

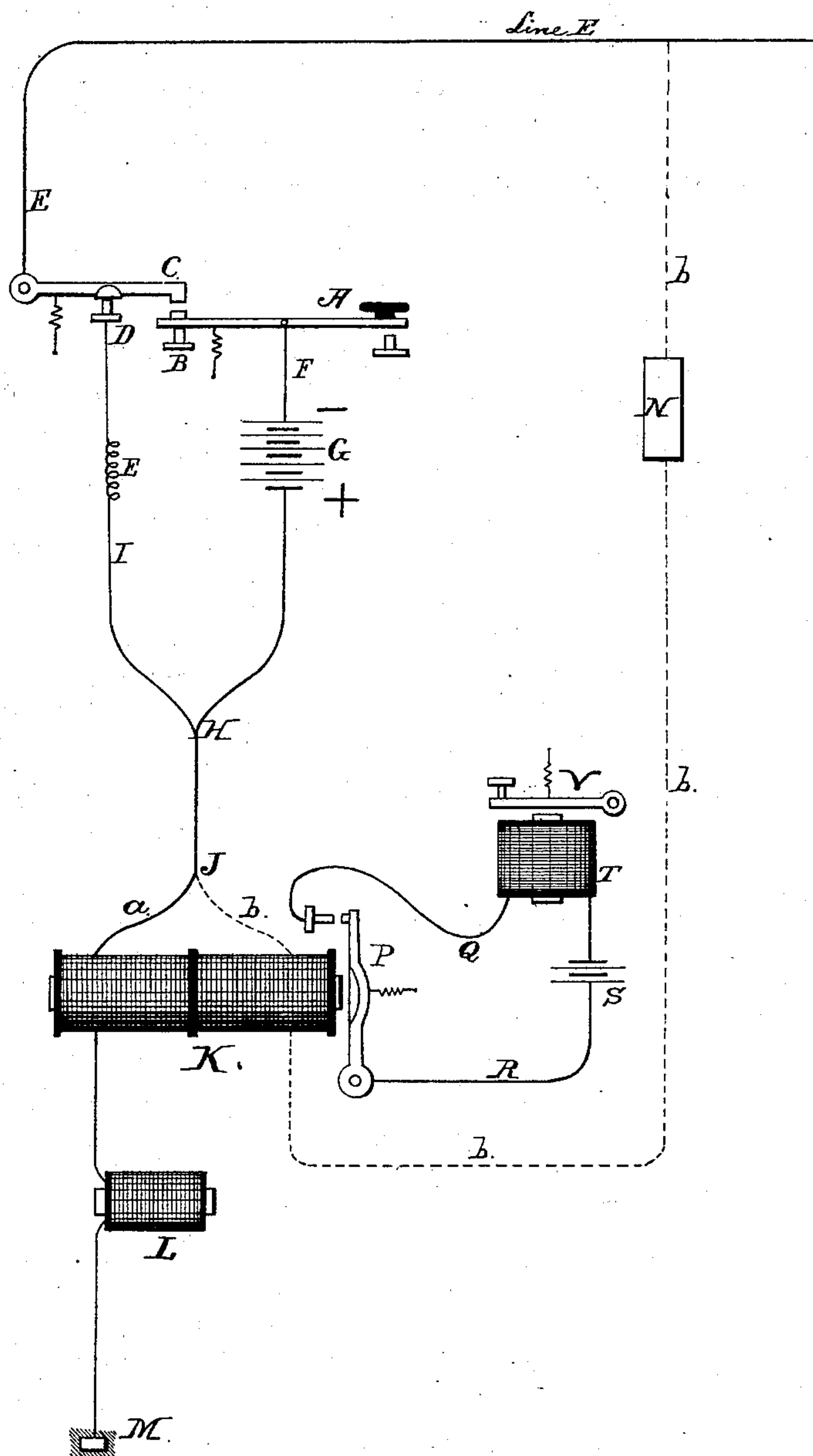
(No Model.)

G. W. GARDANIER.

DUPLEX AND MULTIPLEX TELEGRAPHY.

No. 280,028.

Patented June 26, 1883.



Witnesses;
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UNITED STATES PATENT OFFICE.

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DUPLEX AND MULTIPLEX TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 280,028, dated June 26, 1883.

Application filed December 26, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. GARDANIER, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Duplex or Multiple Telegraph Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to an improvement in duplex or multiple telegraph systems; and its object is to prevent the "static discharge" of the main line from producing false signals upon the sounder or receiving-instrument at the home station during the process of transmitting signals therefrom.

