I. E. COLE.

ELECTRICAL PROTECTIVE APPARATUS.

APPLICATION FILED SEPT. 21, 1917.

1,318,971. Patented Oct. 14, 1919.

Fig. 1.

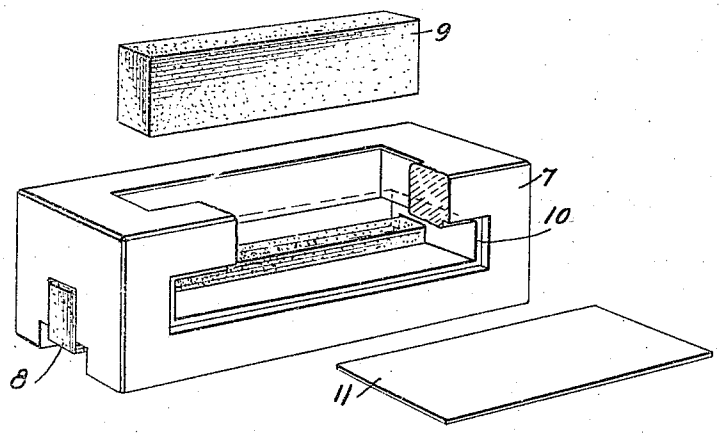


Fig. 4.

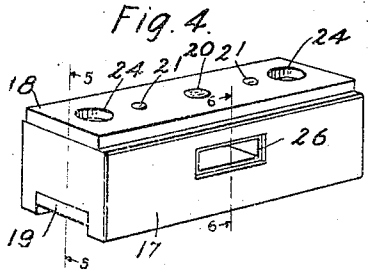


Fig. 5.

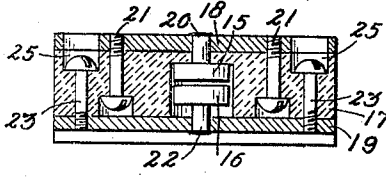


Fig. 6.

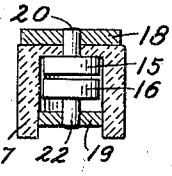


Fig. 2

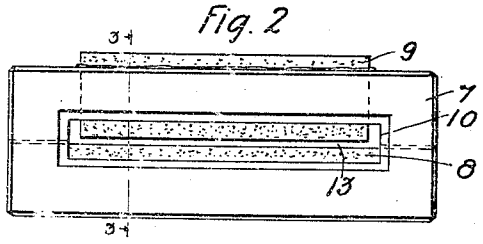
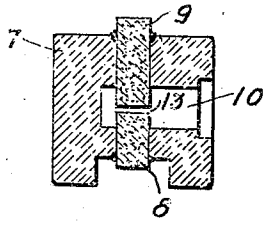


Fig. 3.



Inventor

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by J. G. Roberts Atty.

UNITED STATES PATENT OFFICE.

IRA E. COLE, OF NEW YORK, N. Y., ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ELECTRICAL PROTECTIVE APPARATUS.

1,318,971. Specification of Letters Patent. Patented Oct. 14, 1919.

Application filed September 21, 1917. Serial No. 192,454.

To all whom it may concern:

Be it known that I, IRA E. COLE, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electrical Protective Apparatus, of which the following is a full, clear, concise, and exact description.

This invention relates to devices for protecting circuits from abnormal voltages, lightning and similar disturbances, and more particularly to protective devices for circuits of low normal operating voltage.

The type of protective device most commonly used for the protection of circuits of low normal operating voltage, such as telephone, telegraph and signal circuits, consists essentially of two electrodes spaced apart by a separator of insulating material, usually mica or celluloid. To insure satisfactory operation it is necessary that the thickness of this separator be held within very close limits, which is difficult in the case of mica, and the use of celluloid or a carbonaceous material is objectionable in that after discharge a bridge of conducting material frequently connects the two electrodes.

The object of the present invention is to provide a protective device not possessing the defects inherent in the type commonly used and which, moreover, will be simple in construction, easy to manufacture and assemble, and efficient in operation.

To attain this object the invention provides a unit construction consisting of a block of insulating material in which both electrodes are securely fastened at a definite distance apart and without resorting to the use of a separator. Accurate spacing of the electrodes is obtained by placing a gage between the electrodes during assembly, this gage being removed after the electrodes are cemented in place.

