(No Model.) 2 Sheets—Sheet 1.

P. H. VANDER WEYDE.

TELEGRAPHY.

No. 306,977. Patented Oct. 21, 1884.

Fig. 1.

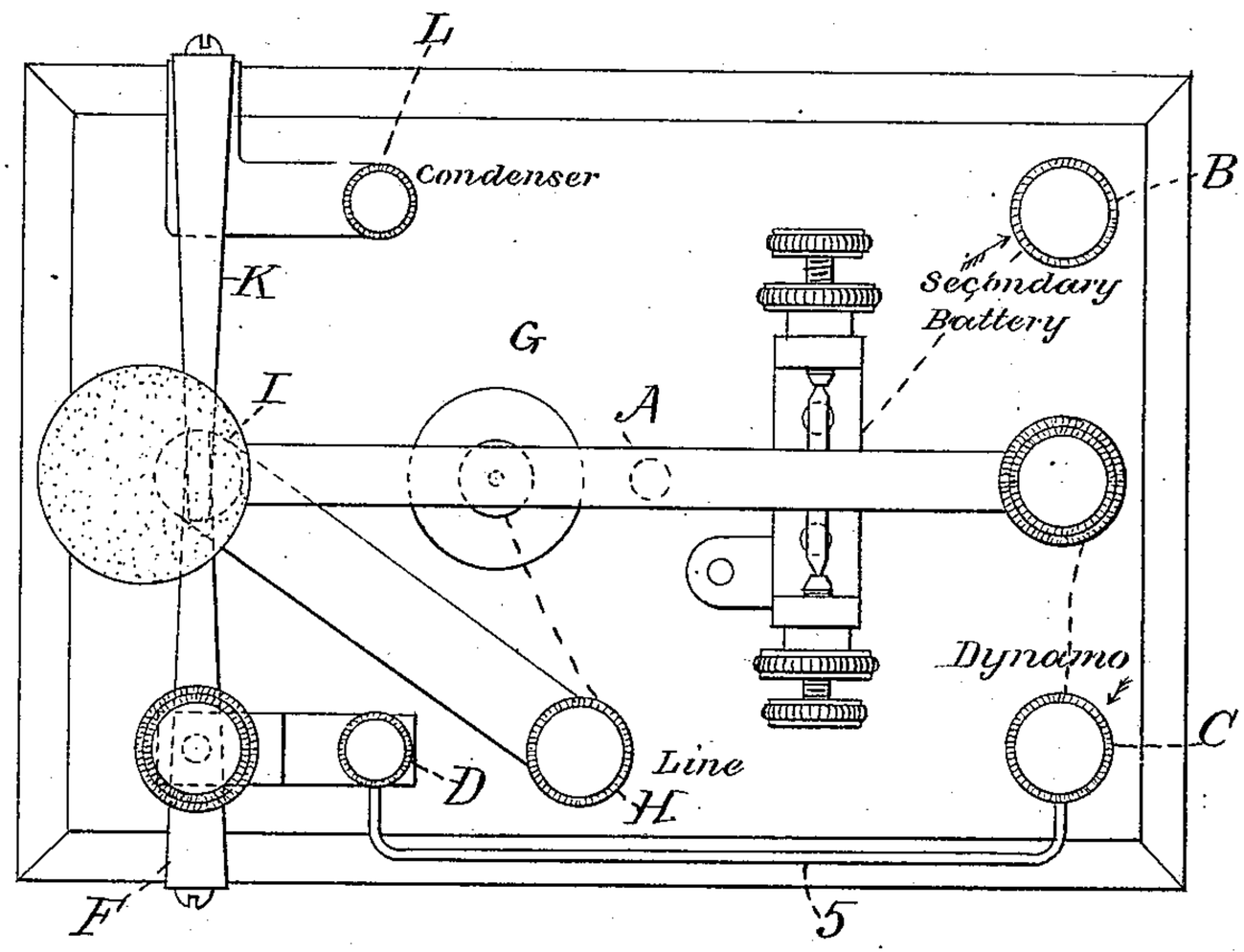


Fig. 2.

