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POWER CONTACT PROTECTOR

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Fig. 1.

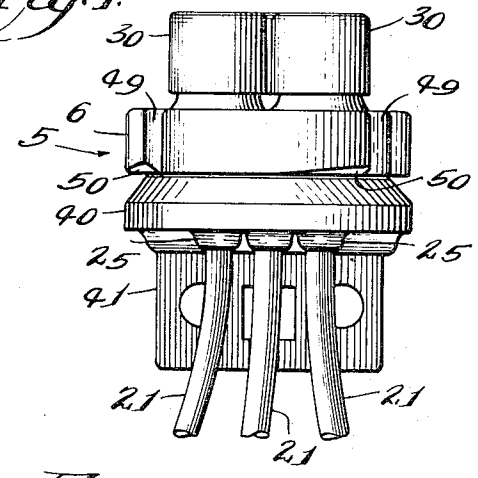



Fig. 2.

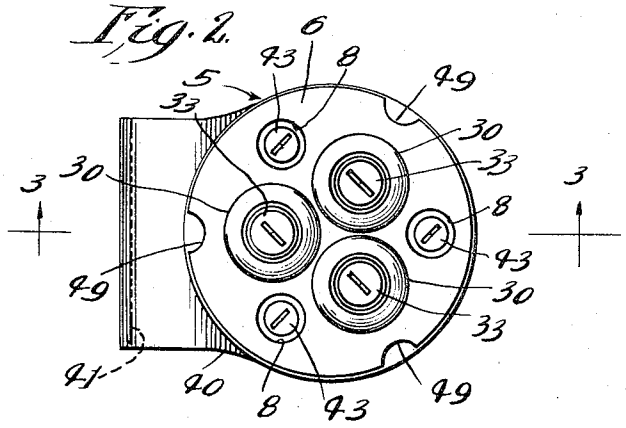
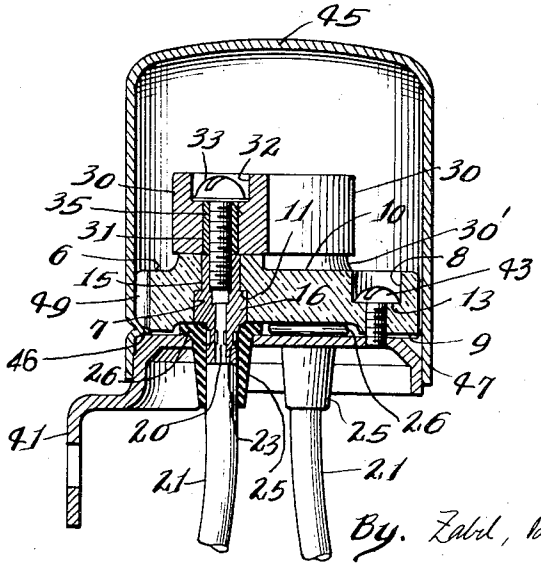



Fig. 3.




Inventor.
Donald L. Baxter.
By. Zabel, Baker, York, Jones & Hoffman
Attorneys.

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# POWER CONTACT PROTECTOR

Donald L. Baxter, Elmhurst, Ill., assignor to Reliable Electric Company, Chicago, Ill., a corporation of Illinois

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3 Claims. (Cl. 313—243)

This invention relates to a power contact protector designed particularly for use with communication lines located adjacent electric power conductors. The protector, however, has other uses, such, for example, as a lightning arrester.

A protector of this type includes a plurality of cylindrical carbon electrodes which are mounted in spaced relation to each other on a base of insulating material such as ceramic. One or more of the carbon electrodes are connected to ground while the others are connected to the respective line wires.

The protector functions to provide a path to ground in case an adjacent power conductor carrying 3,000 volts, for example, accidentally comes in contact with one or more of the lines to which the protector is connected. Ordinarily the protector is required to ground the heavy current resulting from accidental contact for only a short period of time inasmuch as the current surge in the power line is effective to open a protective device installed in the power line circuit. Thus, a protector of this type desirably should not have its operability impaired as a result of one or more instances of use. Rather, the protector should be so designed that it will function without substantial change in its operating characteristics throughout a number of instances of use.

Prior protectors of this type, compared with the present protector, are much more susceptible to damage during use, and, since they are not designed for inspection in the field, such protectors must be removed and replaced with new ones following a known instance of use.

Accordingly, it is an object of this invention to provide a protector which effectively resists destruction, loss of function, or change in operating characteristics heretofore caused by the high temperatures, poor electrical connections, etc. developed during an ordinary instance of use, thereby reducing the necessity of replacing the protector following such use.

