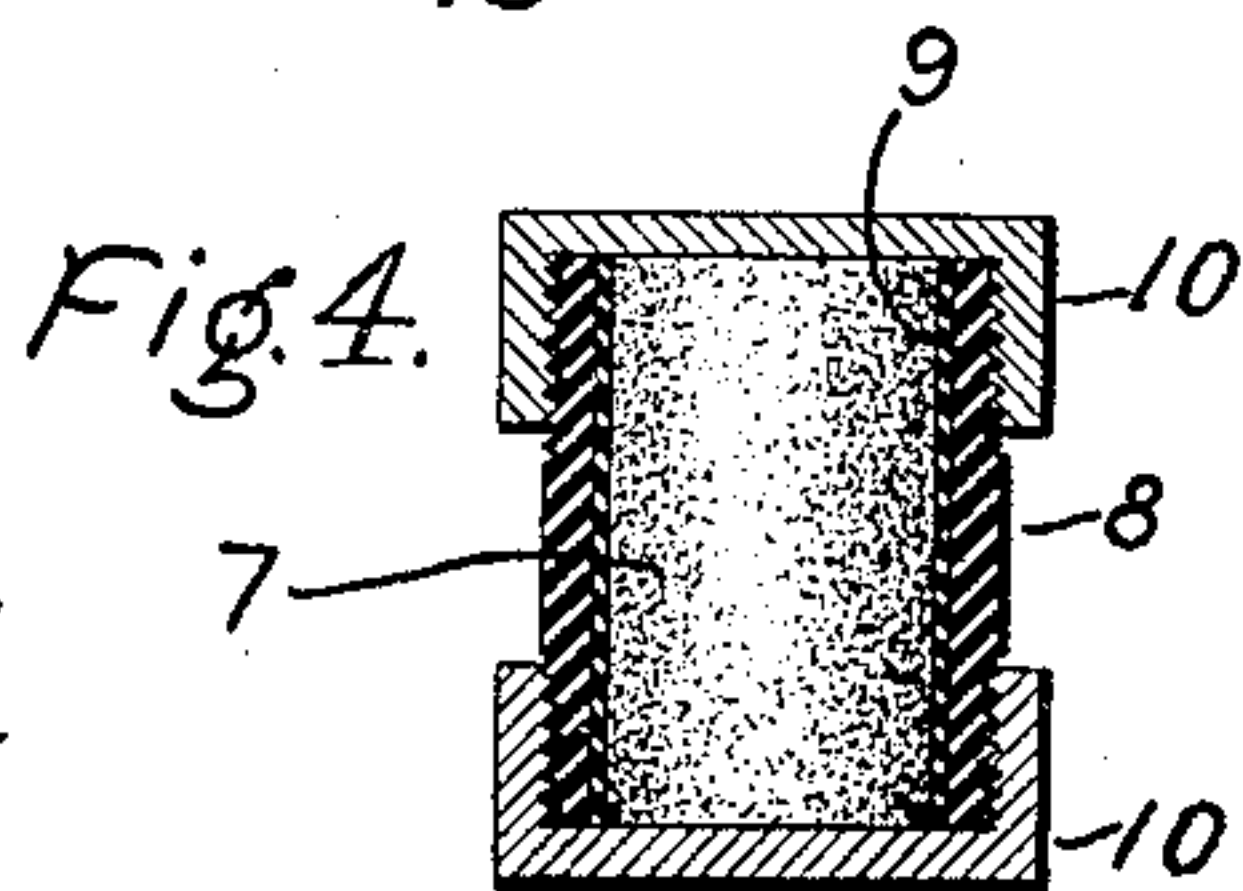
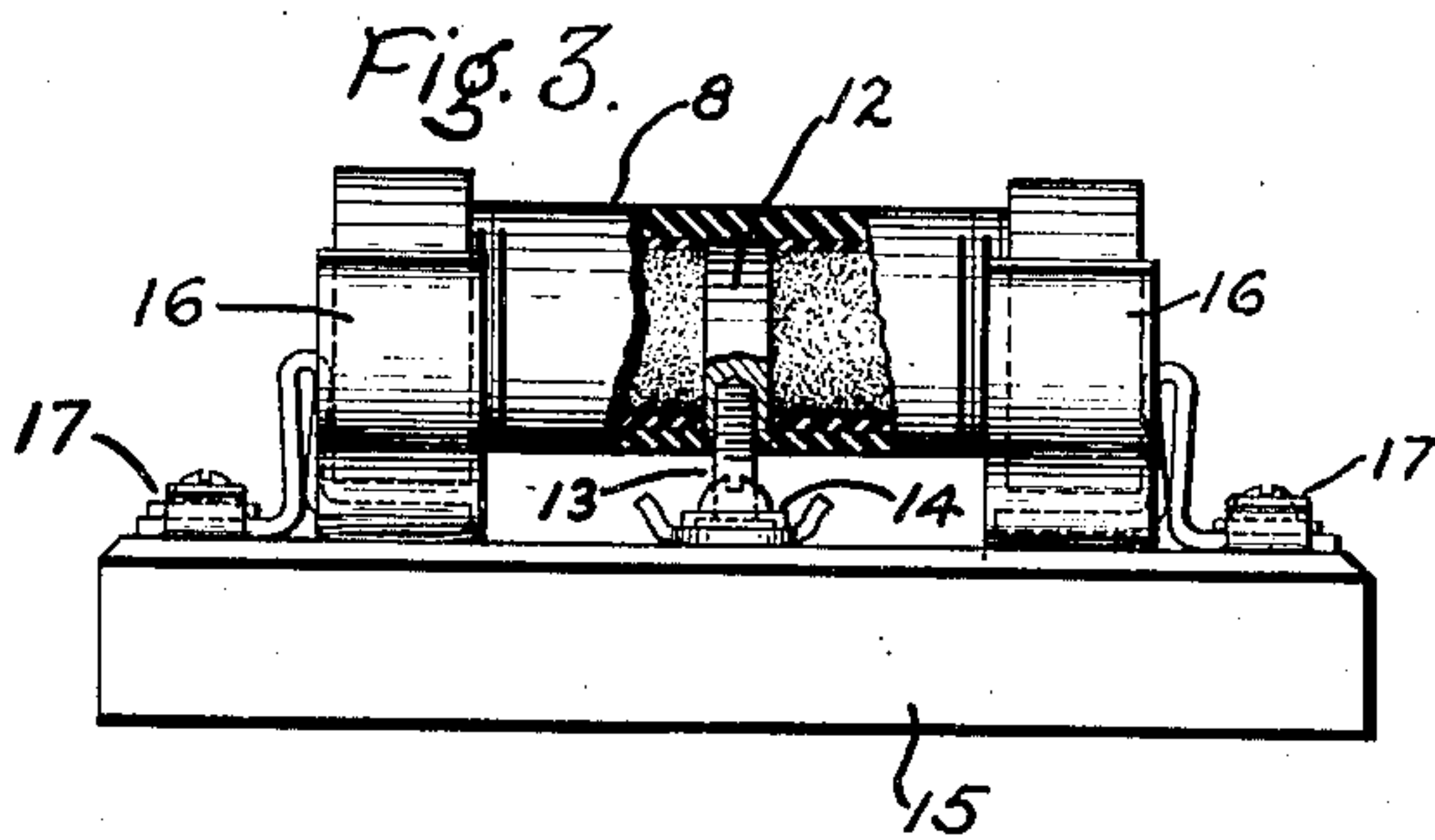
