(No Model.)

C. SELDEN.

STATIC NEUTRALIZER FOR TELEGRAPHS.

No. 291,096. Patented Jan. 1, 1884.

Fig. 1.

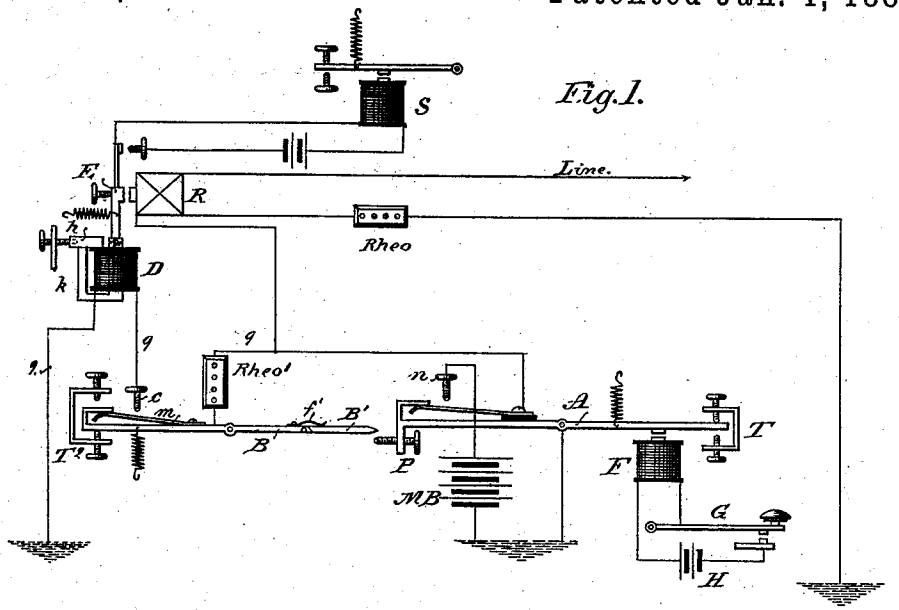


Fig. 2.

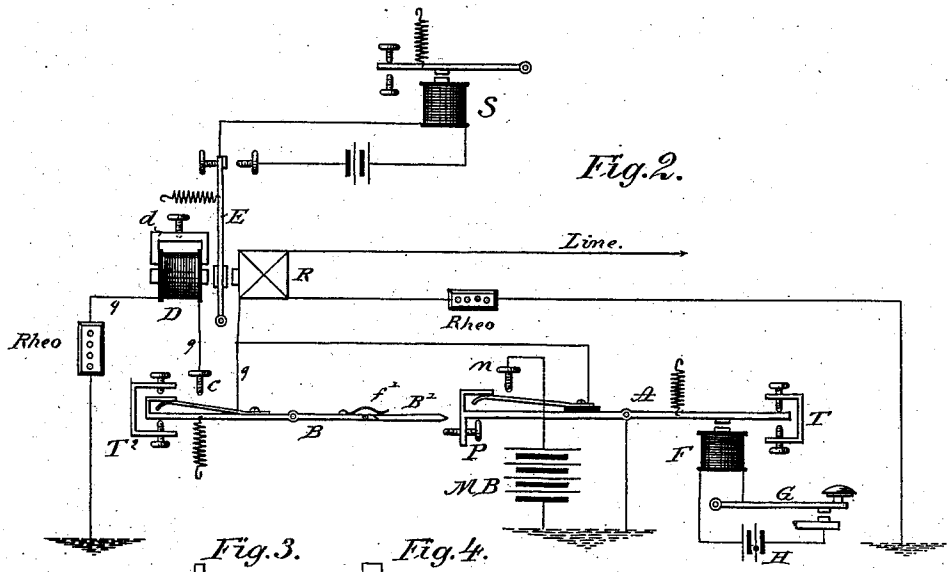


Fig. 3.

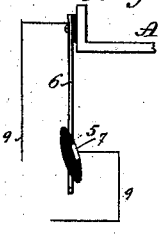
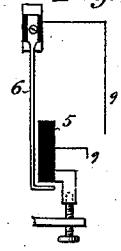


Fig. 4.



WITNESSES

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STATIC NEUTRALIZER FOR TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 291,096, dated January 1, 1884.

Application filed February 7, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SELDEN, a citizen of the United States, and a resident of St. Louis, in the county of St. Louis and State of Missouri, have invented certain new and useful Improvements in Telegraphs, of which the following is a specification.

The object of my invention is to neutralize the disturbing effects of the static discharge-current from a telegraph-line, which occurs simultaneously with the removal of main battery from line and the putting of the line to earth, and which is productive of false signals on the receiving-instrument at the transmitting end of the line.

My invention is designed more particularly for application to duplex or multiplex telegraphs, and I have in the accompanying drawings illustrated one method of applying the same to a duplex telegraph. I do not, however, limit myself to such application of the invention.

