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LE ROY W. KELSAY

2,058,594

PROTECTIVE DEVICE

Filed Aug. 11, 1934

2 Sheets-Sheet 1

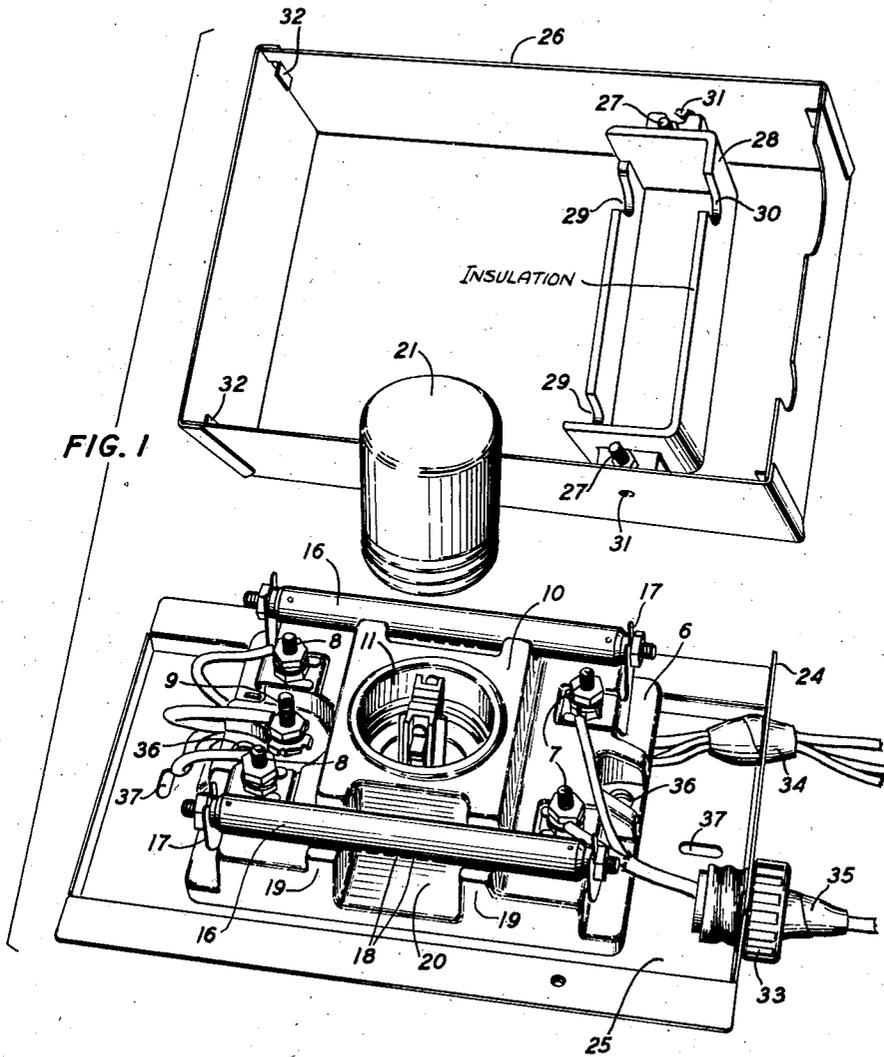


FIG. 1

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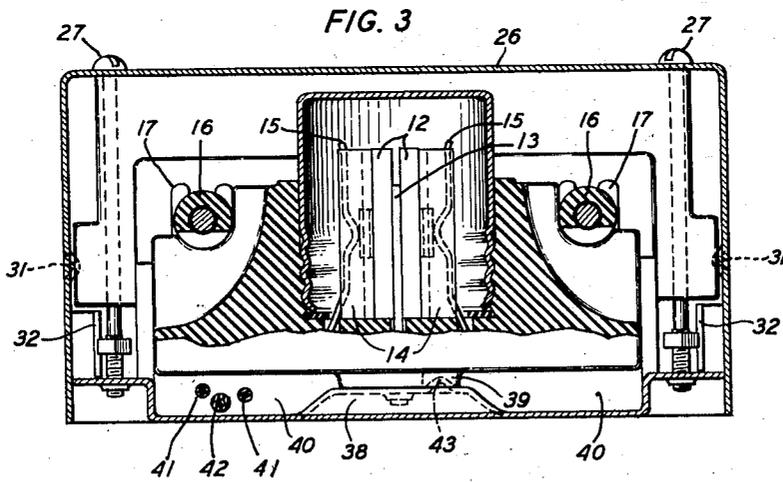
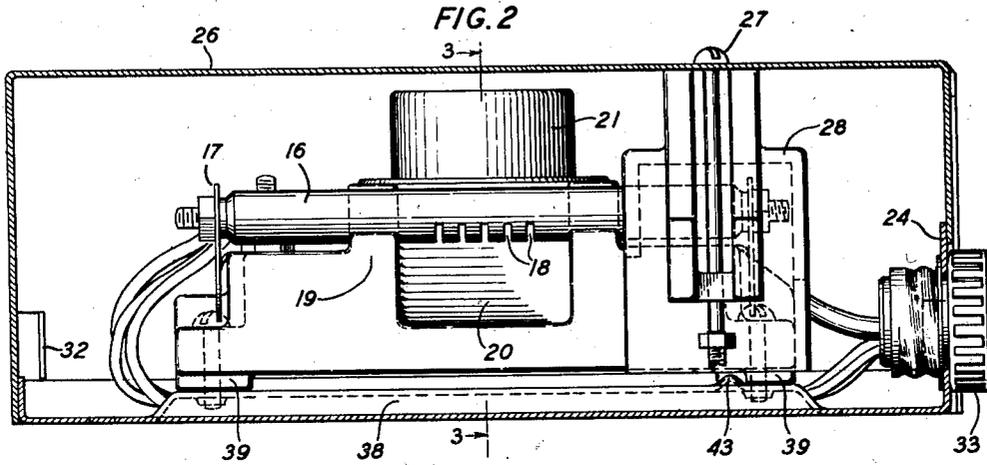
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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE