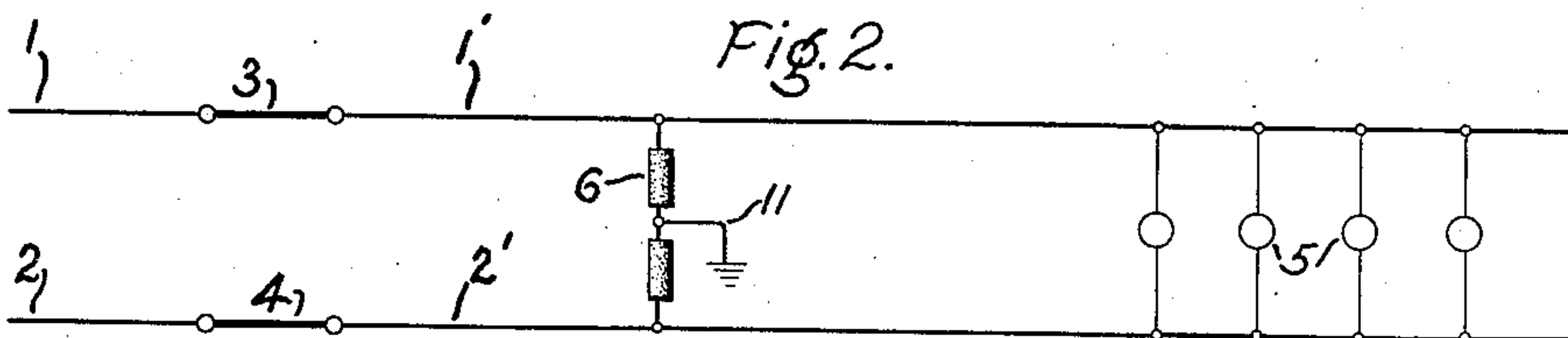
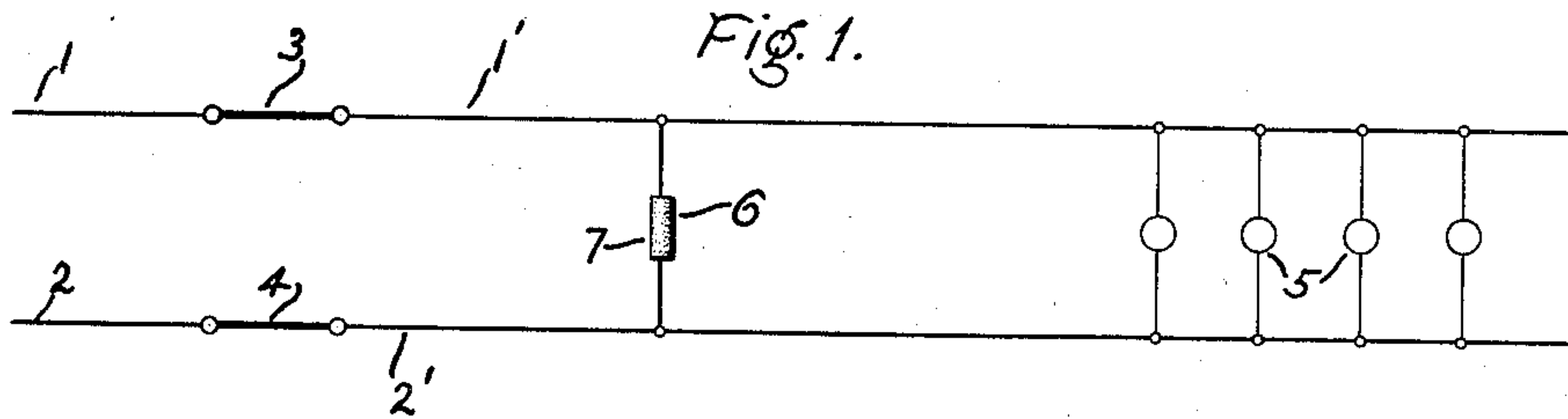