Another object is to provide a protector of this character which easily is inspected in the field and serviced, if necessary. Elements of the protector easily may be replaced in the event such elements are damaged through an unusually severe instance of use.

Another object is to provide a protector wherein decided improvement has been made from the standpoint of sealing the protector against the entry of moisture occasioned by extreme weather conditions.

Still another object is to provide a protector wherein the several lead-in conductors are spaced a substantial distance from one another, thereby improving the protector from the standpoint of proper insulation of conductors from each other.

Still another object of the invention is to provide a protector of this character wherein the use of solder is avoided. The temperatures generated in an instance of use are often sufficiently high to destroy a soldered connection, and, accordingly, the elimination of soldered connections is a distinct advantage.

Other objects, advantages and details of the invention



will be apparent as the description proceeds, reference being had to the accompanying drawing wherein one form of the invention is shown. It is to be understood, however, that the description and drawing are illustrative only and that the scope of the invention is to be measured by the appended claims.

In the drawing:

Fig. 1 is a front elevational view of a protector embodying the invention, the protector cover being removed to illustrate certain structural details;

Fig. 2 is a top plan view of the protector shown in Fig. 1, and

Fig. 3 is a sectional view on line 3—3 of Fig. 2, the cover being shown in place on the protector.

Referring now to the drawing, protector **5** has a generally circular base **6** of insulation material such as ceramic. Base **6** has a plurality of lead-in openings **7** (Fig. 3), there being three such openings in the example shown, which are equally spaced from each other. In addition, base **6** has a plurality of mounting openings **8** therein, there being three such openings in the illustrated example.

The portion of a lead-in opening **7** adjacent bottom **9** of the base is non-circular in shape, such as square or rectangular. The portion of an opening **7** adjacent top **10** of the base may be circular, the diameter of the latter portion being somewhat smaller than the principal dimension of the former to provide a shoulder **11** between the two portions.

Each mounting opening **8** preferably has a countersunk portion adjacent base top **10** which is larger in diameter than the portion adjacent base bottom **9** in order to provide a shoulder **13** between the two portions.

A terminal **15** is disposed within each lead-in opening **7**, the terminal having an intermediate portion **16** which is enlarged and externally shaped to interfit with the non-circular portion of the opening. Thus, terminal **15** is disposed in a non-rotatable manner within base **6** and it bears against shoulder **11**. Each terminal end has a longitudinal opening therein and the terminal end adjacent top **10** of the base is internally threaded. The other end of terminal **15** receives end **20** of a lead-in conductor **21**, the terminal end being squeezed as shown at **23** to establish a mechanical and electrical connection with the conductor end. This manner of connecting the lead-in conductor eliminates the use of solder and provides the aforesaid advantages.

A tubular grommet **25** of resilient insulating material surrounds the adjacent portions of terminal **15** and conductor **21**, as shown in Fig. 3. Grommet **25** has an annular flange **26** which engages bottom **9** of the base. Flange **26** performs important cushioning and sealing functions which will be referred to hereinafter.

A cylindrical carbon discharge electrode or block **30** is mounted on a boss **30'** of base top **10** in alignment with each of the terminals **15**. Each block **30** has an axial opening **31** which is preferably countersunk at one end as shown at **32**. A screw **33** extends through axial opening **31** into threaded relation with the threaded end of terminal **15**, the head of screw **33** being received within the countersunk portion **32** of the opening which later may be filled with ceramic cement (not shown). The diameter of the shank of screw **33** is somewhat smaller than the diameter of opening **31** so that blocks **30** may be adjusted for proper, predetermined spacing with respect to each other. Where three blocks are used, only two need to be adjustable to obtain proper spacing so a sleeve **35** (Fig. 3) may surround one of the screws **33**.

Ceramic base **6** is affixed to a mounting bracket **40** which has a lateral extension **41** adapted to be secured to a pole or other support. Bracket **40** has spaced openings therein which are aligned with the respective

leadin and mounting openings 7 and 8 in base 6. The bracket openings aligned with lead-in openings 7 are large enough to pass the body of a grommet 25 but they are not large enough to pass the annular flange 26 of a grommet. With this arrangement it will be noted that conductors 21 are spaced from each other and thus have the benefit of insulation due to the spacing as well as that due to the insulation material applied to the conductors.

The bracket openings aligned with mounting openings 8 in the base may be threaded to receive screws 43 which are used to secure base 6 to bracket 40 (Fig. 3), the head of a screw 43 being received within the countersunk portion of opening 8 and bearing against shoulder 13. It is obvious that screws 43 may pass freely through the aligned openings in base 40 and be provided with separate nuts, if desired.

