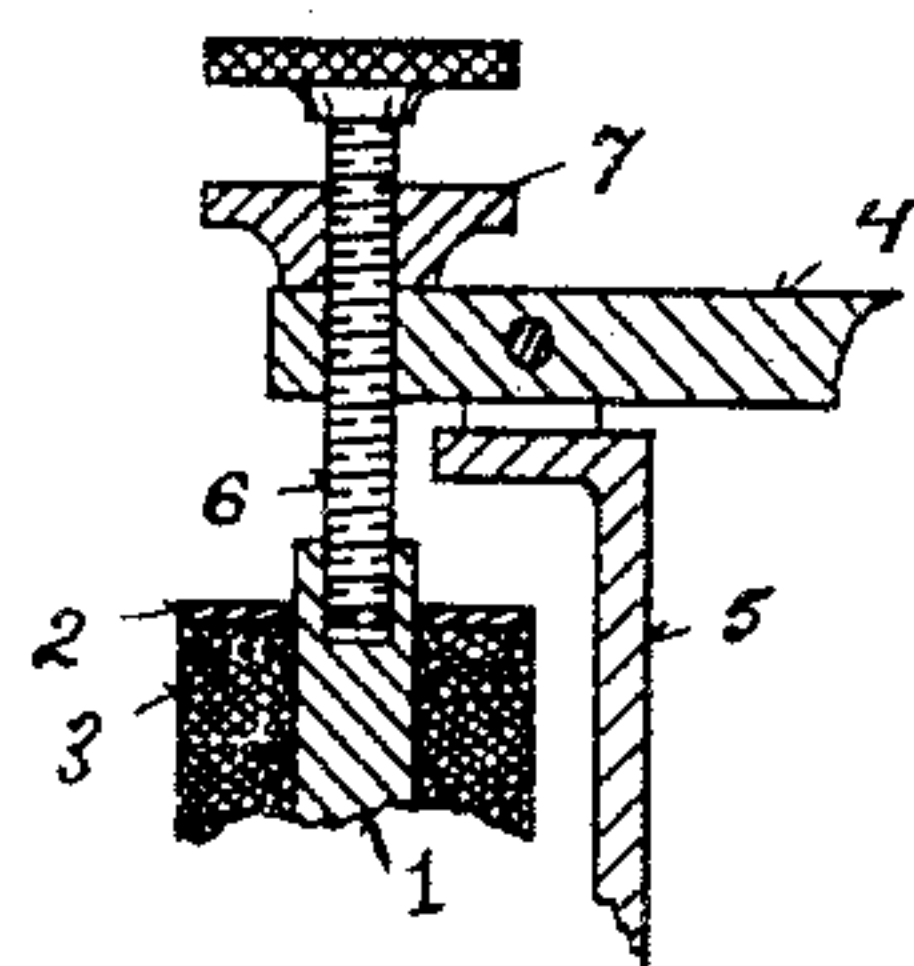
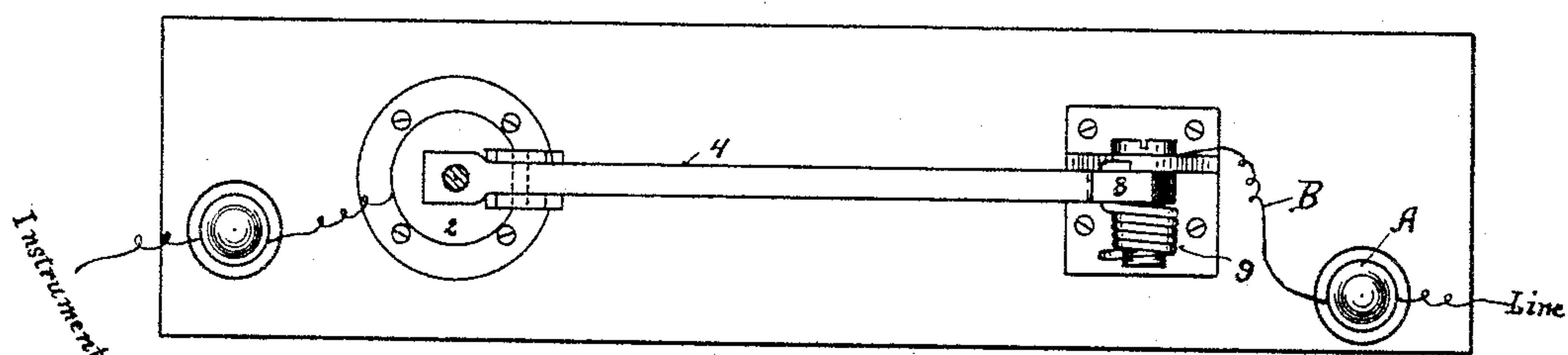