No. 894,705.

PATENTED JULY 28, 1908.

E. SCHATTNER.
PROTECTIVE DEVICE.
APPLICATION FILED JUNE 10, 1905.



WITNESSES:
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UNITED STATES PATENT OFFICE.

ERNEST SCHATTNER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

PROTECTIVE DEVICE.

No. 894,705.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed June 10, 1905. Serial No. 264,586.

To all whom it may concern:

Be it known that I, ERNEST SCHATTNER, a subject of the King of Great Britain, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Protective Devices, of which the following is a specification.

The present invention relates to the distribution of electric energy, and more particularly to protective means for preventing a circuit conductor designed for carrying currents of low or safe potential from becoming charged with unsafe potentials.

It is customary to provide consumption circuits, house circuits, etc., with cut-out devices which are designed to operate automatically to disconnect the circuit upon the passage of abnormal current, but it sometimes happens that the consumption or house circuit has a dangerous potential suddenly impressed thereon, as by a power circuit wire coming in contact therewith, so that the translating devices are injured before the cut-out devices operate and where the consumption wires are open circuited the cut-out devices are wholly inoperative to prevent them from becoming dangerously charged.

The object of my invention is to provide means which will insure prompt action of the cut-out devices in a consumption or house circuit whenever an abnormal voltage is impressed thereupon.

In carrying out my invention I connect the opposite circuit conductors inside of the cut-out devices with a closed shunt connection of sufficient resistance to prevent any considerable flow of current therethrough under ordinary conditions but so constructed that upon an abnormal voltage being impressed upon the conductors the resistance will be automatically decreased and allow current to pass in sufficient volume to operate the cut-out devices. This shunt may be provided with a ground connection with resistance on each side of the latter so that when either conductor becomes dangerously charged a sufficient current will be drawn therefrom to ground to actuate its respective cut-out device.

For a more complete understanding of my invention reference may be had to the following detailed description and to the accom-

panying drawing forming a part of this specification in which,

Figure 1 is a diagrammatic representation of an incandescent house lighting system having fusible cut-outs and provided with one form of my protecting device; Fig. 2 is a similar view with the protecting device provided with a ground connection; Fig. 3 is a side elevation with part broken away of a protective device provided with a ground connection and shown mounted in operative position; Fig. 4 is a longitudinal section of the form of protective device shown in Fig. 1.