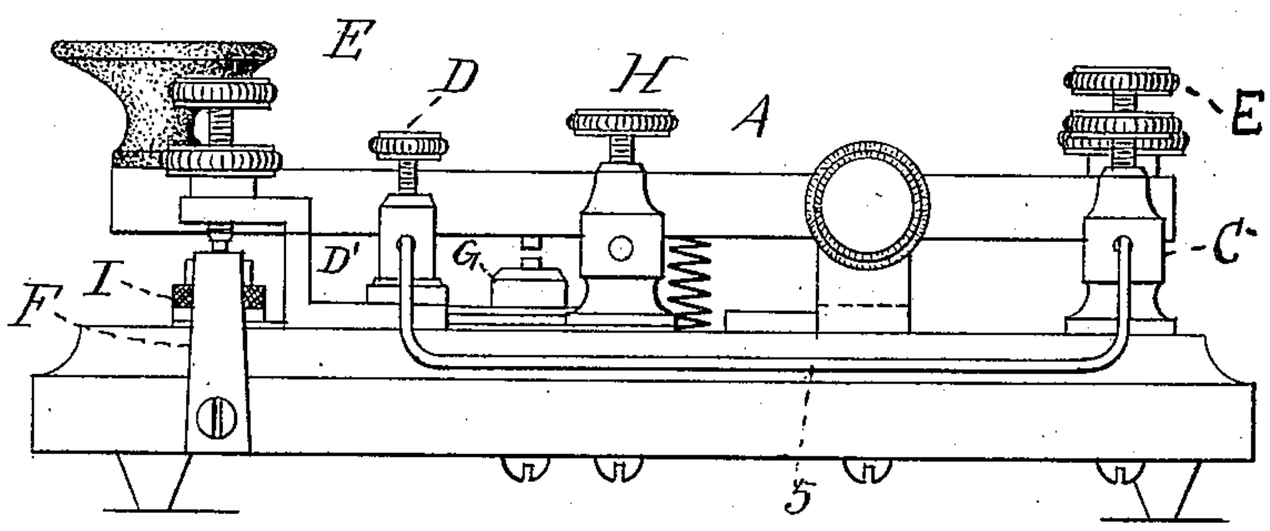


Fig. 3.

