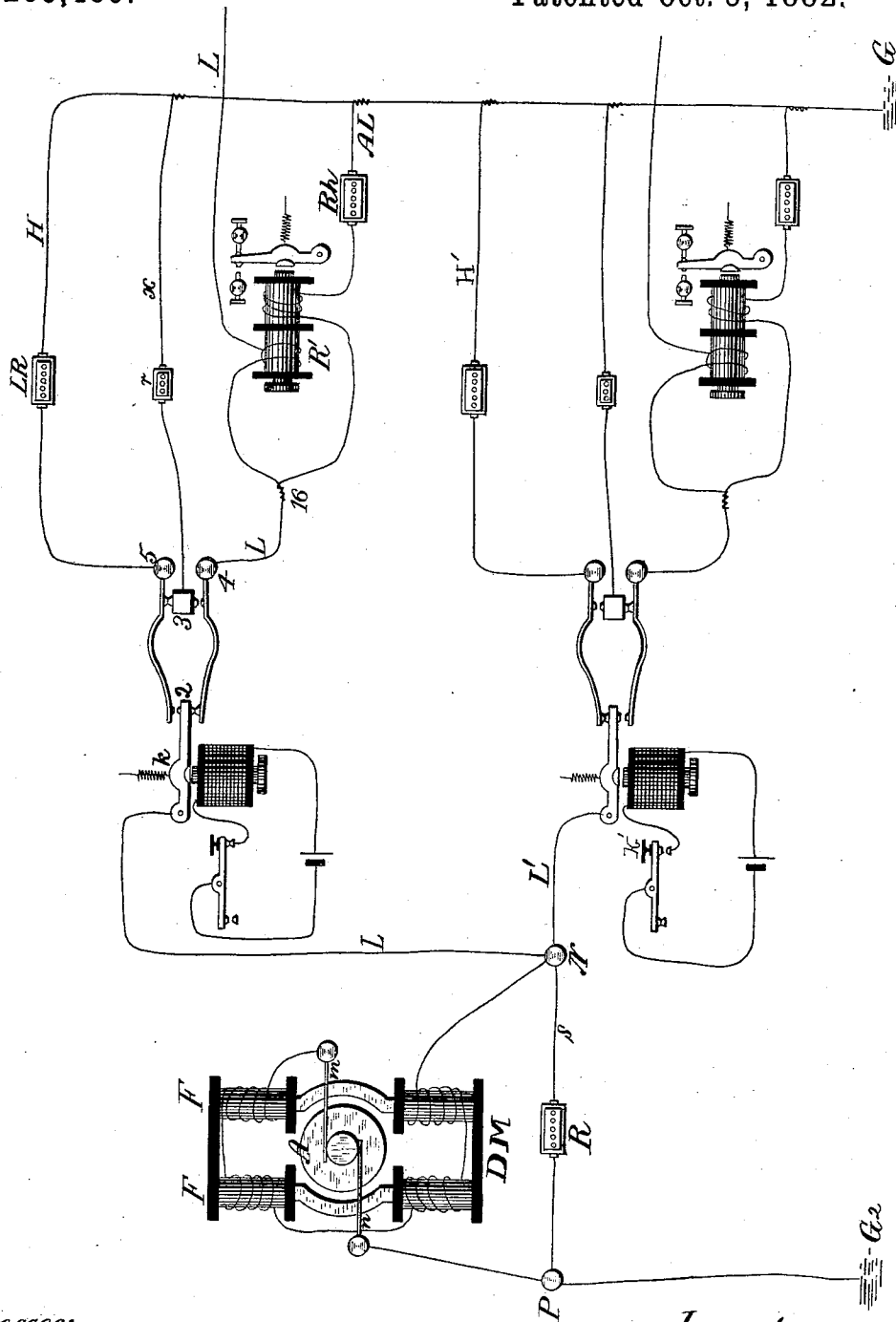


(No Model.)

G. D'INFREVILLE.
DYNAMO TELEGRAPHY.

No. 265,489.

Patented Oct. 3, 1882.



Witnesses:
J. R. Grammet
John C. Sanders

Inventor,
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UNITED STATES PATENT OFFICE.

