

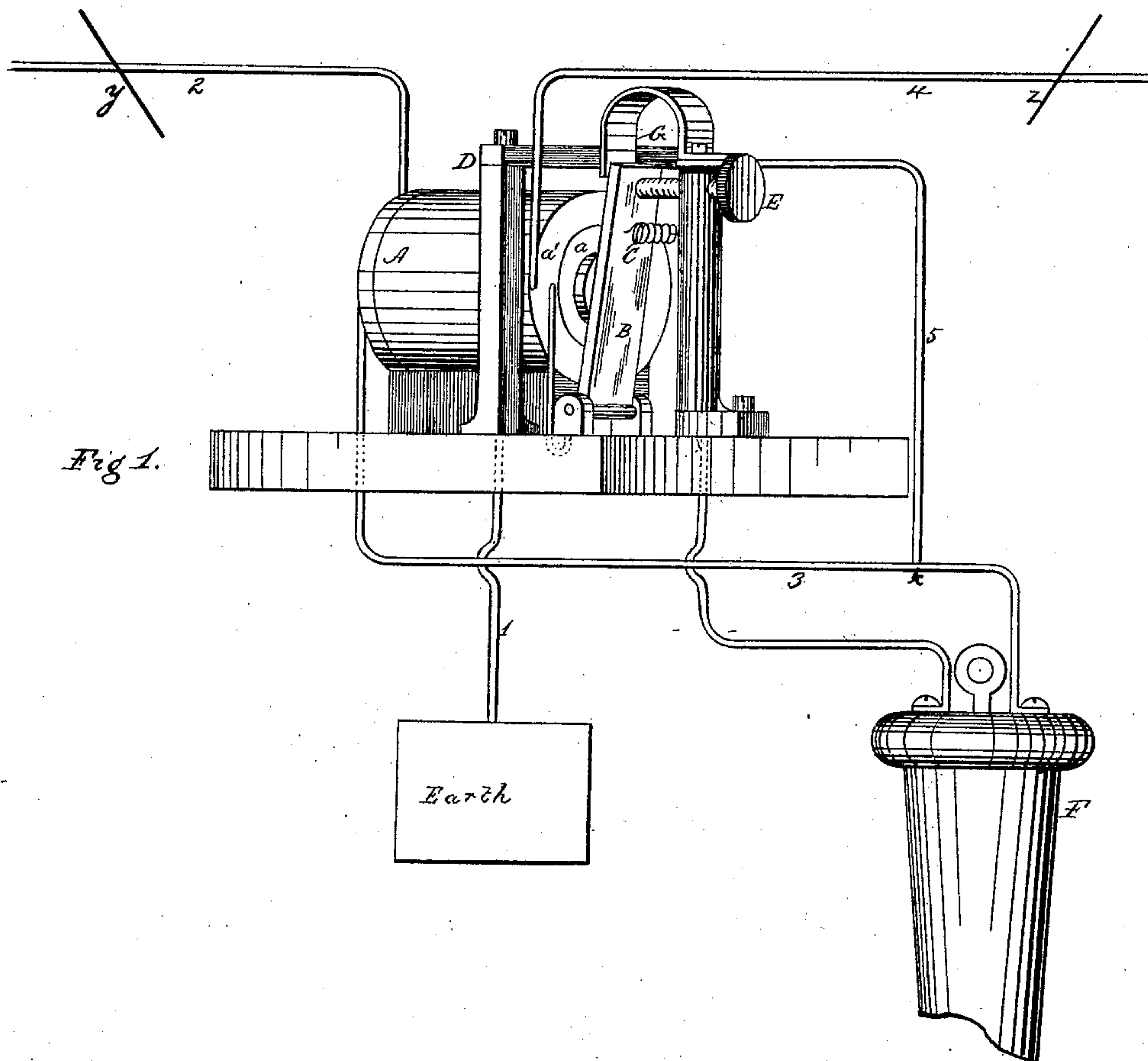
(No Model.)

2 Sheets—Sheet 1.

M. D. CONNOLLY.

PROTECTOR FOR TELEGRAPHIC AND TELEPHONIC INSTRUMENTS.
No. 279,714.

Patented June 19, 1883.