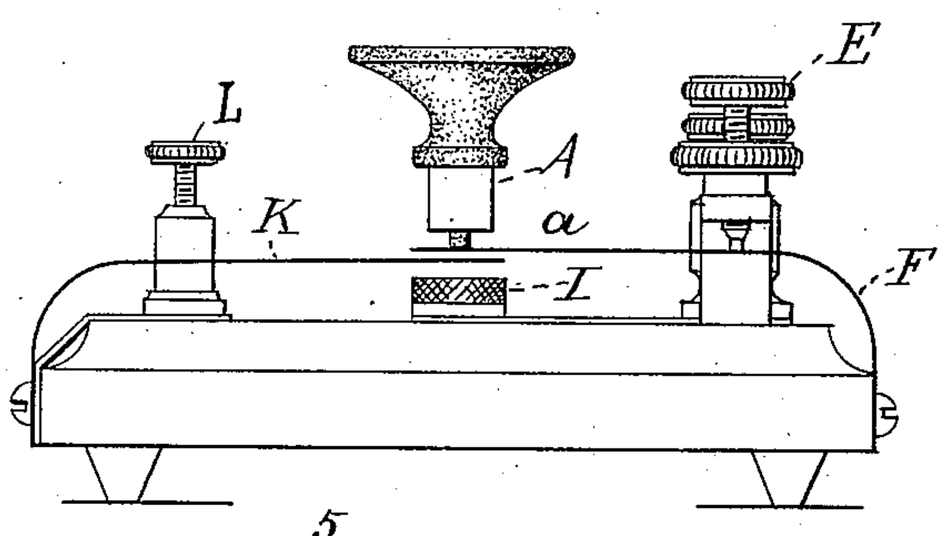
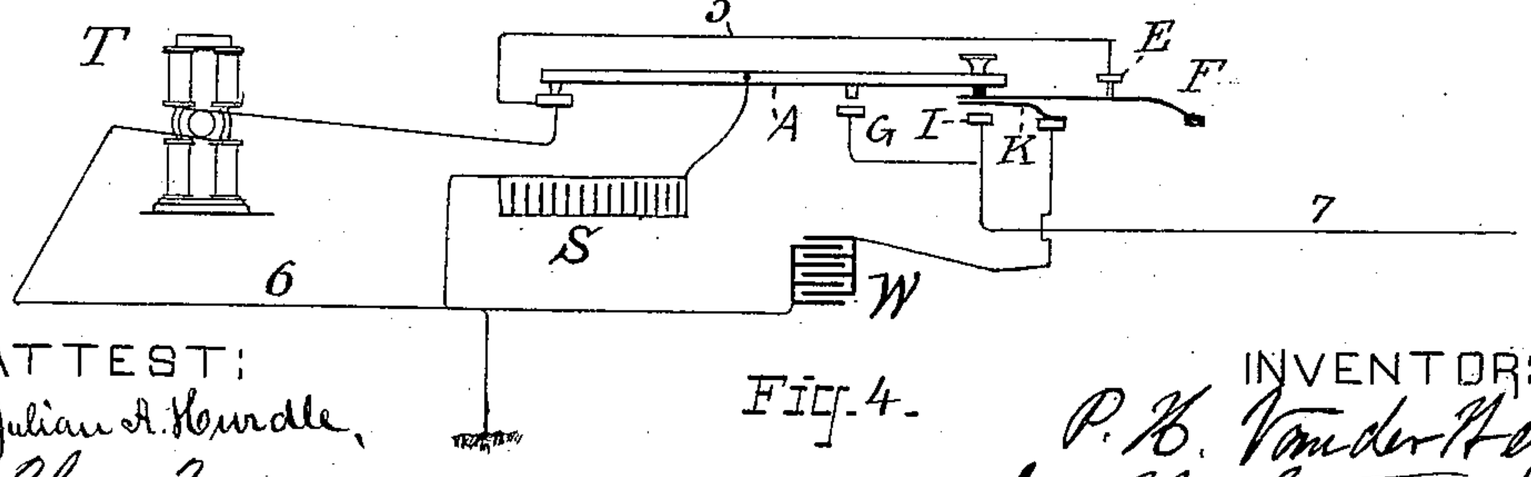


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

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TELEGRAPHY.

No. 306,977. Patented Oct. 21, 1884.