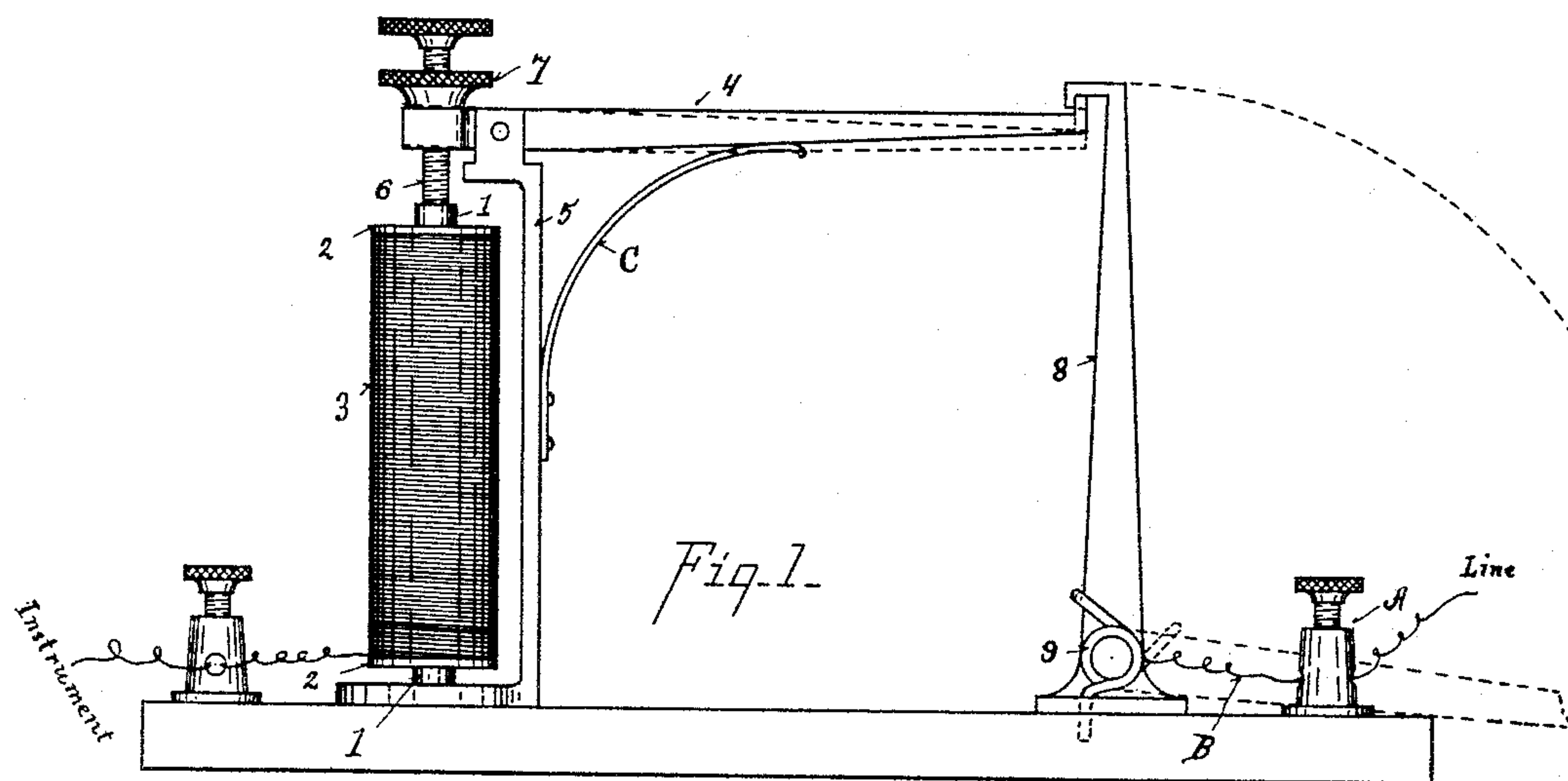