The several features of this invention may be more clearly understood by reference to the accompanying drawings, in which Figure 1 is a perspective view of a partially assembled protector embodying this invention; Fig. 2 is an elevation of the protector shown in Fig. 1 after the assembly has been completed; Fig. 3 is a cross-section view along the line 3—3 of Fig. 2; Fig. 4 is a perspective view of a slightly different construction; Fig. 5 is a sectional view along the line 5—5 of Fig. 4; and Fig. 6 is a sectional view along the line 6—6 of Fig. 4.

Referring now to Figs. 1 to 3, a body member 7 of porcelain or other suitable insulating material is provided at two of its opposite sides with openings or slots adapted to receive the opposing electrodes 8 and 9, which are of conducting material, preferably carbon. In order that these electrodes may be spaced a definite distance apart without resorting to the use of a separator, a third side of the member 7 is provided with an opening or slot 10 of suitable dimensions to permit the insertion of a gage 11 to locate the electrodes during assembly. While separated by gage 11, the electrodes are firmly cemented to the body member. After the electrodes are secured in place the gage 11 is removed, completing assembly and leaving the electrodes 8 and 9 separated by a definite air gap 13 equal to the thickness of the gage employed.

In the alternate construction, illustrated by Figs. 4, 5 and 6, the electrodes 15 and 16 instead of being secured directly to the porcelain body member 17 are fastened to metal plates 18 and 19, respectively, these plates in turn being secured to the porcelain body member. In assembly, the electrode 15 provided with a shank 20 is first securely fastened to the metal plate 18, after which the plate is secured in place by means of the screws 21, 21, which pass through holes in the porcelain member and engage threaded holes in the metal plate 18, the holes in the porcelain being provided with enlarged portions adapted to receive the screw heads. The metal plate 19, carrying the electrode 16, the shank 22 of which fits loosely into a perforation in the plate, is next secured by means of the screws 23, 23, which pass through perforations in the body member and engage threaded holes in the metal plate 19. Clearance holes 24, 24 are provided in the metal plate 18 to permit the passage therethrough of the screw heads, and the perforations in the porcelain member are also provided with enlarged portions 25, 25 in order that the heads of screws 23 may be separated a proper distance from the metal plate 18. After plates 18 and 19 are both secured to the body member, a gage of a thickness equal to the desired air gap is inserted into the slot 26 and between electrodes 15 and 16. The shank 22

of the electrode 16 is then secured to plate 19 by soldering or other suitable means, thereby completing the assembly and permitting the withdrawal of the gage.

It will be noted that in each of the constructions illustrated and described, a means is provided for accurately spacing the electrodes a definite distance apart without resorting to the use of a separator which may later cause trouble by aiding in the formation of a bridge of conducting material between the electrodes. Moreover, in each case a unit protector is provided in which the spark gap is completely inclosed on three sides, forming a closed air pocket for the spark gap, thereby eliminating the circulation of air across the discharge gap and the resulting possibility of trouble from dust accumulating and interfering with the proper functioning of the protector.

What is claimed is:

1. A protective device comprising a block of insulating material substantially rectangular in cross-section and having a plurality of longitudinal slots therein, two of said slots being in alinement, conducting electrodes cemented in place within said alined slots and having their opposing surfaces parallel, and another of said slots substantially perpendicular to the alined slots to provide for the insertion of a temporary spacing member between the electrodes.

2. A protective device comprising a block of insulating material substantially rectangular in cross-section provided with three intersecting longitudinal slots, two of said slots being in alinement and the third slot being substantially perpendicular to the other slots, and a pair of rectangular electrodes cemented in position within the alined slots and having their opposing surfaces in parallel planes.

3. A protective device comprising a block of insulating material substantially rectangular in cross-section having three of its faces provided with slots, a pair of electrodes, and means for supporting said electrodes within the slots in the opposite faces of said block, the other slot providing for the insertion of a temporary spacing member between said electrodes.

4. A protective device comprising a block of insulating material provided with three intersecting slots, one of said slots extending the entire length of said block, a second of said slots in alinement with said first slot and extending only a portion of the length of said block, the third of said slots being substantially at right angles to the other slots, a pair of electrodes, and means for supporting said electrodes in said alined slots.

In witness whereof, I hereunto subscribe my name this 14th day of Sept., A. D., 1917.

IRA E. COLE.