Fig. 6,

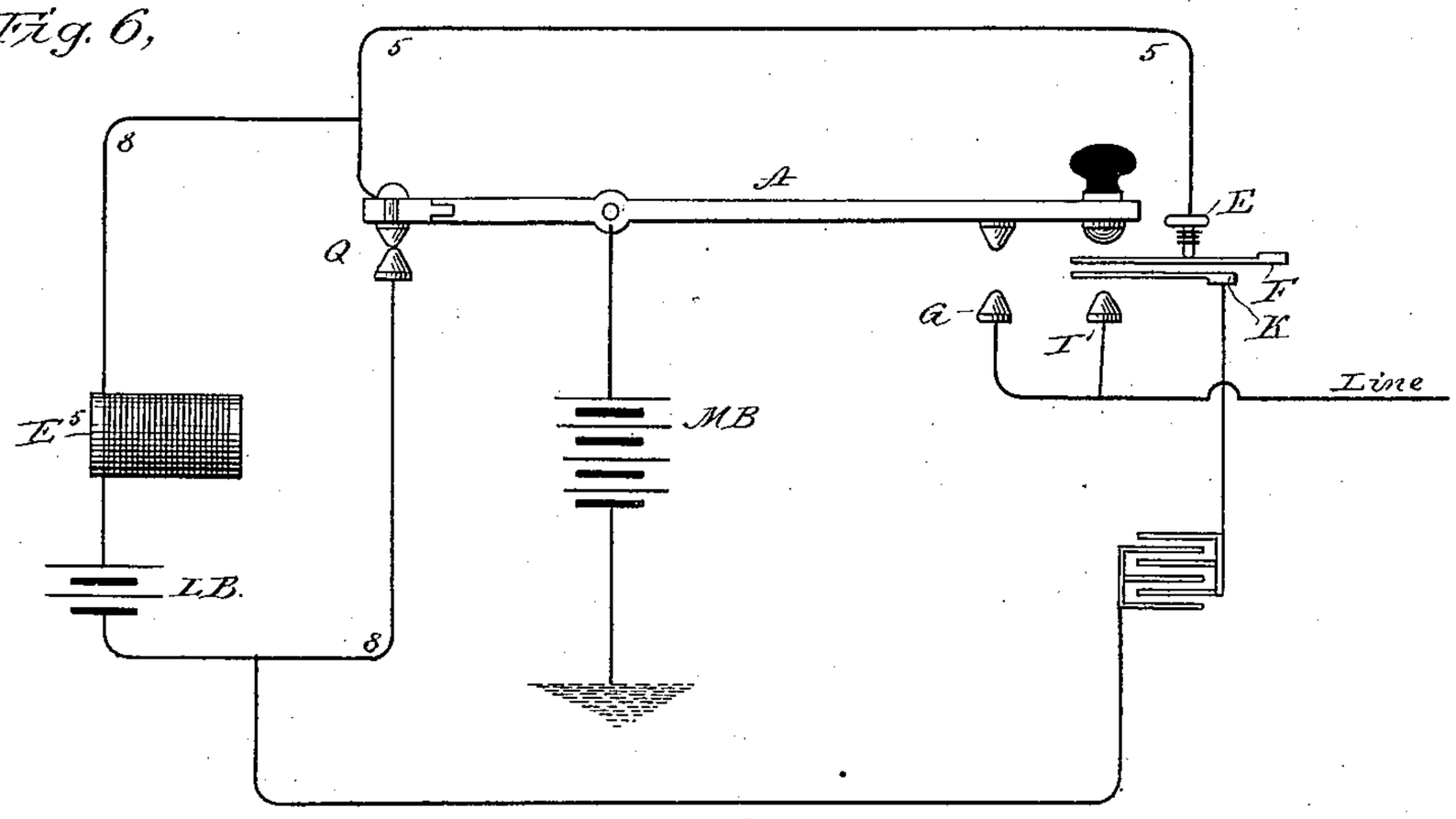