With base 6 affixed to bracket 40, as shown in Fig. 3, it will be observed that grommet flanges 26 are pressed between bottom 9 of the base and the adjacent surface of bracket 40, there being a small clearance between the opposing surfaces of the base and bracket. Since the grommet flanges 26 comprise resilient material, base 6 has a cushion mounting on bracket 40. This cushion mounting reduces the likelihood that base 6 will fracture due to stresses developed therein as a result of the high temperatures occasioned by a discharge. Further, since pressure is exerted on flanges 26, it will be seen that the flanges also function to seal the lead-in openings in bracket 40, thereby preventing moisture etc. from entering the protector at these places.

The protector is further sealed against moisture, dirt, etc. by means of a cup-like cover 45 (Fig. 3) which fits over the top of base 6 and bracket 40. Cover 45 is provided with a plurality of circumferentially spaced lugs or deformations 46 located adjacent open end 47 of the cover. Base 6 has a plurality of similarly spaced, longitudinally extending, peripheral grooves 49 (Fig. 2) through which deformations 46 pass when cover 45 is applied or removed. Bottom 9 of base 6 adjacent each groove 49 is provided with an inclined taper 50, best shown in Fig. 1, which cooperates when cover 45 is rotated to lock or unlock the cover with respect to base 6. As will be understood, the external diameter of the portion of bracket 40 which receives an open end 47 of the cover is such that a tight fit with the cover is provided. Thus, cover 45 may be locked in place by rotation, and the relationship between the open end 47 of the cover and bracket 40 is such that a seal is established.

A terminal 15 is a single element which contributes substantially to the improved results afforded by this protector. This single element has three functions, namely, it receives block holding screw 33, it cooperates with base 6 to prevent rotation of the terminal, and it is attached to the conductor end by squeezing, thereby providing a solderless electrical and mechanical connection which is highly resistant to damage during a discharge.

From the above description it is though that the construction and advantages of my invention will be readily apparent to those skilled in the art. Various changes in detail may be made without departing from the spirit or losing the advantages of the invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A power contact protector comprising a ceramic base having a plurality of lead-in openings and a plurality of mounting openings therethrough, a terminal disposed non-rotatably within each lead-in opening and having a longitudinal opening in each end thereof, the terminal end facing the base top being internally threaded, the other terminal end receiving a lead-in conductor with the terminal end squeezed to establish a mechanical and electrical connection with said conductor, a tubular weather-sealing grommet of resilient, insulating material surrounding the adjacent portions of said terminal and said conductor, said grommet having an annular flange engaging the bottom of said ceramic base, a carbon discharge block mounted on the top of said base in alignment with each of said terminals, each block being secured by a screw passing through the block and threaded into said threaded terminal end, the respective blocks being spaced a predetermined distance from each other, a mounting bracket having openings therein aligned with the respective openings in said ceramic base, and screws extending through the mounting openings of said base into threaded relation with said bracket, the said grommet flanges engaging said bracket and serving to cushion and space said base with respect to said bracket and seal the lead-in openings of said bracket.

2. A power contact protector comprising a ceramic base having a plurality of spaced lead-in openings and a plurality of mounting openings therethrough, a terminal disposed non-rotatably within each lead-in opening, the end of a terminal adjacent the base bottom having a longitudinal opening which receives the end of a lead-in conductor with the terminal end squeezed to establish a mechanical and electrical connection with said conductor, a tubular weather-sealing grommet of resilient, insulating material surrounding the adjacent portions of said terminal and said conductor, said grommet having an annular flange engaging the bottom of said ceramic base, a mounting bracket having openings therein aligned with the respective openings in said ceramic base, and screws extending through the mounting openings of said base and bracket securing the two parts together, the said grommet flanges engaging said bracket and serving to cushion and space said base with respect to said bracket and seal the openings of said bracket which are aligned with the lead-in openings of said base, the lead-in conductors passing through said bracket in spaced relation with each other.

3. In a power contact protector, a ceramic base and a plurality of spaced discharge blocks mounted on said base, a bracket member on which said ceramic base is mounted and supported, resilient elements disposed between and in engaging contact with both said base and said bracket member to establish a cushioned relationship between the two, lead-in conductors extending through respective openings in said bracket member and a resilient, insulating grommet on each conductor, the said resilient elements comprising a flange on each grommet which cooperates to seal said openings.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 470,773 | Wurts | Mar. 15, 1892 |
| 666,329 | Rolfe | Jan. 22, 1901 |
| 721,939 | Chapman | Mar. 3, 1903 |
| 772,190 | Thomas | Oct. 11, 1904 |
| 795,538 | O'Connell | July 25, 1905 |
| 2,670,452 | Yonkers et al. | Feb. 23, 1954 |