WITNESSES

Wm H. Powell.
Jos. B. Connolly

INVENTOR

M. Dan'l Connolly
By Connolly Bros.

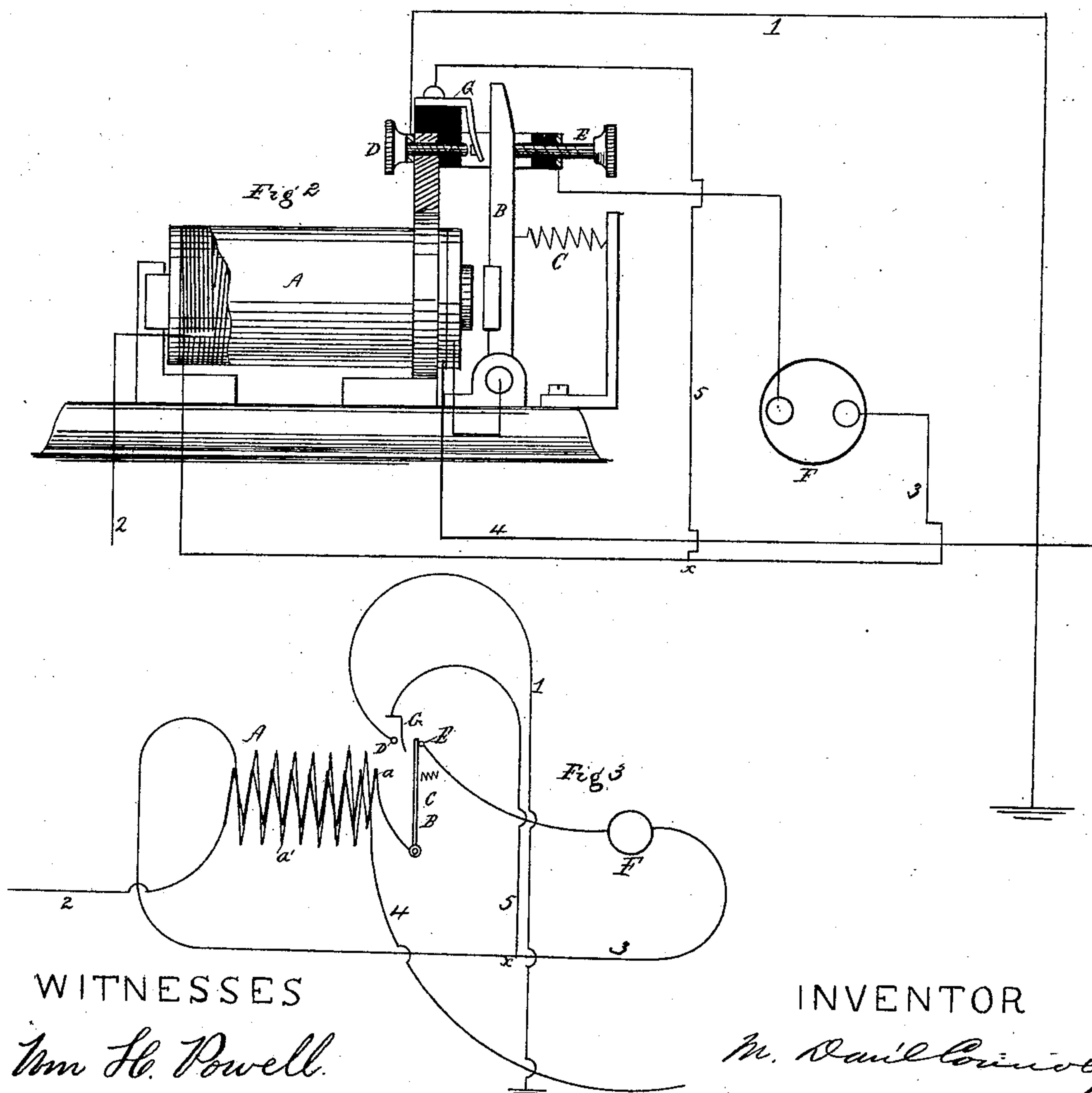
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UNITED STATES PATENT OFFICE.

M. DANIEL CONNOLLY, OF PHILADELPHIA, PENNSYLVANIA.

PROTECTOR FOR TELEGRAPHIC AND TELEPHONIC INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 279,714, dated June 19, 1883.

Application filed February 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, M. DANL. CONNOLLY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Protectors for Telegraphic, Telephonic, and other Electrical Instruments; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a perspective; Fig. 2, a side view, showing a modified mechanical construction; and Fig. 3, a diagram.

