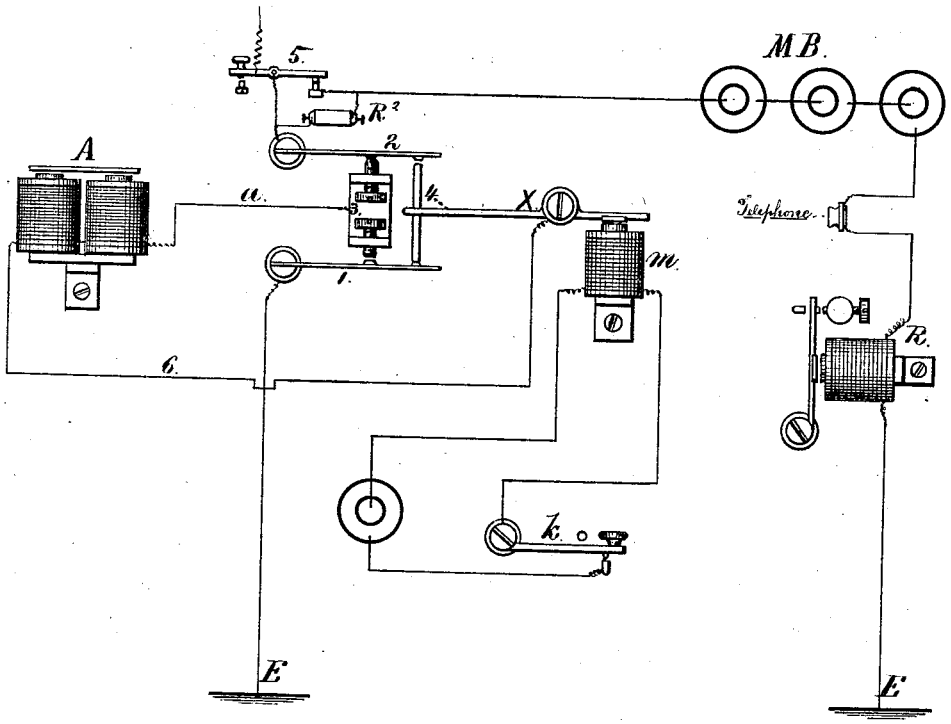
T. A. EDISON.

Duplex-Telegraphs.

No. 217,782. Patented July 22, 1879.



Witnesses

Harold Serrell

Chas. H. Smith

Inventor

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per

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atty

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY, ASSIGNOR TO WESTERN UNION TELEGRAPH COMPANY, OF NEW YORK, N. Y.

IMPROVEMENT IN DUPLEX TELEGRAPHS.

Specification forming part of Letters Patent No. **217,782**, dated July 22, 1879; application filed November 14, 1878.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the State of New Jersey, have invented an Improvement in Telegraphs, of which the following is a specification.

The object of this invention is to transmit signals from one point in a circuit to other points in the same circuit without adding battery, opening the line, or varying the resistance, in order that two series of signals may be transmitted simultaneously.

The invention consists in placing an electro-magnet in circuit, and reversing its position in the line by a reversing apparatus, so that the self-induction of the magnet, which takes place at the moment of a change in the polarity of its cores, shall weaken the constant current for an instant and thus transmit the signal.

A is the electro-magnet, placed in the main line. X is a reversing-sounder. When the local circuit, in which is the magnet *m*, is opened by the key *k*, the line passes through spring 2 to 3, thence by wire *a* to the magnet A, thence by wire 6 to the lever 4, through spring 1 to the earth.

If, now, the key *k* be closed, *m* attracts the lever, and the position of the magnet A is reversed; or, in other words, a change in polarity occurs in its cores by the current of the line passing through it in the opposite direction.

The current from the line passes through spring 2 to lever 4, thence by wire 6 to A, thence by wire *a* to 3, thence through spring 1 to the earth. Although there is a constant current circulating in the line from the main battery, M B, at the moment of reversing the magnet, the powerful induction-current from A is sufficient to neutralize it for an instant. This slight opening, although scarcely affecting the relay R, becomes audible on inserting a telephone-receiver at any point in the line.

If a key, 5, be inserted in the line, and shunted with a resistance-coil, R^2, of, say, one thousand ohms, the throwing in and out of this coil by the key will cause the relay R to work, and, owing to the form of the wave, will not affect, to a perceptible degree, the telephone-receiver; hence two series of signals may be transmitted simultaneously in various directions over a single wire. Of course several stations may be placed on one circuit.

I will mention that a shunted condenser or secondary battery may replace the magnet A.

It is to be understood that the key 5 varies the tension of the line and produces a signal at the relay R, regardless of the position of the magnet A or its equivalent in the line, and that the polarity of the line is not changed by operating the key *k;* but by said key *k* a momentary change in the condition of the line is produced that is responded to in the telephone.

A condenser or secondary battery in the line acts the same as the electro-magnet A, when the flow of the current through the same is reversed by the circuit-connections without the circuit being broken.

I remark that numerous telephones may be placed in the line at various stations, and that all will respond whenever any one of the magnets in the line is reversed in its position in the line, and that these magnets A may be the ordinary relay-magnets of the Morse or other system.

By adding the key and connections one station can signal another or converse with another over the main-line wire without breaking the circuit.

I do not herein claim the combination in one circuit of telephone-instruments and the Morse instruments, as the same is set forth in my prior application No. 132.

I claim as my invention—

1. The method herein specified of producing an electric condition in the closed circuit of a telegraph-line that will give a signal in a telephone by reversing the position in that line of an electro-magnet, secondary battery, or similar device, substantially as specified.

2. The combination, in a closed circuit, of a receiving-magnet, a telephone, an electro-magnet, or its equivalent, and an apparatus for reversing the connections of the same in the circuit, a rheostat or resistance, a shunt to the same, and a key, substantially as set forth.

Signed by me this 11th day of November, A. D. 1878.

THOMAS A. EDISON.

Witnesses:

S. L. GRIFFIN,

MARTIN N. FORCE.