

A. J. WURTS.
 LIGHTNING ARRESTER.
 APPLICATION FILED JAN. 9, 1911.

1,022,717.

Patented Apr. 9, 1912.

FIG. 1

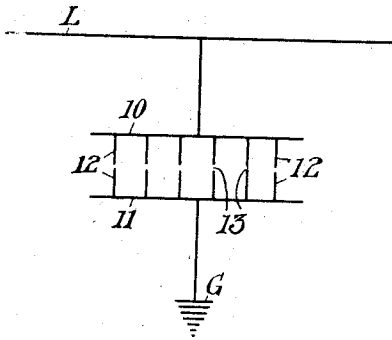


FIG. 2

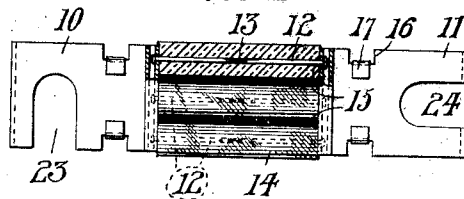


FIG. 3

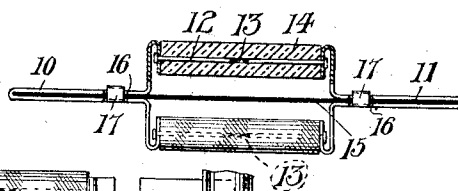


FIG. 4

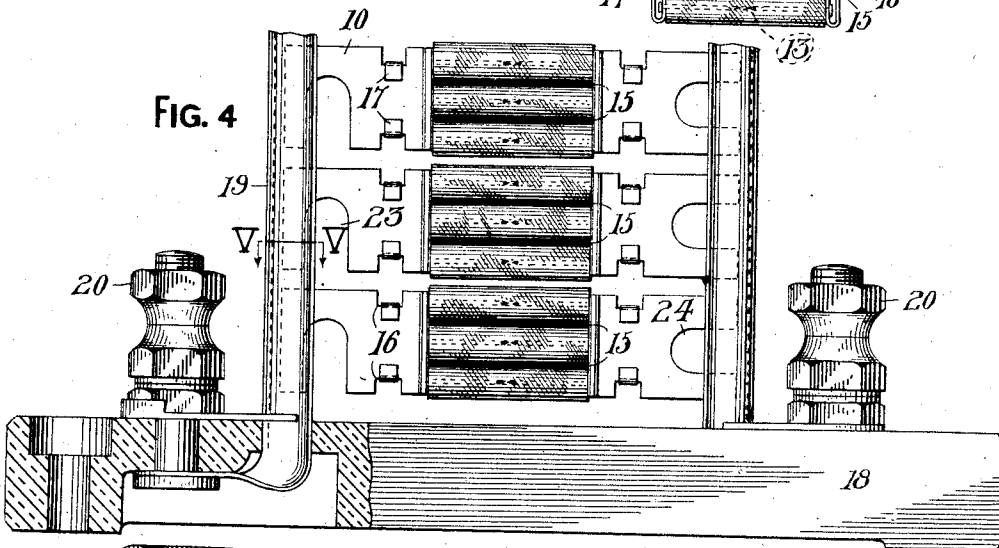
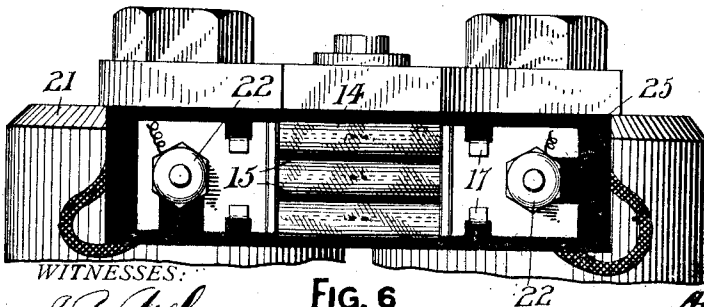
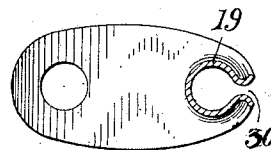


FIG. 5



WITNESSES:

J. B. Affleman,
 A. L. Vencill.

FIG. 6

INVENTOR.