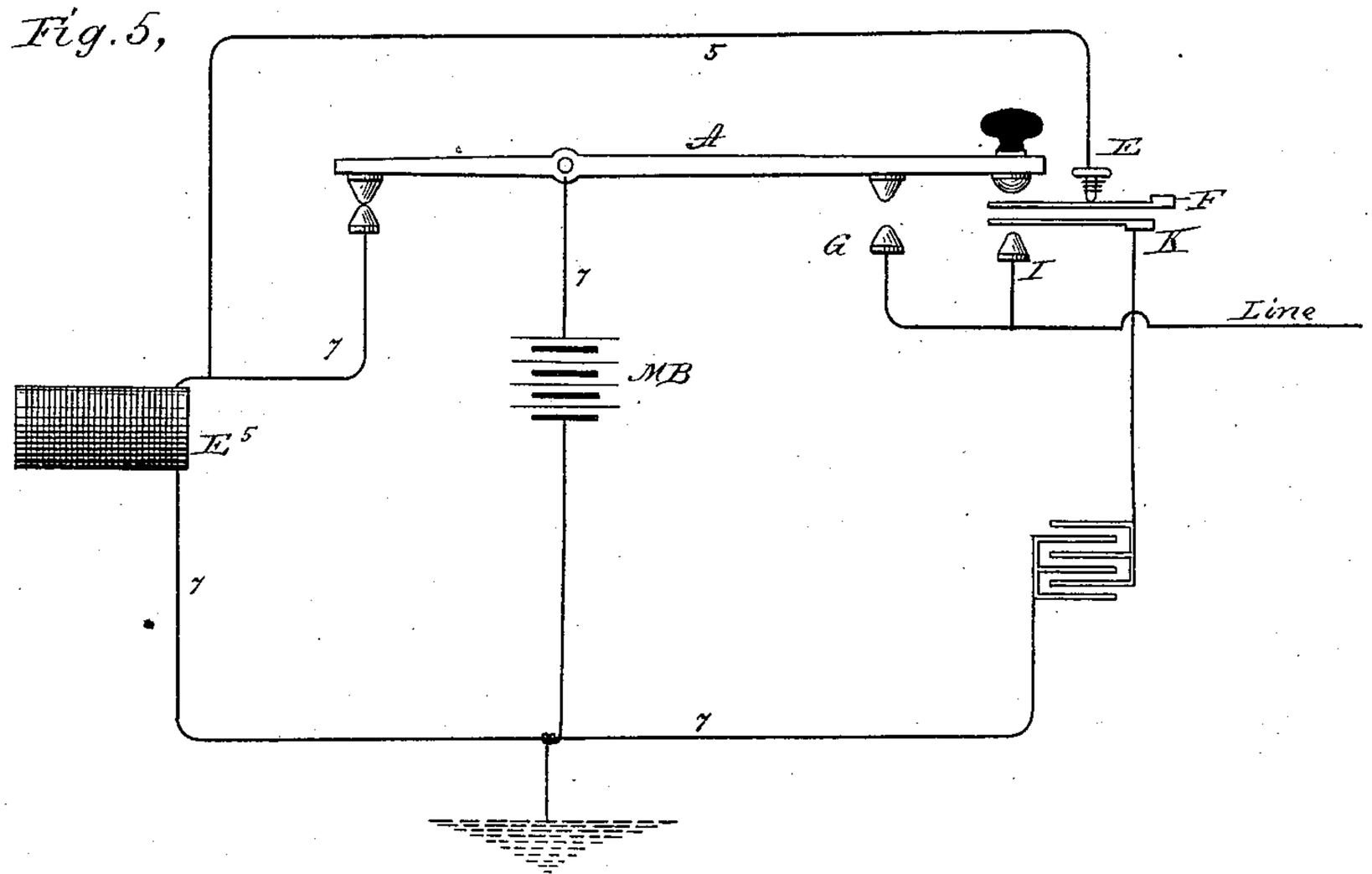