GEORGES D'INFREVILLE, OF NEW YORK, N. Y., ASSIGNOR TO THE WESTERN UNION TELEGRAPH COMPANY, OF SAME PLACE.

DYNAMO-TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 265,489, dated October 3, 1882.

Application filed April 27, 1881. (No model.)

To all whom it may concern:

Be it known that I, GEORGES D'INFREVILLE, of the city, county, and State of New York, have invented a new and useful Improvement in the Art of Applying Dynamo-Electric Machines for Telegraphic Purposes, of which the following is a full and exact specification, reference being had to the accompanying diagram.

10 In an application for a patent executed of even date herewith, and designated as application A, I have fully described the application of a dynamo-electric machine for feeding several branch telegraph-circuits with electricity.

15 In said application I have shown, in connection with each of the series of branches or telegraph-circuits, a shunt which is opened and closed automatically by closing and opening the respective telegraph-circuit with which it co-operates; but my invention as embodied in this application does not broadly embrace said feature.

25 The invention embraced in this application has for its object the application of a dynamo-electric machine for the purpose of feeding telegraph-lines working duplex; and to this end I have provided each transmitting-key upon the several lines with a shunt or branch circuit connected to earth at or near the transmitting-key, in addition to the branch containing a small resistance for the purpose of furnishing a compensating resistance equal to the resistance of the generator at the transmitting station, as is employed in duplex telegraphy, it being understood that the compensating resistance ordinarily employed shall be equal to or less than the joint resistance of the generator and of its shunt or shunts, in order that when the generator is alternately put to line and taken therefrom the resistance of the circuit to the incoming currents shall be maintained constant. The additional branch for such line employed for the purpose of applying dynamo-electric machines to duplex telegraphy is so arranged that when the transmitting-key disconnects the machine from the main line it shall connect the machine with said additional compensat-

ing branch, and to fulfill the purpose of said branch its resistance must be equal to or less than the joint resistance of the main and artificial line. 50

The dynamo-machine which I employ is known as one of the "accumulative" form, in which the currents induced in the armature are conveyed through conductors surrounding the field-magnets of the machine, whereby the field-magnetism of the machine is maintained by its own currents. The internal resistance of said machine therefore consists of the conductors upon its field-magnets and upon its armature, while its external resistance consists of the joint resistance of a constantly-closed shunt, and the series of telegraph-lines joined to the poles of the machine in multiple arc. 55
The external resistance of the machine in respect to the constantly-closed shunt will be constant; but in the process of sending messages upon various ones of the many lines joined in multiple arc connections and disconnections of said lines to the machine must arbitrarily occur. When the machine is disconnected from any main line, if there be no provision for compensation, no circuit is provided for the machine in respect to said line, and to such an extent the resistance of the external circuit of the machine in multiple arc will necessarily be increased, and the electro-motive force of the machine will be materially decreased, and possibly to a great extent; and if all of the series of lines were simultaneously disconnected it is obvious that the external resistance of the machine would be great and equal to the resistance of the constantly-closed shunt, while if all the lines were simultaneously closed in multiple arc the joint resistance would be less, and possibly much decreased. With my arrangement, upon the disconnection of any telegraph-line from the machine, a simultaneous connection between the machine and a compensating branch circuit is made, the resistance of said branch circuit being equal to or less than that of the line. Therefore, whether any one or all of the telegraph-lines be disconnected or not, the joint external resistance of the machine 60
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must remain practically the same, since the operation of the transmitting-keys to effect connections and disconnections at the same time effects a substitution of circuits.

5 I will now describe my invention by a specific reference to the accompanying diagram.

D M represent a dynamo-electric machine having field-magnets F F, armature A, and brushes *m* and *n*.

10 P and N represent the positive and negative poles of the dynamo-machine, and said poles are joined with a constantly-closed shunt, S, having a resistance, R, the amount of which is intermediate in amount between the low internal resistance of the dynamo-machine and the higher joint resistance of all the telegraph-lines joined to the poles of the machine in multiple arc.