Alexander Jay Wurtz
 BY
 H. E. Krueger
 ATTORNEY.

UNITED STATES PATENT OFFICE.

ALEXANDER JAY WURTS, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

LIGHTNING-ARRESTER.

1,022,717.

Specification of Letters Patent.

Patented Apr. 9, 1912.

Application filed January 9, 1911. Serial No. 601,514.

To all whom it may concern:

Be it known that I, ALEXANDER JAY WURTS, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Lightning-Arresters, of which the following is a specification.

One object of my invention is the provision of a lightning arrester having a plurality of pairs of electrodes connected in multiple, each of which pairs comprises a fuse.

I will describe a lightning arrester embodying my invention, and then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a diagrammatic view showing a lightning arrester embodying my invention. Figs. 2 and 3 are front and side elevations respectively of one form of lightning arrester unit embodying my invention. Fig. 4 is a view showing one convenient method of mounting one or more lightning arrester units such as are shown in Figs. 2 and 3. Fig. 5 is a sectional view on the line 5-5 of Fig. 4 looking in the direction of the arrow. Fig. 6 is a view showing a method of mounting a lightning arrester unit embodying my invention in the terminal posts of a relay or other electrical device.

Similar reference characters refer to similar parts throughout the several views.

One feature of a lightning arrester embodying my invention is the provision of continuous and uninterrupted protection to the line for a plurality of successive discharges without the necessity of renewal or attention.

Another feature is a lightning arrester comprising a plurality of pairs of electrodes connected in multiple, each pair being in itself a fuse. I thus avoid the necessity of placing a fuse in series with the arrester, and therefore I provide a lightning arrester whose capacity for discharge varies directly as the number of spark gaps placed in multiple, in distinction from the combination of a plurality of multiple spark gaps connected in series with a single fuse, in which latter type the capacity of the arrester for discharge is limited by the resistance of the fuse.

Referring now to Fig. 1, which is a diagrammatic representation of a lightning ar-

rester embodying my invention, 10 and 11 designate metallic wires or plates in electrical connection respectively with a line L and ground G, or if desired, in shunt with some electrical device. Projecting from these plates toward each other are electrodes 12, arranged in pairs, each pair having a spark gap 13 between their points. I thus provide a lightning arrester having a plurality of spark gaps in multiple, across one or more of which a discharge will take place, depending on the volume and other conditions of the discharge. One or both of the electrodes 12 of each pair are preferably of a material which will be fused by the passage through them of a dynamic current following a discharge across the spark gap. By this construction, each pair of electrodes serves the double function of a lightning arrester and a fuse, and I thus avoid the necessity of connecting a separate fuse in series with the arrester. Heretofore, in the use of lightning arresters having a plurality of spark gaps, it has been necessary to connect a separate fuse in series with the arrester, and in such cases the line has been left unprotected after each discharge until the series fuse could be replaced. In a lightning arrester embodying my invention, however, after a discharge across one or more pairs of electrodes there will be no time interval during which the line is left unprotected, for the reason that only those pairs of electrodes which have participated in the discharge will be fused, thus leaving the line protected by the remaining pairs of electrodes. Furthermore, a lightning arrester embodying my invention comprises a plurality of pairs of electrodes no pair of which can become bridged or fused together, as has heretofore been possible in lightning arresters comprising a plurality of spark gaps formed by a pair of more or less substantial serrated metallic plates.

It will be evident from the foregoing that the capacity of a lightning arrester embodying my invention to carry off a discharge increases in proportion to each increase in the number of pairs of electrodes connected in multiple.