2,058,594

## PROTECTIVE DEVICE

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8 Claims. (Cl. 200—133)

This invention relates in general to protective devices and more particularly to such devices for protecting telephone lines from the hazards resulting from lightning and exposure to neighboring power lines.

For the protection of telephone lines, it is customary to install at the subscriber's premises a protective device arranged to afford protection from high voltages induced by lightning discharges and also, where the occasion arises, afford protection from induced surges or accidental contact with neighboring power lines. Protection against light charges induced by lightning or other surges is afforded by open space cut-outs or spark gaps which provide a path to ground for the discharges. In order to protect against heavy lightning discharges or excessive currents resulting from accidental contact with a power line, fuse elements are provided to open the circuit when the flow of current is of an order to present a fire hazard. In cases where the outside telephone lines come in contact with power lines causing the operation of the fuse elements, the resulting highly conductive ionized gases bridging the fuse terminals have a tendency to sustain an arc which might easily result in destructive effects, and it is, accordingly, necessary to take precautions for insuring that under the exposure conditions prevailing, an arc will not be sustained upon operation of the fuses.

The principal object of the present invention, therefore, is an improved protective device which is compact and decreased in size without sacrificing its operating characteristics.

A further object of the invention is such a device which may be enclosed in a housing for use in outdoor locations and so arranged that the confined gases upon operation of the fuse elements do not result in a lowering of the protection afforded.

These and other objects of the invention are attained in accordance with one feature of the invention by the provision of suitable walls or barriers to shield the terminals and to provide transverse channels for directing the ionized gases away from the protector.

In accordance with another feature, the base of the protector is arranged, when mounted, to form channels through which the terminal leads from the instrument to be protected are threaded, thus protecting them against damage during operation of the device.

In accordance with still another feature of the invention, a housing is provided and equipped with a loosely mounted insulating cap which fits over

the line terminals and shields them from the ionized gases.

These and other features of the invention may be more clearly understood by reference to the attached drawings, in which

Fig. 1 is an exploded view in perspective of a protective device embodying the features of this invention;

Fig. 2 is an elevation of the protector and housing with one side of the housing removed; and

Fig. 3 is a sectional view on the lines 3—3 of Fig. 2.

Referring to the drawings, there is disclosed a protector employing an insulating mounting 6 preferably of porcelain provided with line terminals 7—7, instrument terminals 8—8 and ground terminal 9. The central portion 10 of this mounting is of increased thickness and is provided with an opening or well 11 adapted to receive a cut-out device consisting of carbon blocks 12—12 positioned adjacent the ground plate 13 and porcelain blocks 14—14 equipped with suitable electrodes maintained at a fixed spacing from the blocks 12—12. These blocks are held in position by spring members 15—15 which are electrically connected to the instrument terminals 8—8. The ground plate 13 is connected to ground terminal 9 and in service is connected to a suitable ground. Fuses 16—16 are connected between the line and instrument terminals being held in place by suitable spring clips 17. These fuses are preferably of tubular type and are provided at their central portion with one or more slots or vents 18, as shown. The upper surface of the protector mounting is provided with ridges or walls 19—19 which have semi-circular slots therein in which the fuses 16 rest in position, these walls serving as barriers to protect the terminals from ionized gases upon operation of the fuses. The walls 19—19 further cooperate with the walls of the central portion 10 to provide an arcuate channel 20 adjacent the central portion of the fuses. Upon operation of the fusible elements, the volatile vapors expelled through the vents 18 are, by this channel, directed away from the protector and thus prevent to a large degree the danger of an arc being sustained between the fuse terminals. In order to further prevent damage from the expelled gases, the cut-out device is provided with a cap 21 which is threaded into the well 11. The outer surface of cap 21 is provided with an insulating finish.