My invention consists in the production, in the main line between the battery and earth at the home station, of a static discharge simultaneous with and substantially equal to and of the same polarity as the static discharge of the main line, the effect being that the two discharges of like polarity will neutralize each other and permit the receiving-instrument at the home station to remain unaffected. The "static charge" of a telegraph-line, and the effect of its discharge upon the receiving-instrument at the transmitting-station, when not obviated, are well understood.

In the practice of my invention I place an inductive resistance coil or coils in the main line between the battery and earth, which permits the same to be charged in an opposite direction to that of the main-line charge, and vice versa, the current in the main line being always of opposite polarity to that with which the induction-coils are charged. Upon permitting the transmitting-key to assume its normal position, after the line has been charged in one direction and the induction-coils in an opposite direction, the static discharge of the line and of the induction-coils will be of like polarity, and will be met by a static discharge of like polarity from the induction-coils toward the relay. The two currents of like polarity, meeting, will instantly neutralize each other, and the said discharge of the line will thus be prevented from producing false signals at the transmitting-station. By the ar-

rangement of the induction-coil in the main line between the battery and earth I am enabled to simultaneously charge it with a current of opposite direction to that sent to the line; and as the extra or induced current of the said coil is always in the same direction with that with which it is charged, it will appear plain that the static discharge of the line and of the coil will be of like polarity and will neutralize each other without affecting the relay. The extra or induced current of the inductive resistance coil or coils renders *nil* the discharge of the line.

The invention will be readily understood by reference to the accompanying diagram, which illustrates it embodied in the apparatus at one of the terminal stations of a single-current system of duplex telegraphy; but it must be distinctly understood that the invention is applicable, with equally satisfactory results, to either single or double current systems of multiple transmission.

Referring to the accompanying drawings A denotes the transmitter, which may be actuated by the finger direct or by the usual form of key in connection with an electro-magnet and local battery. The working end of the transmitter-lever plays between the resting contact B and the swinging end of the pivoted lever C, which, when in its normal position, rests upon the contact D. From the pivot end of the lever C the main line E extends to the distant terminal. A wire, F, including the battery G, passes from the transmitter A and merges at H, with the wire I leading to the contact D, and containing coils E, which offer a resistance equal to the internal resistance of the battery. From the point H a wire is continued to the point J, where it separates, one branch (lettered *a*) passing around one end of the relay K, thence to the inductive resistance-coil L, and then to the earth at M, the other branch, *b*, constituting the artificial line, passing around the opposite end of the relay K to the line E, being provided between the relay and line with the rheostat N, or equivalent device, whose resistance is equal to that of the main line. At one end of the relay K is the usual armature, P, which, in connection with the wires Q R, local battery S, and electro-magnet T, actuate the sounder V in the

customary manner. I shall use one or more inductive resistance-coils L, according to the length and other varying conditions of the line.

5 When the transmitter A is depressed, a current in one direction is sent from the battery G through the said transmitter and the lever C to the line E, and at the same time a current in an opposite direction passes from the bat-
10 tery to the point J, where it divides on the branches *a b*, that part of the said current which passes through the branch *b* finding its way through the artificial line, main line, lever C, and transmitter A, back to the battery,
15 while that portion on the branch *a* charges the induction-coil L, and passes thence to the earth. Upon the opening of the transmitter A there will be a static discharge of the line, and also of the induction-coil L. The static discharge
20 of the line will be in the opposite direction to the current with which it was charged, and the discharge of the induction-coil will be in the same direction in which it was charged, and the two discharges, being of the same po-
25 larity, will neutralize each other and prevent the discharge of the line from affecting the home relay.

The apparatus hereinbefore described does not constitute any part of the invention sought
30 to be protected by this application, and is illustrated merely that the invention claimed herein may be clearly understood. The relay K is of well-known construction, being provided with two separate coils having the same num-
35 ber of convolutions, and arranged so that when

the current from the branches *a b* pass through them they will have an equal and opposite magnetic effect upon their soft-iron cores, and thereby counteract each other's influence. No attraction of the armature will thus occur, and
40 hence when the transmitter at the home station is depressed there will be no signal caused thereby on its associate receiving-instrument.

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

45 1. The method of preventing the static discharge of a telegraph-line from producing false signals upon the sounder or receiving-instrument at the home station in the process of
50 transmitting signals therefrom, which consists in the simultaneous production, in the main line between the battery and earth at the home station, of a static discharge substantially equal to and of the same polarity as the said static
55 discharge of the line, the effect being that the two discharges of like polarity will neutralize each other and prevent the false signals, substantially as set forth.

2. In a duplex or multiple telegraph apparatus, an inductive resistance-coil placed in
60 the main line between the battery and earth, and arranged to operate substantially in the manner and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE W. GARDANIER.

Witnesses:

CHAS. C. GILL,

HERMAN GUSTOW.