

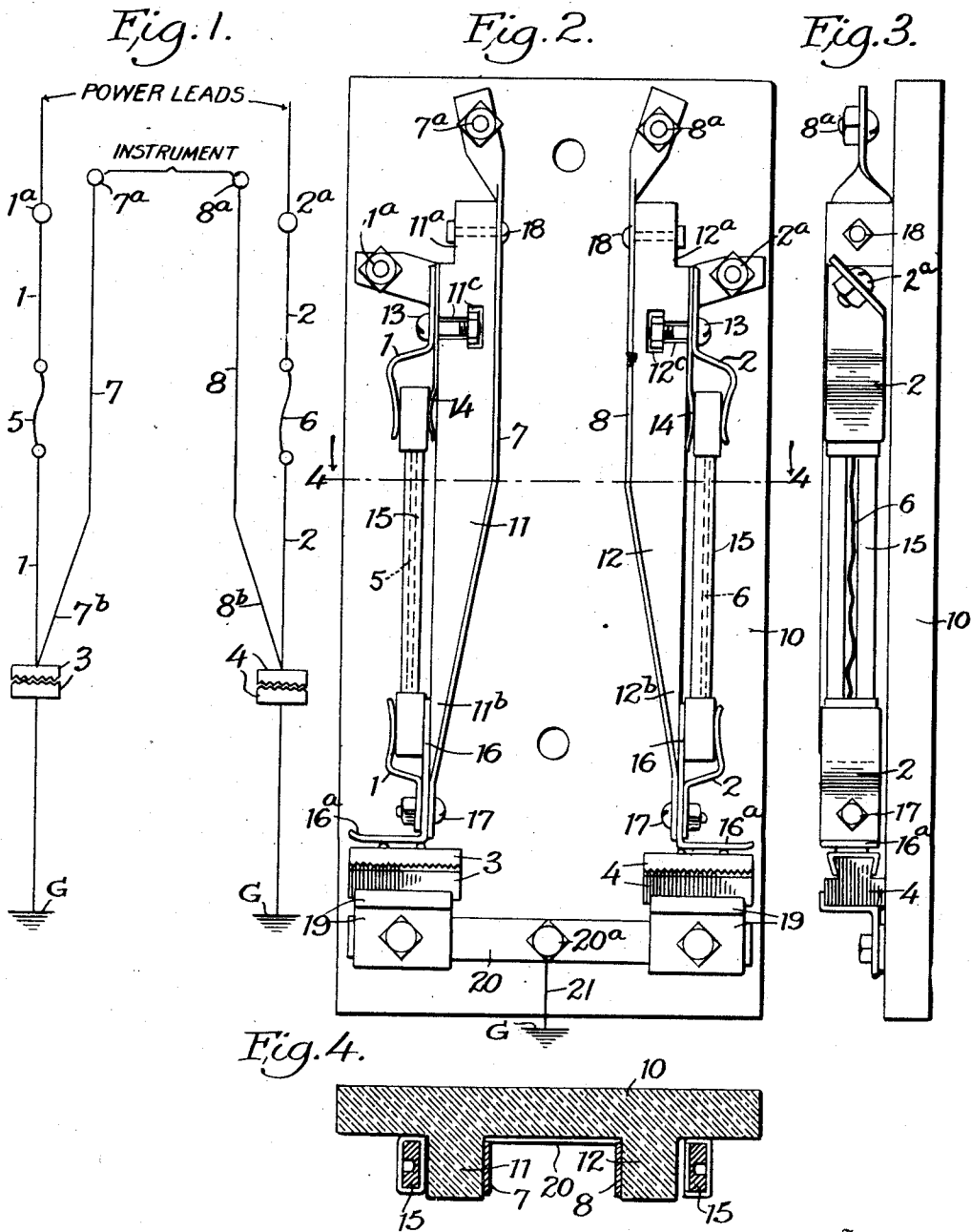
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STRAIGHT LINE DISCHARGE PROTECTOR

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STRAIGHT-LINE-DISCHARGE PROTECTOR

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This invention is a novel straight line discharge protector for instrument circuits, such as telephone or radio circuits or the like, and the principal object of the invention is to provide a protector adapted to be connected between the power leads and the instrument, the protector embodying the feature of providing a straight line electrical discharge to ground of all currents of abnormally high potential. Further objects are to provide a protector offering resistance to the flow of high potential currents to the instrument protected by means of sharp angle return bends in the power leads, the return bends leading to the instrument; and to provide a protector having fuses in the power lines adapted to be ruptured by the opposed magnetic fields of the conductors and their return bends. Other minor objects will be hereinafter set forth.

I will explain the invention with reference to the accompanying drawing which illustrates one practical embodiment thereof to enable others familiar with the art to adopt and use the same; and will summarize in the claims the novel features of construction, and novel combinations of parts, for which protection is desired.

In said drawings:—

Fig. 1 is a diagrammatic view of the protector circuit.