The telegraph-lines, when desired, may be 20 joined to the pole N of the machine, being connected to earth at distant stations; or, if desired, they may be connected to pole P and to earth at distant stations. The dynamo-currents of the machine have their origin in the armature A, and are conveyed by brushes *m* and *n* from the armature immediately around the field-magnets F F to the poles P and N. A large portion of the current necessarily makes a complete circuit from P to N through the shunt S, while other portions of the current of the dynamo-machine find a circuit from one pole of the machine to the other over the various telegraph-lines to earth at distant stations, and thence through the earth back to 30 the earth-connection G² at the home station.

35 *k* represents a key or transmitter for duplex telegraphy upon line L. When said key is open currents from the machine cannot pass over the line L, but instead may pass over the branch H, having a resistance, L R, equal to or less than the joint resistance of the main and artificial line. The circuit in this event will be from negative pole N over line L to key K, point 2 over spring to point 5, branch H, 40 earth G to earth G², pole P to the negative pole N, through the dynamo-machine itself. While key *k* is open and a circuit is in the meantime provided from the dynamo-machine over branch H to earth G, the main line L is 50 connected through point 4 and anvil 3 to the branch *x*, having a resistance, *r*, connected to earth G. The resistance of *r* is made equal to the joint resistance of the generator and its shunt or shunts, as is well understood in telegraphy, in order that incoming currents from the line may meet a constant resistance both when the generator is connected to and disconnected from the line. In like manner the other lines may be disconnected from the dynamo-machine, and at the same time the dynamo-machine will be connected over their respective branches.

60 R' represents an ordinary differential relay oppositely wound, with branches from main line L dividing at point 16.

A L represent the artificial line having resistance R *h*, and G the earth-connection to which artificial line A L, compensating branch *x*, and branch H are all carried.

In addition to the line L, attached to pole 70 N, L' and several other lines may be attached thereto. The line L', as shown in the drawing, is provided with a transmitting-key and a compensating branch, H', similar to branch H, provided for line L. The connections at 75 the transmitting-station in respect to line L' are altogether similar to those of line L, and therefore require no specific description.

I do not desire to claim in this case a dynamo-electric machine for telegraphic purposes, 80 in combination with a main telegraph line or lines forming a portion of the external circuit of said machine when closed, and a compensating shunt or shunts joining the opposite poles of said machine, whose resistance or resistances are approximately equal to those of 85 corresponding main lines, with or without an automatic switch or switches which close said shunt or shunts when the main line or lines are opened and break said shunt or shunts 90 when the main lines are closed, as such matter is fully claimed in another application filed by me.

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

95 1. The combination of a dynamo-electric machine, a duplex telegraph-line and artificial circuit, a transmitting-key, a compensating branch whose resistance is equal to or less than that of the duplex line, and a branch 100 whose resistance is substantially equal to the internal resistance of the dynamo-machine.

2. The combination of a dynamo-electric machine and a series of duplex telegraph-lines 105 attached to one of the poles of said machine in multiple arc, each line being provided with a transmitting-key and two compensating branches, the resistance of one branch being equal to or less than the resistance of the main line, and the resistance of the other branch 110 being equal to the resistance of the generator, or to the joint resistance of the generator and its shunt, the whole being so arranged that upon the operation of the transmitting-key of any line said line is successively connected 115 first through the dynamo-machine and then through the branch whose resistance is equal to the resistance of the machine, while at the same time the machine is successively connected 120 first to the main line and then to the branch whose resistance is equal to or less than the resistance of the main line.

3. A dynamo-electric machine whose field-magnetism is maintained with the currents due to its own armature, and whose poles are joined 125 by a constantly-closed shunt, in combination with a series of duplex lines, each of which lines is provided with a transmitting-key and two compensating branches whose resistances are substantially equal to the respective re- 130

sistances of the main line and the resistance of the generator, the whole being so arranged that when by the operation of the transmitting-key the main line is disconnected from
5 the dynamo-electric machine, said main line is connected with the branch whose resistance is equal to that of the generator, and also when the machine is disconnected from the main line said machine is connected by means

of a transmitting-key to the branch whose resistance is equal to the resistance of the main line, substantially as set forth.

April 20, 1881.

GEORGES D'INFREVILLE.

Witnesses:

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W. B. VANSIZE.