

No. 682,204.

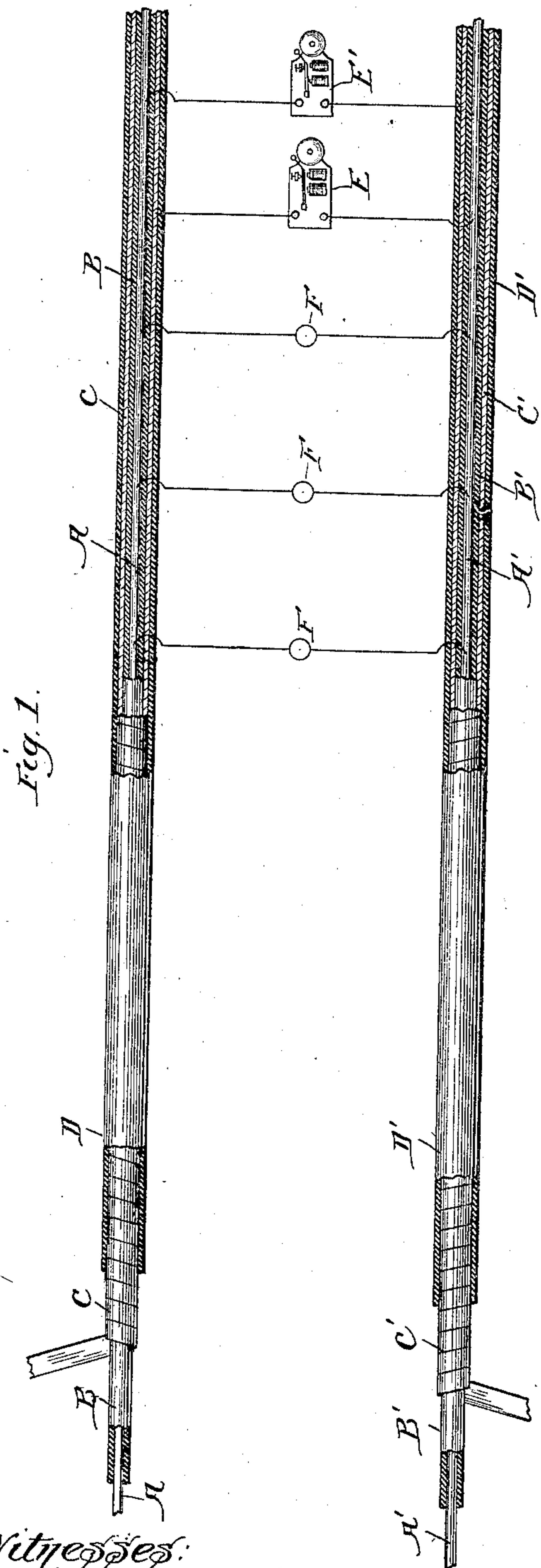
Patented Sept. 10, 1901.

I. KITSEE.

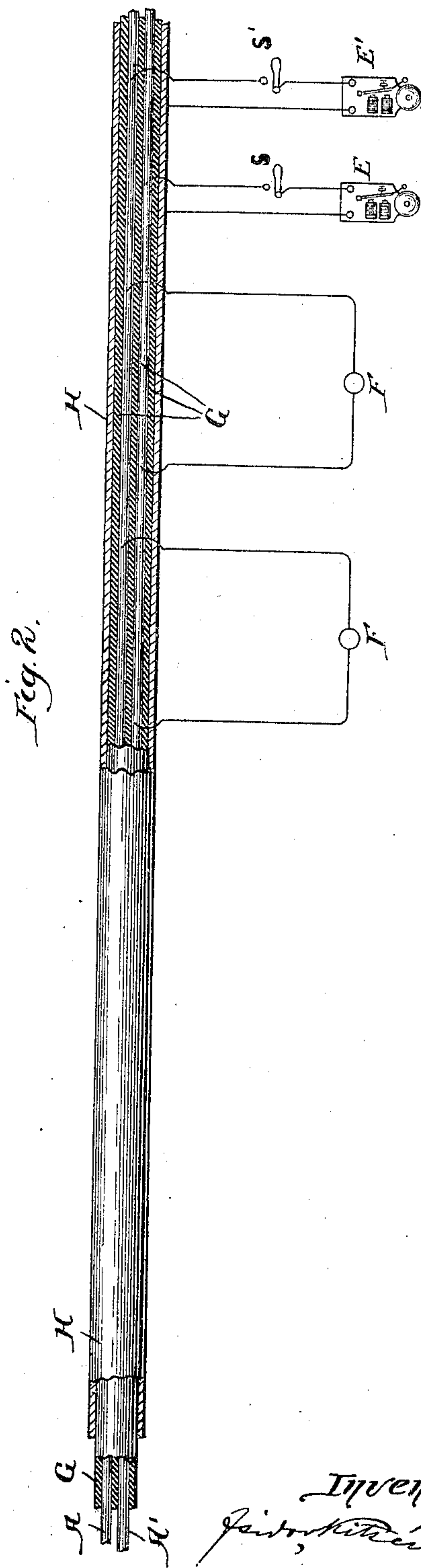
DEVICE FOR INDICATING LEAKS IN INSULATION OF ELECTRIC CONDUCTORS.