Fig. 2 is an enlarged plan view of the protector.

Fig. 3 is a side elevation thereof.

Fig. 4 is a section on the line 4—4 Fig. 2.

As shown in Fig. 1 the protector circuit is designed for straight line discharge to the ground, the line conductors 1 and 2 having their terminals 1^a and 2^a connected directly to the usual power lines or leads (not shown), the opposite ends of conductors 1 and 2 being connected to discharge blocks 3 and 4 directly connected to ground G. In the conductors 1 and 2 intermediate the terminals 1^a, 2^a, and discharge blocks 3, 4, are interposed fuses 5 and 6 of desired capacity.

The instrument conductors 7 and 8 are disposed parallel with and between the line conductors 1 and 2, and extend from instrument terminals 7^a, 8^a adjacent their respective line

conductors 1 and 2 beyond the fuses 5 and 6, the ends of conductors 7 and 8 opposite from the terminals 7^a and 8^a being connected as at 7^b, 8^b with the discharge blocks 3 and 4, the portions 7^b, 8^b making sharp or acute angles with the line conductors 1 and 2, so that the current passing from terminals 1^a, 2^a through line conductors 1 and 2 must make a sharp angle return bend through portions 7^b, 8^b in passing to the instrument terminals 7^a and 8^a.

A sharp angle offers resistance to the flow of electric current, therefore such an angle is made at each return bend in the circuit leading to the instrument, to retard the flow of high potential electric currents to the instrument protected.

A current with a high potential entering the conductors 1 and 2 from the power leads has a natural tendency to proceed in a straight line; therefore the discharge blocks 3 and 4, are placed in alignment with the conductors 1 and 2 or the entrance of the current to the protector so that the current may follow its natural course and be prevented from entering the instrument protected.

Another feature of the circuit shown in Fig. 1 is that in case an electric current, with potential high enough to be dangerous to the instrument protected, enter the protector conductors 1 and 2, and in case any portion of this high potential current dangerous to the instrument protected should pass the return bends 7^b, 8^b and pass toward the instrument, magnetic fields will be set up around the conductors 7 and 8 carrying such current, which magnetic fields will oppose the force of the magnetic fields set up around the conductors 1 and 2 thereby placing great stress upon the fuses 5 and 6, rupturing said fuses and opening the circuit to the instrument much more quickly than would be experienced should the sharp angle return bends to the instrument be omitted from the circuit.

The magnetic stresses which rupture the fuse are of electrical nature, but the rupture of the fuse is of a physical nature, the same being a physical break in the fuse.

The specific embodiment of the protector shown in Figs. 2, 3 and 4, preferably com-

prises a base 10 of porcelain or other suitable insulating material, with two parallel raised ribs 11 and 12 thereon and preferably integral therewith, the ribs 11 and 12 supporting the conductors and fuses as hereinafter set forth. As shown the ribs 11 and 12 are substantially rectangular in cross section and provided with recesses 11^a, 12^a in their upper outer corners, and their lower ends are tapered as at 11^b, 12^b, towards the outer lower corners to form the acute or sharp angle return bends. The conductors 1 and 2 are preferably made of bronze or other metal and are of substantial width, and are disposed on the outer side faces of ribs 11 and 12 respectively, the upper ends of the line conductors 1 and 2 being secured to the ribs by bolts 13 passing through the conductors with their shanks and nuts disposed in T-shaped retaining slots 11^c, 12^c in the faces of the porcelain ribs. The upper ends of conductors 1 and 2 are flanged or bent outwardly away from the ribs and carry copper or bronze bolts 1^a and 2^a forming the terminals for the power leads.

Between each conductor 1 and 2 and their ribs is a flat bronze spring 14 adapted to hold the upper end of fuse holder 15 in close contact with the line conductors to make a good electrical contact, the conductors having off-set portions to receive the fuse holders 15.

The lower portions of conductors 1 and 2 are preferably made in the form of clips adapted to engage the lower ends of fuse holders 15, which holders are inserted between the conductors and bronze or other strips 16 making electrical contact with the discharge blocks 3 and 4, the lower ends of strips 16 being flanged outwardly as at 16^a for that purpose. The instrument conductors 7 and 8 are disposed on the inner side faces of ribs 11 and 12 respectively and meet the strips 16 below the ribs, and the lower ends of the conductors and strips 16 are secured together by means of bolts 17 transfixing the same above flange 16^a. The upper portions of conductors 7 and 8 are secured to their ribs by bolts 18 passing through the reduced upper ends of the ribs and the end of conductors 7 and 8 are flanged outwardly and carry copper or bronze bolts 7^a and 8^a forming the instrument terminals of the protector.

Each fuse holder 15 is preferably made of wood and is copper tipped at each end, to engage the conductors and the strips 14 and 16; and fuse holder 15 is also channeled on its outer side face to receive the fuse wires 5 or 6 which are mounted therein and soldered to the copper tips of the holder to form a continuous electrical circuit from terminals 1^a and 2^a to blocks 3 and 4.