Referring now to Figs. 2 and 3, I have here shown one form of a lightning arrester unit embodying my invention. The electrodes 12 are preferably in the form of pins of fusible material, and for this purpose I

may use ordinary toilet pins suitably connected with the plates 10 and 11. These electrodes may be supported in the plates 10 and 11 in any suitable manner, as for example, as here shown, by punching holes in the ends of the plates, inserting the electrodes, and bending the ends of the plates back upon the body of the plate thus securing the heads of the electrodes. As here shown, the plates 10 and 11 are held in their proper relative positions by means of a bar 15 of insulating material. The metallic plates may be secured to this bar 15 by means of notches 16 in the bar 15 into which are bent tongues 17 formed by slits in the metallic plates. As here shown, each pair of electrodes is inclosed in a tube 14 of destructible material, preferably a glass tube, having a capillary hole, the diameter of the hole being approximately the same as the diameter of the electrodes 12. By such a tube I provide a means for insulating each pair of electrodes from the adjacent pairs, thus permitting the pairs of electrodes to be placed much closer together than would be permissible without such insulation. Another feature of the tube is the protection of the spark gaps from dust, dirt and insects, etc., which might permit the electrodes to become electrically connected. Still another feature of the capillary tube is the support afforded the electrodes whereby the electrodes of each pair are held rigidly in alignment, thus maintaining the desired length of spark gap between their ends. A further feature of this tube is the indication of the condition of the electrodes; that is, when the electrodes have been fused the fact is indicated by the destruction or discoloration of the tube.

As shown in Figs. 2 and 3, the plates 10 and 11 are formed in such manner as to serve as terminals for the electrodes, by means of which terminals the unit may be mounted in any desired manner. Referring to Fig. 4, I have here illustrated one arrangement of mounting, comprising a base 18 carrying two supporting posts 19, 19, which posts are constructed to form slots 30 as shown in Fig. 5 for the accommodation of the terminal plates 10 and 11 of the lightning arrester units. These supporting posts 19 may be secured to the base 18 by means of bolts 20 which may also serve as terminal posts for the electrical connections to the lightning arrester. It will be evident that by the use of this arrangement of mounting, any desired number of units,

each comprising a plurality of pairs of electrodes, may be conveniently mounted on one base. One feature of such an arrangement of mounting is economy of manufacture. Another feature is the convenience of replacement of the units.

In Fig. 6 I have shown an arrangement for mounting a lightning arrester unit embodying my invention in the terminal posts of an electro-magnet. In this view 21 represents a pair of electro-magnets for a relay or other electrical device, having terminal posts 22 carried in an insulating plate 25 secured to the back strap of the magnet. A lightning arrester unit such as I have hereinbefore described may be conveniently mounted in the binding posts 22 by means of slots 23 and 24 in the plates 10 and 11, and may be readily replaced after it has been destroyed by one or more discharges.

Although I have herein shown and described only one form of lightning arrester unit embodying my invention, I do not wish to limit myself to this specific form, as various modifications may be made therein without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. A lightning arrester comprising a plurality of pairs of fusible electrodes connected in multiple, the electrodes of each pair having a spark gap between their ends.
2. A lightning arrester unit comprising two oppositely arranged conductors, a plurality of pairs of fusible electrodes, the electrodes of each pair having a spark gap between their ends, one electrode of each pair being electrically connected with one of the conductors and the other electrode with the other conductor, and a capillary tube of frangible insulating material inclosing each pair of electrodes.
3. In a lightning arrester, two electrodes arranged with a spark gap between their ends, and a capillary tube inclosing said electrodes.
4. In a lightning arrester, two fusible electrodes arranged with a spark gap between their ends, and a capillary tube inclosing the electrodes.

In testimony whereof I affix my signature in presence of two witnesses.

ALEXANDER JAY WURTS.

Witnesses:

L. FREDERIC HOWARD,
I. J. HARTER.