(Application filed Jan. 24, 1900.)

(No Model.)



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DEVICE FOR INDICATING LEAKS IN INSULATION OF ELECTRIC CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 682,204, dated September 10, 1901.

Application filed January 24, 1900. Serial No. 2,651. (No model.)

To all whom it may concern:

Be it known that I, ISIDOR KITSEE, of the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Devices for Indicating Leaks in the Insulation of Electric Conductors, of which the following is a specification.

My invention relates to an improvement in electric circuits.

10 The object of my invention is to provide means whereby defects in the circuit may easily be detected.

It frequently happens that the wiring in dwellings and stores becomes defective. In 15 most cases the insulation breaks down in time, and through the escape of the current frequent fires occur. Often the conductor itself becomes heated either through a greater flow of current or through the change of molecules, whereby the brittleness of the conductor increases, and this again in time may lead to accidents. In short, conflagrations due to electric wires in dwellings as well as stores are not a very infrequent occurrence, and it 25 would be of the utmost importance to detect any defects in the insulation of the circuit before the danger-point is reached.

The aim of my invention is to provide means for such protection.

30 Referring to the drawings, Figure 1 is a diagrammatical view wherein two separate cables are used. Fig. 2 is a diagrammatical view wherein both wires are in one cable.

In Fig. 1, A A' are the two main wires, and 35 B B' the insulation surrounding said wires. C C' are conducting-wrappings surrounding said insulation. D D' are outside insulations. E is an electric bell, being electrically connected to C and A', respectively. E' is a second electric bell connected to A and C', respectively. F F F are lamps.

40 In Fig. 2, A A' are the two main wires. G is the insulation interposed between and surrounding said wires. H is a conducting-tube inclosing the wires with their insulation. E 45 is an electric bell connected, with the interposition of the switch S, to the wire A' and the conducting-tube H, respectively. E' is a second electric bell connected, with the interposition of the switch S', to the wire A and

the conducting-envelop H, respectively. F F are lamps.

I will first describe my invention as applied to a circuit as illustrated in Fig. 1. In this circuit every wire is carried separately into 55 and throughout the building. Each of the circuit-wires is, as illustrated in the drawings, provided with the insulated conducting center core, the conducting-wrapping, and the outer insulator. The wire proper may 60 be provided with any of the insulation as now used. The conducting-wrapping is preferably in the shape of a thin metallic band—such, for instance, as tin-foil—which may be wrapped in the manner, as shown in the 65 drawings, around the wire insulation, but instead of the spiral wrapping a conducting-tube may be used. The mode of providing this conducting-wrapping with an outer insulator may vary according to requirements. 70 The circuit is provided with my safeguarding device in the following manner: The wire A of the circuit is connected with the conducting-wrapping C' of the wire A', with the interposition of the alarm or calling-up device 75 E', and the wire A' is connected, with the interposition of the alarm or calling-up device E, with the conducting-wrapping C of the wire A. If now through the overheating of the wire A the insulation of said wire becomes heated and therefore partially conducting, a slight flow of the current from that wire toward the conducting-wrapping will be the result. A current-path will therefore be established between A and C', actuating the 85 alarm or calling-up device E'. If wire A' is raised to a higher temperature, then a leakage will be established between A' and its conducting-wrapping, and therefore a current will flow through the alarm or calling-up device E. If from any cause whatsoever a leakage occurs between the ground and any of the circuit-wires and the conducting-wrapping C or C' is connected to the ground or no outside insulation is applied to 95 the conducting-wrapping, then the conducting-wrapping will at once be electrically connected with the circuit-wire and the alarm will come into play. In practice I prefer to make the electromagnet actuating the alarm 100

or calling-up device of a comparatively high resistance. I would suggest that in a one-hundred-and-ten-volt circuit the resistance should not be less than five thousand ohms.

5 This will serve two purposes—first, the current-flow would be very small, and, second, on account of the high resistance of the electromagnet it would be more capable of detecting slight leakages.

10 The arrangement as shown in Fig. 1 is preferred in such places where the current is provided from a central station using a three-wire system, with the neutral wire grounded.