My invention consists, broadly, in employing the static discharge-current as a means of neutralizing the effects of said current upon the receiving-instrument, to effect which I cause the whole or a portion of the static discharge-current to momentarily flow through a circuit containing an electro-magnet or other electro-responsive device, which, by suitable means, will either magnetically or mechanically oppose and neutralize the effects of said static discharge-current acting in the coils of the relay.

My invention consists, likewise, in the combination, with coils or helices which act either magnetically or mechanically to neutralize the effects of the static discharge upon the home-relay, of means for momentarily connecting said coils with the main line simultaneously with the withdrawal of the main-line battery, so that the static discharge-current (all or a portion) will flow momentarily through said coils.

My invention consists also of certain combinations specified in detail in the claims.

In the accompanying drawings, Figure 1 is a diagram of circuits and apparatus illustrating one method that may be used for carrying my invention into practice. Fig. 2 illustrates a modified plan. Figs. 3 and 4 show a device that may be used for closing the circuit to the neutralizing-coils momentarily upon movement of the transmitter in one direction only.

In Fig. 1, R indicates a differentially-wound relay electro-magnet, of the usual construction for a duplex telegraph, one of whose coils is in the line-circuit, while the other is in a split or branch circuit to earth containing an artificial resistance Rheo. Said relay is connected, as ordinarily, with the insulated spring of the transmitter-lever A, which spring normally rests against a hook on the end of the lever, thus completing the normal connection between line and earth through the transmitter. The resistance usually employed in the earth-connection and adjusted to equal resistance of main-line battery is omitted for the sake of simplicity.

The contact-stop, with which the spring makes connection when the transmitter is operated, is indicated at *n*, while M B is the main-line battery connected with said stop, so as to be placed to line by the operation of the transmitter.

T indicates the usual stops for the transmitter-lever A, and F, H, and G, respectively, the electro-magnet, local battery, and key by which the transmitter is controlled.

S is the sounder in a local circuit controlled by the relay.

E indicates the armature of the relay, which armature is arranged in the present case to be subjected to the polarizing influence of an electro-magnet coil, D, and is for that purpose mounted directly on the core of the coil D, as shown, or may form the core itself, being suitably pivoted to act as an armature. The armature is of soft iron, and in the normal condition of the device is not polarized by the coil D, and is therefore free to be attracted by the core of the relay. When, however, the static discharge-current flows in the coils of the relay, the armature is simultaneously polarized by the coils D, but in such a way as to tend to neutralize the inductive effects of the core of the relay, and to thus render the armature incapable of attraction by the relay. This device is described and claimed in another application for patent filed by me, and I therefore herein make no claim to it. It is shown here merely for the purpose of illustrating one of the methods that may be employed for utilizing the static discharge-cur-

rent, which latter is allowed to flow in the coils D in the manner to be now described, or in any other suitable manner. The coils D are included in a branch wire to earth connected to the main-line circuit, and indicated by the numeral 9, which branch wire includes a rheostat Rheo′ for the purpose of determining the amount of current that shall flow in said branch, and is closed at the proper time by the action of lever B, carrying contact-spring *m*, and, playing between stops at T^2, spring *m* makes contact with screw *c*, when the lever B is turned on its fulcrum, thus completing circuit 9. At the end of lever B is pivoted a piece, B′, having a shoulder or step, which abuts against the end of lever B. A spring, *f*′, tends to hold the piece B′ in the position shown, and if said piece be moved downward the lever B moves with it and closes circuit 9. The shoulder is, however, so formed as to allow the piece B′ to swing upward freely without interference with or from the lever B.

Upon the end of transmitter A is an adjustable stud or pin, P, which rides under the end of B′ and lifts it when the transmitter is operated to put the main battery to line, but finally slips by the end of B′, allowing the same to resume its normal position shown. This movement of the transmitter does not produce any effect on lever B or circuit 9. When the transmitter returns to its normal position, however, the stud P engages with the other side of B′, thus carrying lever B with it and closing circuit 9. This closing of circuit 9 is by proper adjustment of the parts made to take place simultaneously with the removal of the main-line battery M B from line and the connection of the line to earth. Just before reaching its position of rest the stud P slips by the end of B′, and the parts resume their normal position. The devices just described for closing circuit 9 are described and claimed in another application for patent filed by me. Other means might be used in their place for momentarily closing the circuit 9 at the proper time.

