, so as to be affected by the reversals of current which tend to disturb the position of the relay-armature of the neutral receiving-instrument.

My invention consists, further, in certain improved combinations of apparatus, which will be hereinafter described, and more specifically stated in the claims.

I have herein illustrated my invention as applied to the receiving-instrument of a duplex or quadruplex telegraph in which one message is sent by changes of tension solely, without change of polarity, and the other by changes of polarity without changes of tension, this system and combination of currents being what is sometimes called the "Edison system." The invention is, however, applicable to other duplex and quadruplex telegraphs employing other combinations of currents, where the neutral relay is subjected to loss of power through reversals of current em-

ployed in affecting other instruments on the circuit.

In the accompanying drawings, Figure 1 is a diagram of apparatus embodying my invention and showing the same applied to the receiving-instrument at one end of a quadruplex telegraph in which the relays are wound differentially or with coils included in main and artificial lines or circuits, so as to be unaffected by outgoing signals. Fig. 2 shows a modified way of connecting the primary of the induction-coil to the main and artificial lines.

L indicates the main line and L' the artificial line, A being the neutral receiving-instrument and B the polar receiving-instrument or relay.

The wire connected to the transmitting apparatus, which latter is omitted for the sake of simplicity, is indicated by the numeral 5. The main and artificial lines branch from the wire 5 in the ordinary way.

E indicates an electro-magnet, which acts upon the armature-lever of the neutral receiving-instrument or relay A in an obvious way, so as, when excited, to tend to hold the armature-lever of A against its front stop. The coils of the magnet E are connected with the secondary of an induction-coil, I, which I prefer to arrange in the manner shown, with its primary coil made in two portions, included, respectively, in the main and artificial lines L L', so that the induction-coil shall be unaffected by outgoing signals.

The operation of the apparatus would be substantially as follows: Outgoing currents produce no effect upon the electro-magnet E, because the primary of the induction-coil, being substantially unaffected, does not set up a secondary current in the coil connected to magnet E. When the neutral relay A is excited in response to a signal from the distant station and its armature-lever is drawn against its front stop, a reversal of the line-current for the purpose of acting on electro-magnet B, or any other polar instrument in the circuit, would cause the magnet A to lose its power for an instant at the time of reversal, and the armature-lever of said instrument might be drawn back so as to produce a false signal. This, however, is prevented by the operation of the electro-magnet E, which at

the instant of the loss of power in magnet A is excited through the secondary current set up by the operation of the line-current on the primary of the induction-coil at the instant of reversal. The result is that although the magnet A may lose its power, the magnet E comes in to fill the gap and holds the armature-lever of the relay against its front stop.

I am aware that it has been before proposed to employ a supplemental coil for the same purpose, wound upon the same core with magnet A; but in such case the supplemental coil must be wound in a particular direction, and there are other difficulties which are entirely avoided by the employment of the separate magnet I have herein shown.

I have shown my invention applied to the apparatus at one end of a quadruplex line; but it is evident that it may be applied in other positions, provided the primary be properly connected to feel the reversals and hold the armature-lever of neutral relay A against its front stop at the instant of reversal.

It will be observed that when the armature-lever of relay A is drawn up the armature of electro-magnet E is brought nearer to the pole of the magnet. There ensues this advantage, that at the time magnet E is required to produce its compensating effect its armature is close to the pole of the magnet, so that, even though the parts be so adjusted that the secondary current may not be strong enough to draw the armature of magnet E away from its retracted position, it will still be strong enough to hold the armature up and prevent false signals at the time that the armature-lever of magnet A is against its front stop.

It is obvious that the primary of the induction-coil may be rendered insensible to outgoing currents by any of the arrangements employed in duplex telegraphs for preventing the

receiving-instrument at one end of the line from responding to the messages transmitted to the distant end. It is therefore quite plain that the primary of the induction-coil might be included in the bridge of a Wheatstone bridge-duplex, after the manner indicated in Fig. 2.

In respect to the manner of connecting the induction-coil primary to the circuit, many modifications are allowable without departing from the essential principles of the invention.

What I claim as my invention is—

1. The combination, with a neutral receiving-instrument placed on a line on which reversals of current take place, of a supplemental electro-magnet acting on the armature-lever of said neutral receiving-instrument in a proper direction to hold the lever against its front stop and an induction-coil whose secondary is connected to the supplemental electro-magnet, while its primary is connected to the line, so as to be responsive to reversals of polarity of the line-current taking place at the time that the neutral receiving-instrument is excited.

2. The combination, substantially as described, of a neutral relay, a supplemental electro-magnet acting on the armature-lever of said relay, an induction-coil whose primary is properly connected so as to be insensible to outgoing currents, and a secondary for said induction-coil connected to the supplemental electro-magnet.

Signed at New York, in the county of New York and State of New York, this 7th day of December, A. D. 1886.

FRANCIS W. JONES.

Witnesses:

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