15 The arrangement as shown in Fig. 2 is preferred in isolated plants where the generator is perfectly insulated from the ground; but the arrangement as shown in Fig. 2 may be varied by providing the conducting-tube with an outer layer of insulating material.

20 I have illustrated the alarm devices E E' as consisting of a simple bell; but other alarm devices may be placed in the circuit or the electromagnetic device may be provided with means to close a local circuit, thereby actuating one of the well-known calling-up or
25 annunciating devices. Such arrangement is so well understood that it is unnecessary for me to describe or illustrate the same.

In Fig. 2 it is necessary to provide the
30 alarm-circuit with a cut-out or switch for the reason that were both circuits normally closed a path for the current would be established even if the insulation is not defective. The *modus operandi* of ascertaining any defect
35 in insulation or circuit in this figure is as follows: Normally both switches S and S' are open. When the person in charge desires to ascertain if the circuit is in order, he first closes one of these two switches—say switch
40 S—whereby the alarm device E would come into play if the insulation of the wire A' is defective. He then opens switch S and closes switch S', whereby the alarm device E' would come into play if the insulation of the wire A
45 is defective. He then closes both switches S S' and establishes a circuit of high resistance from A through switch S', alarm device E', outer conducting-wrapping, alarm device E, switch S, and wire A'. If now the insulation between the two wires A and A' is defective, then the sound of the alarm device
50 will be weaker in inverse proportion to the strength of the resistance between the two wires and may cease entirely if the insulation is broken down.
55

Instead of an alarm any of the well-known indicating devices may be used.

Thus my invention and the means of carrying out my invention are in contradistinction
60 to the aims and means employed in the so-called "fire-alarm systems." In this system one or the other of the conductors has to be of an easily-fusible metal, for the reason that electric contact may be made in the circuit,
65 or, if the circuit is a continuous one, the elec-

tric contact may be broken. In all these cases the fusing of the conductor is necessary, so as to alter the electrical condition of the circuit and to actuate the fire-alarm devices. In my invention the fusing of the circuit-
70 wire or independent conductor is not contemplated, but, on the contrary, both the circuit, as well as independent conductor, should be of a metal capable of withstanding a high temperature, and it is only the greater or
75 lesser resistance of the insulating material which determines the status of the indicating devices, and whereas the fire-alarm circuits do not carry any current except the slight
80 current necessary to actuate the alarm device my invention is only applicable to such circuits carrying normally a current sufficient to feed consuming devices placed either in series or multiple are in this circuit, and the
85 annunciating devices embodying my invention are adapted to be actuated by slight traces of such current if following a path not contemplated.

Having now described my invention, what I claim as new, and desire to secure by Letters
90 Patent, is—

1. In combination, a circuit carrying a current useful for light or power, consuming devices placed in said circuit, and an indicating
95 device, one terminal of which is connected to the circuit proper, and the second terminal of which is connected to a conductor insulated from, but in proximity to said circuit.

2. In a device to protect buildings from injury due to the leakage of electric energy, a
100 conductor or conductors carrying said electric energy, said conductor or conductors insulated throughout their length, and provided with a metallic envelop, in combination with an indicating device or devices con-
105 nected with one terminal to the current-carrying circuit, and with the other terminal to the conducting-envelop.

3. A circuit, carrying an electric current, incandescent lamps connected in multiple arc
110 as to said circuit, an insulating-envelop for each line-wire of said circuit, and a conducting-envelop inclosing both of said line-wires, in combination with an indicating or alarm
115 device connected to one of the wires of which said circuit is formed and to the conducting-envelop, respectively.

4. In an electric circuit for light and power, two conducting-lines, each provided with an
120 insulating-envelop, a conducting-envelop inclosing the insulating-envelop, consuming devices connected to the conducting-lines, and an indicating device of a resistance higher than the resistance of any of the consuming
125 devices, connected to one of the line-wires and the conducting-envelop respectively.

5. In combination with a current-carrying circuit, consuming devices placed in said
130 circuit, an alarm device connected, with interposition of a switch, to the circuit and to

a metallic envelop surrounding said circuit, but insulated therefrom.

6. A circuit carrying an electric current useful for light and power, insulating material surrounding the wire of said circuit, conducting material in contact with said insulating material, consuming devices for said circuit, and a high-resistance-indicating device connecting with one terminal to the conducting-circuit, and with one terminal to the

independent conductor, and means to open and close the indicating-circuit.

In testimony whereof I sign my name, in the presence of two subscribing witnesses, this 22d day of January, 1900.

ISIDOR KITSEE.

Witnesses:

WM. M. DEUTSCH,
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