Fig. 5,



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UNITED STATES PATENT OFFICE.

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TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 306,977, dated October 21, 1884.

Application filed March 2, 1882. (No model.)

To all whom it may concern:

Be it known that I, PETER H. VANDER WEYDE, 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 Telegraphy, of which the following is a specification.

In the operation of both land and submarine telegraphs of whatever kind, when the line is of considerable length, a sensible interval elapses after the closure of the electric circuit at the transmitting end of the line before the signal can be observed at the receiving end and before the electric wave attains its maximum strength. This phenomenon is due, as is well known, to the effects of static induction in the line, and also to what may be termed the "inertia" of the receiving-instrument, time being required before the receiving-instrument can be made to feel the full effect of the electric wave, and to give any manifestation of the passage of a current.

The object of my invention is to overcome so far as possible the retardation of signaling due to the above or other causes; and this I propose to accomplish by re-enforcing the electric wave or impulse flowing from the signaling-battery or other generator at the moment that it begins to flow by the aid of the discharge current from a condenser automatically charged at the moment before the main-line circuit is closed for the purpose of placing the signal-current to line. By thus re-enforcing the electric wave at the commencement of its flow—that is, at the time when the effects in the receiving-instrument are at their weakest—I am enabled to make the signal manifest at a shorter interval after the closing of the circuit at the transmitting end, and to considerably increase the speed of signaling.

In carrying out my invention, I propose to charge the condenser by the extra current produced by the breaking of the closed circuit of any suitable generator—such as a dynamo-electric machine, galvanic battery, or a secondary battery—at the transmitting end of the line, and to connect the condenser to the line simultaneously with the generator supplying the line-current, so that the discharge from the condenser will re-enforce the generator-current at the beginning of the electric wave or impulse, the operations of connecting the condenser to the proper circuits to receive the extra current and of placing it to line with the current from a machine or battery being performed automatically and concurrently with the operations of the transmitting-instrument in the act of signaling. I ordinarily prefer to use the extra current produced by the breaking of a local circuit for the same generator that is used for supplying the signaling-current to the line, although, as will be readily understood, this is by no means necessary; and I may, if desired, use two separate generators—one for supplying the line or signaling-current, and the other for charging the local circuit, the breaking of which, in the act of signaling, by the operation of the transmitting-instrument produces the extra current which charges the condenser as a preliminary to the connection of the first generator together with the condenser to line.

I have herein described my invention in connection with a novel arrangement of a dynamo-electric generator, a secondary battery, and a transmitter, which forms the subject of an application for patent filed by me in the United States Patent Office on the 11th day of February, 1882, No. 52,347, in which arrangement the dynamo is made to charge the secondary, and the transmitter is made to disconnect the dynamo from the secondary, and connect the latter to line whenever a signaling wave or impulse is to be sent to line. I have herein described the transmitter as acting to break the local circuit from the dynamo-machine to the secondary battery, for the purpose of producing the extra current; but while the novel combination, hereinafter described, of the dynamo-machine, secondary battery, transmitter, and condenser forms of itself a specific and valuable portion of my invention, the circuit broken might just as well, so far as the general and broad objects of the invention are concerned, be the circuit of a dynamo-machine only, the current of said machine or of some other suitable generator being employed to send the signaling-current; or it might be the circuit of a secondary battery charged in any desired manner, or a galvanic battery, said circuit containing by preference electro-magnetic coils or helices of any desired

kind, the current of either of said batteries or of an additional generator of any desired kind being employed for the signaling current.

For the sake of simplicity I have described my invention in connection with the Morse system of telegraphy; but it is obvious that the objects and results to be accomplished belong also to other systems, and I do not desire to limit myself to the particular application of my invention herein described, nor to the particular devices shown, as the invention consists, broadly, in a method of re-enforcing the signaling-current at the beginning of its flow by the aid of the discharge-current from a condenser, the charging of which has been previously accomplished automatically by the extra current set up through the breaking of a closed circuit simultaneously with the movement of the transmitter in the act of signaling.

Referring to the accompanying drawings, Figure 1 is a top view of a Morse key provided with attachments by which my invention may be carried into effect. Fig. 2 is a side view of the same. Fig. 3 is an end view. Fig. 4 is a diagram showing the manner in which the various parts are electrically connected. Figs. 5 and 6 are diagrams illustrating modifications of the invention.

A represents the lever of a telegraph-key mounted in the ordinary manner upon a base-board, and electrically connected with a post, B, which serves for the connection of a wire leading to a secondary battery. The back contact-stop for the key is formed in the ordinary manner, and is electrically connected with a binding-post, C, which serves for the connection of a wire running to a dynamo-electric machine. The post C is also in electrical connection through a wire, 5, with a post, D, which in turn is mounted upon and in electrical connection with a plate, D′, carrying at its upper end an adjustable contact-screw, E, with which, when the key is at rest or against its back contact-stop, a spring, F, secured to the base-board, and insulated from the other parts, makes electrical contact.