The general operation is as follows: In the normal position of the parts the armature E can be attracted, there being no current in coils D, and said armature is therefore free to respond to signaling-currents from the distant station, and the sounder S is operated. The transmitter-lever being at rest and battery M B disconnected, the circuit from line to coils D is broken at *m c*. When the transmitter is operated so as to put the main battery to line, the circuit 9 still remains open for the reason already explained, and the current from the main battery flows in the ordinary way, dividing between the two coils of the relay R, so as to produce no effect on the armature. When the transmitter returns to its normal position, the circuit 9 is closed for an instant simultaneously with the flow of the static discharge-current in the relay-coils, and the armature remains at rest. The time during which circuit 9 is closed is, however, so short that there is no interference with signals from the distant station. The rheostat Rheo′ enables the operator to adjust the strength of the neutralizing effects produced by the static discharge-current in the neutralizing-coil D or other device. To adjust the duration of the current in coil D, I propose to employ a device consisting of a piece of soft iron, *h*, mounted on and in magnetic connection with an extension, *k*, from one pole of the core of D, and adjustable to and from the opposite pole, so as to close, more or less, the magnetic circuit, and thus vary, in a well-known way, the facility with which the core, having been momentarily charged with magnetism, will lose its magnetic charge.

In Fig. 2 the armature-lever of the relay carries the usual armature or armatures, and is arranged in such a way that the core of D and the core of the relay R will act in mechanical rather than in magnetic opposition to one another. If separate armatures be employed for the cores of D and R, and said armatures are not in inductive proximity, the opposition will be purely mechanical. If, however, the cores are placed on opposite sides of the same armature, the element of magnetic induction will be present also to a greater or less degree. The lever E is in the present case supposed to be of the ordinary material—such as brass, carrying an iron armature or armatures. The general operation is substantially the same as with the arrangement of Fig. 1, with the exception that the core of D pulls mechanically against the core of R at the instant of the flow of static discharge-current in the coils of the relay. To adjust the duration of the pull of D so that it shall correspond somewhat to the time during which the effects of the static discharge-current are felt in the relay, but so that, nevertheless, it shall not be necessary to keep the circuit 9 closed during the whole of that time, I may employ such a device as has been already described in connection with Fig. 1, or an equivalent device, consisting of a piece, *d*, of iron, adjustable to and from the ends of the core of D, so as to act like the armature of a horseshoe-magnet in bridging the poles and completing, to a greater or less extent, the magnetic circuit.

Instead of lever B and its attachments I may use the device shown in Figs. 3 and 4, in side and rear view. In these figures, 5 indicates a block of some insulating material, carrying on one face a piece of conducting material, 7, which forms one side of a break in the circuit 9, while 6 is an insulated contact-spring carried by transmitter A and forming the other side of said break. When the transmitter is at rest, the parts are in the position shown, so that when the transmitter is operated to put the main battery to line the spring 6 will ride up on the inclined back of the piece 5, and will slip by the top and assume such a position that on the return move-

ment of the transmitter the spring will slide upon the face and momentarily close the circuit 9. By making the piece 5 adjustable the moment at which the circuit shall be closed may be determined.

I do not limit myself to any particular device for opposing the action of the relay on the armature at the proper time, as other means of utilizing the static discharge-current itself for the purpose will readily suggest themselves. Any suitable device, instead of coil D, may be employed that will properly respond to the effects of an electric current.

I do not limit myself to any particular method of or device for connecting the coils D, or other electro responsive device acting directly or indirectly in opposition to the relay to the main line, as the essence of my invention consists in making use of the static discharge-current acting through said coils for neutralizing the effects of such current on the receiving apparatus.

I do not limit myself to the means described for completing circuit 9, as it is obvious that other means may be employed without departing from the spirit of my invention. It is likewise obvious that my invention may by suitable modifications be applied to other systems of single, duplex, or multiplex telegraphy.

What I claim as my invention is—

1. The combination, with a relay, of an auxiliary electro-responsive device arranged to neutralize the effects of a static discharge-current flowing in the relay-coils, and means for connecting said auxiliary device with the line simultaneously with the flow of the static discharge-current in the relay-coils, so that the said discharge may flow in whole or in part through said auxiliary device.

2. The combination, with a relay, of auxiliary coils or helices for neutralizing the effects of the static discharge-current in the relay, and means for admitting the static discharge-current to said helices simultaneously with its flow in the coils of the relay.

3. The combination, with a relay, of auxiliary coils D, branch connection 9, and means for closing the latter simultaneously with the flow of the static discharge-current in the relay, whereby a portion of said current may flow in branch 9, and neutralize the effects of such current in the relay-coils.

4. The combination of an auxiliary neutralizing device, a transmitter, and a circuit-closer for connecting the auxiliary device with the line simultaneously with the movement of the transmitter in removing the main battery from line, so as to admit a portion or all of the static discharge-current to the auxiilary neutralizing device, as and for the purpose described.

5. The combination of coils D, circuit 9, transmitter, and supplemental circuit-closer operated simultaneously with the transmitter, and serving to close circuit 9, connected to main line, so that when the circuit is closed the static discharge-current may flow into the same, simultaneously with the movement of the transmitter in disconnecting the battery.

6. The combination of neutralizing-coil D, circuit 9, connected to main line, so as when closed to receive a current of static discharge, circuit-closer B B′, and transmitter A.

Signed at St. Louis, State of Missouri, this 18th day of January, A. D. 1883.

CHARLES SELDEN.

Witnesses:

H. C. TOWNSEND,

THOS. TOOMEY.