The discharge blocks 3 and 4 are preferably of the standard saw tooth carbon type, are held against the flanges 16^a of strips 16 by

clips 19 of bronze bolted or screwed to the base 10, the two clips 19 being connected to a common bronze or copper ground bus bar 20 having a terminal 20^a connected with a ground conductor 21.

The materials, both metal and non-metal, may be varied as desired; and I do not consider my invention limited to the specific embodiment shown in the drawing, for obviously changes may be made therein within the scope of the claims.

I claim:

1. In a protector for electrical receptive devices, conductors having return bend portions adapted to be connected across the receptive device; and means at the bends for providing straight line discharge for currents of abnormally high potential.

2. In a protector as set forth in claim 1, the return bends making acute angles with the conductors to offer maximum resistance against flow of current of abnormally high potential to the receptive device.

3. In combination with a protector as set forth in claim 1; a fuse in each conductor disposed in the magnetic fields of the conductor and its return bend.

4. In a protector as set forth in claim 1, the return bends making acute angles with the conductors; and fuses in the conductors adjacent the return bends.

5. In a protector for electrical receptive devices conductors having parallel return bend portions adapted to be connected across the receptive device; the return bend portions lying adjacent their respective conductors; and grounded discharge blocks at the apexes of the bends for providing straight line discharge for currents of abnormally high potential.

6. In a protector as set forth in claim 5, the return bends making acute angles with the conductors to offer maximum resistance against flow of current of abnormally high potential to the receptive device.

7. In combination with a protector as set forth in claim 5; a fuse in each conductor disposed in the opposed magnetic fields of the conductor and its return bend.

8. In a protector as set forth in claim 5, the return bends making acute angles with the conductors; and fuses in the conductors adjacent the return bends.

9. A protector for electrical receptive devices, comprising a base having raised ribs of insulating material thereon; a conductor mounted on one side of each rib and having a return bend portion secured to the other side of the rib adapted to be connected to an electrical receptive device; and means at the return bends for providing discharge for currents of abnormally high potential.

10. In a protector as set forth in claim 9; the ends of the ribs adjacent the return bends being shaped to fit the bends; and the return

bends making acute angles with the conductors to offer maximum resistance against flow of current of abnormally high potential to the receptive device.

20. In a protector as set forth in claim 17; the return bends fitting the ends of the ribs and making acute angles with the conductors; and fuses in the conductors mounted on the ribs adjacent the return bends.

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| 5 | 11. In a protector as set forth in claim 9; a fuse in each conductor mounted on the ribs and adapted to be physically ruptured by the opposed magnetic fields of the conductor and its return bend. | 70 |
| 10 | 12. In a protector as set forth in claim 9; the return bends fitting the ends of the ribs and making acute angles with the conductors; and fuses in the conductors mounted on the ribs adjacent the return bends. | 75 |
| 15 | 13. A protector for electrical receptive devices, comprising a base of insulating material having raised ribs thereon; a conductor mounted on one side of each rib and having a return bend portion secured to the other side of the rib adapted to be connected to electrical receptive device; and grounded discharge blocks at the return bends for providing straight line discharge for currents of abnormally high potential. | 80 |
| 20 | | 85 |
| 25 | 14. In a protector as set forth in claim 13; the ends of the ribs adjacent the return bends being shaped to fit the bends; and the return bends making acute angles with the conductors to offer maximum resistance against flow of current of abnormally high potential to the receptive device. | 90 |
| 30 | | 95 |
| | 15. In a protector as set forth in claim 13; a fuse in each conductor mounted on the ribs and adapted to be physically ruptured by the opposed magnetic fields of the conductor and its return bend. | 100 |
| 40 | 16. In a protector as set forth in claim 13; the return bends fitting the ends of the ribs and making acute angles with the conductors; and fuses in the conductors mounted on the ribs adjacent the return bends. | 105 |
| 45 | 17. A protector for electrical receptive devices, comprising a base of insulating material having a pair of spaced parallel raised ribs thereon; a pair of conductors mounted on the outer side faces of the ribs and having return bend portions secured to the inner side faces of the ribs and adapted to be connected across the terminals of an electrical receptive device; and grounded discharge blocks at the apexes of the bends for providing straight line discharge for currents of abnormally high potential. | 110 |
| 50 | | 115 |
| 55 | 18. In a protector as set forth in claim 17; the ends of the ribs adjacent the return bends being shaped to fit the return bends; and the return bends making acute angles with the conductors to offer maximum resistance against flow of current of abnormally high potential to the receptive device. | 120 |
| 60 | | 125 |
| 65 | 19. In a protector as set forth in claim 17; a fuse in each conductor mounted on the ribs and adapted to be physically ruptured by the opposed magnetic fields of the conductor and its return bend. | 130 |