The front contact-stop or anvil for the key is indicated at G, and is in electrical connection with the main-line post H, after the ordinary fashion. Electrically connected with the same post, H, is another contact-stop or anvil, I, with which another spring, K, makes contact when forced down against the anvil by the key. Spring K is in permanent electrical connection with a post, L, to which one pole of a condenser is connected, and its free end is overlapped beneath the end of the key-lever by the free end of the spring F. A stud, *a*, of insulating material, or of conducting material suitably insulated, is connected to the bottom of the key-lever, and when the lever is operated for the purpose of closing the line-contact G said stud carries spring F into contact with K, and the latter into electrical connection with the second line contact-stop I. In this operation spring F is removed from contact with the screw-stop, E, which, as before explained, is in electrical connection with the post C, connected with the dynamo-electric machine and with the rear anvil of the key. The contact I is adjustable up and down, and by preference the spring K is provided with an adjusting-screw similar to E.

The operation of the devices is as follows, the various parts being suitably adjusted to secure the desired sequence of making and breaking the various circuits.

The connections and the operation will be more readily understood from Fig. 4, in which T represents a dynamo-electric machine, one pole of which is connected to the rear anvil of the key-lever, while its other pole is connected to a wire, 6, leading to a secondary battery, S, whose other terminal is in constant connection with the key-lever by post B, as before explained.

W represents the condenser, one pole of which is in constant connection with the spring K by means of post L, while its other pole is connected to earth, and also to the wire C, which latter forms a portion of the closed circuit in which the extra current for charging the condenser is set up. The secondary battery is also provided with a ground-connection, as shown. The main line is represented at 7. When the key is at rest and against its rear anvil, there is a closed circuit through the key from the dynamo-electric machine to the secondary battery, which is thus charged, as explained in my former application, and is ready at any time to supply the main-line current when the transmitter is closed. In the closed circuit thus formed through the dynamo-machine and secondary, the extra current is set up which is employed for charging the condenser. The key being in its normal position, as just assumed, the line-contacts at G and I are open, and the springs F and K are also out of contact with one another, while spring F rests against contact-screw E, which, as before explained, and as shown in the diagram, is connected to the circuit including the dynamo-machine and the secondary battery, and between one pole of the dynamo-machine or other generator and the secondary battery. The opposite pole of the condenser from that joined to spring K is connected to the wire leading from the opposite pole of the dynamo to the secondary battery. From this connection it follows that if the closed circuit of the dynamo-machine be broken at the back contact of the key, and at this instant connection be made between wire 5 and the pole of the condenser connected to spring K, the extra current set up by the coils of the dynamo will flow to and charge the condenser. When the key is depressed for the purpose of closing the contact at G and putting the current from the secondary battery to line, the first effect is to disconnect the dynamo from the secondary. By this act the closed local circuit in which the secondary and dynamo are

included is broken, and simultaneously the local circuit, or that portion thereof which contains the dynamo-machine, is connected to the condenser through the wire 5, stop E, and springs F and K, which are brought into contact with one another by the depression of the key simultaneously with the breaking of the local circuit at the rear anvil, so that the extra current set up by the disruption of the local circuit is conveyed to the condenser and charges the same. In the present instance the extra current is of considerable strength, although it will not be inconveniently so if a quantity dynamo-machine be used and the secondary battery be charged with its plates in multiple arc, as explained in my prior application. As the movement of the key continues the current from the secondary battery is placed to line by the closing of line-contact at G, while simultaneously the condenser is connected to line by the contact of spring K with the anvil I, so as to re-enforce the first portion of the electric impulse, the spring F and contact E being so adjusted that immediately after the condenser receives the extra current the contact between F and E is broken. As the key returns to its normal position the condenser is disconnected from the line, and the parts are restored to their former condition.