The protective device thus described is very compact, its length being limited substantially, for example, by the length of the fuse elements.

It is thus possible to mount the protector on narrow floor beams without resorting to additional mounting boards and without projecting below the beams.

5 For use in outdoor locations where exposed to weather, there is provided a metallic base plate 25 cooperating with a cover portion 26 to completely enclose the protector. The cover is secured to the base plate by means of mounting screws 27—27 extending through the upper 10 portion of the cover and loosely mounted thereon is an insulating cap 28 of rectangular shape which cooperates with a portion of the protector mounting to provide an insulating housing completely enclosing the line terminals and the fuse 15 terminals connected thereto. The cap 28 is provided with slots 29 to fit over the fuses 16. Slot 30 is also provided to receive the line wires. Indentations 31—31 are provided in the sides of 20 the cover to cooperate with suitable slots in the ends of the cap 28 to insure the proper alignment of this member with the protector mounting. Projecting tabs 32—32 are provided in the cover 26 and cooperate with the base plate to 25 insure the cover being maintained in proper alignment by means of the two mounting screws. One end of the base plate 25 is provided with a right angled extension 24 which is provided with perforations to permit the entrance of the 30 instrument and line wires. The line wires are threaded through a porcelain bushing 33 which provides adequate insulation between the line wires and base plate which may be grounded. The instrument and ground wires are taped, as 35 shown at 34, and the line wires as shown at 35 to completely enclose the openings thus preventing the entrance of dirt and insects. The protector mounting is secured to the base plate by means of screws 36—36 and suitable slots 37—37 40 are provided to permit mounting of the housing.

The base plate 25, as shown, more clearly in Fig. 3, is provided with an upwardly embossed ridge portion 38 which engages a similar ridge 39 on the bottom of the mounting 6, thus providing on either side channels 40—40 through 45 which the instrument wires 41 and ground wires 42 are threaded. In this manner the low potential wiring is effectively separated and insulated from the line wires and is not directly exposed to the hot ionized gases generated upon 50 operation of the fuses. The ridge 38 is provided at one end with an upwardly extending indentation 43 which registers with a corresponding depression in ridge 39 to insure the parts being 55 assembled in the correct manner.

The protector, as thus described, is very compact and efficient in operation and presents a pleasing appearance. Furthermore, when enclosed in the housing as described, its operation 60 is not seriously impaired by the volatilized gases which are necessarily confined in the housing.

What is claimed is:

1. A protective device comprising a centrally 65 vented fuse member and an insulating mounting therefor, said mounting being provided with transverse walls to form a venting chamber ad-

60 adjacent to the vented portion of said fuse member and to provide barriers between the vented portion of said member and the fuse terminals.

2. A protective device comprising a centrally 5 vented fuse member and an insulating mounting therefor, said mounting being provided with a transverse channel adjacent the central portion of said fuse member and so formed as to direct away from said device the gases gener- 10 ated upon operation of the fuse members.

3. A protective device comprising an insulating mounting plate, a fuse element mounted 15 thereon, said mounting plate being so shaped as to provide an arcuate chamber for transversely directing conducting gases resulting from the operation of said fuse element.

4. A protective device comprising an insulating mounting, a fuse mounted thereon, and an insulating cap cooperating with said mounting to 20 shield one terminal of said fuse from conducting gases generated upon the operation of said fuse and to provide a barrier between the respective terminals of said fuses.

5. A protective device comprising an insulating mounting, a pair of line terminals at one end 25 thereof, a pair of instrument terminals at the other end thereof, contact springs assembled on said terminals, and tubular fuses vented at their central portions connected between said line and instrument springs, the upper side of said 30 mounting being provided with walls to shield said terminals and to form arcuate channels adjacent the central portion of said fuses whereby gases expelled by the operation of said fuses are directed away from the device. 35

6. A protective device comprising an insulating mounting having a pair of fuses mounted 40 thereon, a housing therefor, and an insulating cap carried by said housing and adapted to cooperate with said mounting to enclose the line terminals of said fuses and shield said terminals and cover from gases generated from the operation 45 of said fuses.

7. A protective device comprising an insulating mounting having a pair of fuses mounted 50 thereon, a metallic base plate to which said insulating mounting is secured, a cover cooperating with said base plate to form an enclosing housing, means for securing said cover to said plate, and an insulating cap carried by said 55 means and adapted to cooperate with said mounting to enclose the line terminals of said fuses and shield said terminals and said cover from gases generated upon the operation of said fuses.

8. A protective device comprising an insulating mounting having a pair of fuses mounted 60 thereon, a metallic base plate to which said mounting is secured, a cover cooperating with said base plate to form an enclosing housing, means for securing said cover to said plate, an insulating cap carried by said means, and means in said cover for guiding said cap to insure 65 alignment with said mounting to provide an insulating housing enclosing one end of said fuses.

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