My invention has relation to devices for diverting harmful electrical currents from telegraphic, telephonic, and other electrical instruments; and my improvements have for their object to protect such instruments on both their sides, as hereinafter fully described, by means of a single protector—that is to say, without using two protectors, one on each side of the protected instrument.

My invention consists in the peculiar construction and combinations of parts hereinafter fully described, constituting the protecting device, and in the combination therewith of a telephone or other electrical instrument within the circuit of the protecting device.

For the diversion of abnormal currents I have previously invented a device comprising an electro-magnet with armature in circuit therewith and making circuit alternately to line and ground, to line normally when the armature was unattracted, and to ground when attraction occurred through the influence of such abnormal currents. Such device has been found to answer admirably for the ends of a line, or where circuit is made directly to earth from the instrument protected; but said protector was not designed for a case where the earth is not made direct and the line proceeds onward—as, for example, where several telephone-exchange subscribers have their instruments placed on one and the same line.

My present improvements have for their object to provide a protector for the case just suggested—that is to say, a device which will

protect telephone or other instruments on both sides, or on what may be called its “incoming” or “outgoing” lines.

Referring to the accompanying drawings, A represents an electro-magnet or solenoid comprising two helices, *a* and *a'*, the latter being wound outside the former. B is the armature of said magnet, having a retracting-spring, C, and front and back stops, D E, respectively. From the front stop, D, there is a line, 1, to earth or metallic return, and from back stop, E, circuit is made to the telephone or other instrument F to be protected. Circuit is as follows: Main line 2 proceeds first to inner helix, *a*, thence to armature B, and from latter, while retracted, by back stop, E, to telephone or other instrument F. From instrument F circuit is by line 3 to outer helix, *a'*, and thence by main line 4 onward. A normal or ordinary working current in either direction takes the path indicated. There is a branch line, 5, leading off from line 3 at *x* to a spring, G, which stands between the armature B and front stop, C, but does not, in the normal posture of affairs, make electrical contact with either of said parts. Consequently circuit by way of G is normally open; but let an abnormal current get onto line—say by a cross of an electric-light line at *y*—said current passes through helix *a*, energizing the same, and causing armature B to be attracted away from E and toward D. This breaks line to instrument F, and makes circuit to ground or metallic return by way of line 1. The instrument F, being cut out, is protected against the abnormal current which obtains access to line on that side of the instrument which pertains to line 2 or cross *y*. Suppose, again, an abnormal current gets onto line on the other side of the instrument—say by an electric-light line making a cross at *z*—said current first traverses outer helix, *a'*, energizing the same, and drawing up armature B, making contact with spring G, and binding latter against front stop, D. This closes circuit through lines 3 5 1 to ground or return and cuts out instrument F. The said instrument is thus protected against such abnormal current, and the latter, so long as it continues flowing, maintains the energization of helix *a'*, and finds a short course to earth or to return from *z* by way of line 5, spring G, front stop,

D, and line 1. It will thus be seen that no matter on which side of the instrument F an abnormal current gets onto line said instrument is completely protected, and that when the
5 normal or ordinary working condition of parts prevails, said instrument is in a circuit within the protector, or is in the protector's internal circuit. When the abnormal current is very powerful, the initial impulse or attraction of
10 the armature is sufficient to draw the latter far enough to close the contacts D G, in which case no vibration of the armature takes place. If desired, however, a spring may be located in the place of the stop E, so as to continue
15 the circuit therethrough until the armature has acquired momentum enough to fully insure a complete establishment of the earth-circuit. It is, however, considered advantageous to omit this spring when it can be done, in order
20 to avoid the formation of an electric arc between it and the armature-lever.

What I claim as my invention is as follows:

1. A device for protecting telegraphic, telephonic, and other electrical instruments against

abnormal currents of electricity, or for divert- 25
ing such currents from electrical instruments, comprising an electro-magnet, A, having two helices, *a* and *a'*, an armature, B, with front and back stops, D E, respectively, a spring or contact piece, G, normally out of circuit, 30
said stop D being connected to ground, and the spring or contact piece G being located between the armature-lever and the stops D G, and connections for said parts, substantially as shown and described. 35

2. An electro-magnetic protector for electric instruments, comprising an electro-magnet, ground and line stops, and devices, substantially as described, whereby abnormal currents from either side of the instrument are 40
diverted therefrom to ground, as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 15th day of February, 1883.

M. DANL. CONNOLLY.

Witnesses:

JOS. B. CONNOLLY,
WM. H. POWELL.