It is obvious that, instead of the coils of the dynamo-machine, any form of electro magnetic coils or helices arranged in any closed charged electric circuit may be employed for giving strength to the extra current on the breaking of such circuit when the transmitter is operated. It is therefore to be understood that my invention is not limited to a system of telegraphy employing a secondary battery for supplying the line-currents and a dynamo-machine for charging the secondary, arranged with relation to one another in the manner shown herein and claimed in my prior application referred to, and I may in place of such arrangement use any of the ordinary means for supplying the current to the line, and I also may make use of other closed circuits for setting up the extra current, instead of that containing the main-line generator.

Some of the various modifications of my invention are illustrated in Figs. 5 and 6.

In Fig. 5, M B indicate an ordinary transmitting galvanic battery, and E^5 an electro-magnet in the local circuit 7 therewith closed through the back contact of the key when the latter is at rest. The connections of the stop E and of the condenser are made to said closed circuit, as shown, so that the extra current set up on the breaking of said circuit may be carried to the condenser as before explained.

In Fig. 6 the circuit by whose breaking the extra current is developed is independent of the transmitting-battery, and is closed through insulated back contacts, *q*, of the transmitter A.

L B is a local battery in the normally-closed circuit containing the electro-magnet E^5. The circuit containing the battery L B and the magnet E^5 is indicated by the numeral 8, and connection is made to said circuit in the manner shown and as before explained. The action is in principle the same as in the cases before illustrated.

Other constructions of Morse key and attachments may be employed for producing the necessary changes in the circuits, this being a matter capable of many variations.

As my method may be applied to other systems of telegraphy besides Morse telegraphy, I do not wish, as I have before stated, to be understood as limiting myself in this respect.

What I claim as my invention is—

1. The combination, with a transmitter, of a condenser, means for charging the condenser simultaneously with the operation of the transmitter, and circuit closing or controlling devices for connecting the condenser to line at the instant of the connection of the transmitting battery or source, so that the discharge of the condenser may aid the transmitting-current at the beginning of the electric impulse.

2. The combination, with a transmitter, of a condenser, a charged circuit closed when the transmitter is at rest, means for breaking said charged circuit to produce a charge of the condenser at the instant the transmitter is operated, and circuit-closing devices for connecting the condenser to line at the beginning of the electric signal, as and for the purpose described.

3. The combination, substantially as described, of a signaling battery or generator, a closed electric circuit therefor, a telegraph-transmitter, a condenser, apparatus for breaking said closed circuit and connecting the same to the condenser concurrently with the operation of the transmitter, and means for connecting the condenser to line simultaneously with said signaling battery or generator.

4. The combination, substantially as described, with a telegraph key or transmitter, of a condenser, and means for connecting said condenser to a local circuit when the transmitter begins to move, and upon the continuance of the movement breaking the connection to said local circuit and connecting the condenser to line.

5. The combination, substantially as and for the purpose set forth, of a telegraph-key, a battery or other suitable current-generator, a condenser, and means for connecting and disconnecting the condenser to the main-line circuit simultaneously with the connection and disconnection of the current-generator.

6. The combination, substantially as described, of a battery or other suitable current-generator, a telegraph-key whose back contact forms a portion of a local circuit for said generator, circuit-closing devices for completing a connection between said local circuit and a condenser when the local circuit is broken, and means for connecting said condenser to

the circuit closed by the front contact of the key when the latter closes said circuit.

7. The combination, substantially as and for the purpose set forth, of a secondary battery, a dynamo-electric generator, a telegraph-transmitter, a condenser, and circuit-connections, and devices, as described, whereby when the circuit between the generator and the condenser is broken the extra current produced thereby is made to charge the condenser, and the discharge current from the condenser is conveyed to line simultaneously with the current from the secondary battery.

PETER H. VANDER WEYDE.

Witnesses:
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