The consumption circuits shown in the drawing have the outer exposed conductor sections 1, 2 connected to the respective inner sections 1', 2' by cut-out fuses 3, 4, and the inner sections of the conductors are connected to opposite terminals of incandescent lamps 5 according to the usual practice. Connected to the inner conductor sections 1', 2', between the points of attachment of the fuses and the lamps therewith, is a protective shunt connection 6 with resistance.

In the constructions shown in Figs. 1 and 5, resistance units are provided each consisting of a body 7 of some resistance substance having a negative temperature coefficient; that is, the resistance which it offers to the passage of an electric current decreases with an increase in temperature. Among the substances possessing negative temperature coefficients magnetite is known to have the self-reducing characteristics to a marked degree, and when it is red hot its resistance is only about one per cent. of what it is at ordinary temperatures. By mixing with magnetite certain amounts of clay base its critical resistance may be fixed at any point desired so that when subjected to ordinary or safe electrical potentials only a small amount of current will flow therethrough insufficient to perceptibly raise the temperature, but when subjected to an unsafe or abnormal potential sufficient current will flow to rapidly raise its temperature and permit a rapid increase in the flow of current therethrough. I have employed with good results for certain potentials the following mixture: eighty parts of magnetite and twenty parts of clay base; the latter being composed of clay, flint and spar. This mixture is combined with water and made into desired shapes and baked. A substance such as described may be supported

in an insulating tube 8 with a packing 9 of asbestos and metallic end caps 10 screw-threaded to the ends of the tube and bearing at their inner surfaces upon the ends of the
5 body of resistance material.

In the arrangement shown in Fig. 2 the resistance of the shunt connection 6 is divided and a ground lead 11 connected between the sections. As shown in detail in Fig. 4, this
10 lead consists of a metal disk 12 located at the center of the insulating tube 8 and having a stud 13 screw-threaded thereto, projecting radially through the side of the tube and adapted to engage a binder contact 14 to
15 which a grounded wire may be attached and carried by the insulating block 15 upon which are mounted contact clips 16 for receiving the end caps 10 and provided with binding posts 17. When the caps 10 are
20 screwed up the resistance cylinders 7 are forced into engagement with opposite sides of the disk 12 so that current may pass from one cap 10 through both resistance cylinders 7 and the disk 12 to the opposite cap
25 10, or from either cap through the adjacent resistance cylinder and the grounded connection 11.

When a current of abnormal difference of potential is thrown upon the exposed conductor sections 1, 2, it operates at once upon
30 the shunt connection 6 whether the circuit be open or closed through the lamps 5, and by means of the increase of voltage across the shunt connection, current in sufficient
35 volume is permitted to pass the cut-out devices 3, 4 to insure their operation.

It is possible for a charge of high voltage to be impressed upon one of the conductors 1, 2 without causing a corresponding difference of potential between them, but with the
40 grounded shunt connection shown in Fig. 2 current will be drawn from the conductor of high potential through a part of the resistance device to ground and thereby effect the
45 operation of the cut-out device in the conductor under high potential charge.

I do not desire to restrict myself to the

particular form or arrangement of parts herein shown and described, since it is apparent that they may be changed and modified
50 without departing from my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is,—

1. The combination with the conductors of an electric consumption circuit provided
55 with automatic cut-out devices, of a high resistance shunt connection between said conductors having provisions for automatically reducing said resistance.

2. The combination with the conductors
60 of an electric consumption circuit provided with automatic cut-out devices, of a shunt connection between said conductors having a section of resistance material of negative temperature coefficient. 65

3. The combination with the conductors of an electric consumption circuit provided with automatic cut-out devices, of a shunt connection between said conductors having a section of resistance material of negative
70 temperature coefficient of such characteristics and proportions that upon the passage of a normal current therethrough the resistance shall not heat up above a certain critical temperature and therefore remains stable
75 and upon the impression of an abnormal voltage across it the temperature shall rise, increasing the current therethrough and reducing its resistance.

4. The combination with the conductors
80 of an electric consumption circuit provided with automatic cut-out devices, of a shunt connection between said conductors provided with a ground connection, and resistances of negative temperature coefficients inter-
85 posed between said ground connection and said conductors.

In witness whereof, I have hereunto set my hand this 8th day of June, 1905.

ERNEST SCHATTNER.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.