(No Model.)

I. N. MILLER.  
ELECTRICAL PROTECTOR.

No. 448,980.

Patented Mar. 24, 1891.



Witnesses

C. W. Miles, \_ \_ \_

Geo Ashton \_ \_ \_

Inventor

Isaac N. Miller

By his Attorneys Wood & Byrd

# UNITED STATES PATENT OFFICE.

ISAAC N. MILLER, OF CINCINNATI, OHIO.

## ELECTRICAL PROTECTOR.

SPECIFICATION forming part of Letters Patent No. 448,980, dated March 24, 1891.

Application filed October 28, 1890. Serial No. 369,612. (No model.)

*To all whom it may concern:*

Be it known that I, ISAAC N. MILLER, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Electrical Protectors, of which the following is a specification.

This invention has for its object to provide a novel excessive-current protector for telegraph, telephone, and other electric instruments, whereby abnormal currents will break the circuit. To such end my invention involves the features of construction, the combination or arrangement of devices, and the principles of operation hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of my improvement. Fig. 2 is a top plan view of the same. Fig. 3 is a detail view of the connecting device.

1 represents a core or axis of metal capable of a great degree of expansion by heat, such as lead.

2 represents bobbin-disks connected to axis 1.

3 represents a coil of insulated wire possessing great resistance or poor conductivity—as, for example, German-silver wire.

4 represents a lever pivoted near one end to standard 5, and 6 the screw-rod tapping the short arm of the lever and bearing against one end of the expansion core.

7 represents a regulating-screw for adjusting the normal position of the lever 4.

8 represents a pivoted lever engaging with lever 4, so as to normally form a metallic contact therewith.

I have shown the connection of the hook form, which I deem the simplest and best mode of detaching and connecting the two devices.

9 represents a spring, which is wound round the axis of the lever 8 so as to normally incline it outward. A weight, however, may be substituted for the spring to overbalance said lever, so that when the hooks are disconnected the lever will automatically fall outward. When, however, the lever 4 is hung in a vertical plane and the lever 8 in a horizontal plane, neither weight nor spring is required, as the gravity of said lever 8 will move out of

close proximity with the lever 4 far enough to form a complete break in the circuit.

B represents a large fuse-wire, forming metallic connection between the binding-post A and the lever 8. So far as the principal feature of my invention is concerned, this fuse-wire is not necessary. It is only an additional protection against currents of very high pressure, which generate to a high and dangerous degree, such as are used in arc electric lighting. It is prevented from being operated by lightning-discharges or other abnormal currents of momentary duration by adjusting the hook of lever 4 so that more expansion is required to release it than will be generated by lightning or momentary currents. This freedom from operation by momentary currents is the main object sought, and I have produced a device that will only operate when a dangerous current enters it and remains a sufficient length of time to heat or damage electrical machinery, and thereby endanger the safety of the building.

Mode of operation: The levers 4 and 8 are adjusted by means of the screw 7 so as to make the required contact of their hooks. When the abnormal current is passed through the line to the wire of coil 3, it heats the axis 1, expanding the same, raising the short end of lever 4, and causes the hook end to drop. As in the form shown, the short end of the lever 4 is about one-sixteenth of the length of the longer arm. Consequently the lifting of said lever one two hundred and fifty-sixth of an inch at short end will lower the outer end one-sixteenth, which is sufficient to release the hooks. The approximate length of the hooks and length of lever may be varied at liberty. When fuse-wire B is employed, it should be of sufficient conductivity to safely conduct the ordinary abnormal currents and the usual discharges of lightning and readily-fusible undercurrents of very high degree of pressure.

C represents a spring for maintaining contact of levers 4 and 8.

My device is adapted to be used at the end of a line or in a loop-circuit and placed in line outside of the instrument upon either branch of a loop after the manner shown and described in Letters Patent of the United States No. 430,967, granted me June 24, 1890



Having described my invention, what I claim is—

1. An excessive-current protector consisting of the heat-coil having an expansive core, 5 a lever pivoted in juxtaposition to one end to form a long and short arm, a screw-rod engaging the short arm of the lever and bearing against one end of the expansive core, and a pivoted contact-lever having a detachable engagement with the long arm of the screw-rod-carrying lever and released from engagement therewith by the expansion of the core, substantially as described. 10

2. An excessive-current protector consisting of the heat-coil having an expansive core, 15 a lever pivoted in juxtaposition to one end to

form a short arm and a long arm having a hooked end, a screw-rod engaging the short arm of the lever and bearing against one end of the expansive core, and a pivoted contact-lever having a hook in detachable engagement with the hooked end of the long arm of the screw-rod-carrying lever and released from engagement therewith by the expansion of the core, substantially as described. 20 25

In testimony whereof I have hereunto set my hand.

ISAAC N. MILLER.

Witnesses:

C. W. MILES,  
T. SIMMONS.