

No. 649,388.

Patented May 8, 1900.

A. J. WURTS.
LIGHTNING ARRESTER.
(Application filed June 8, 1899.)

(No Model.)

Fig. 1

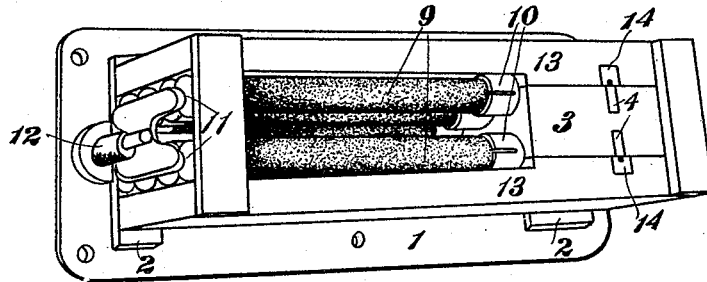


Fig. 2

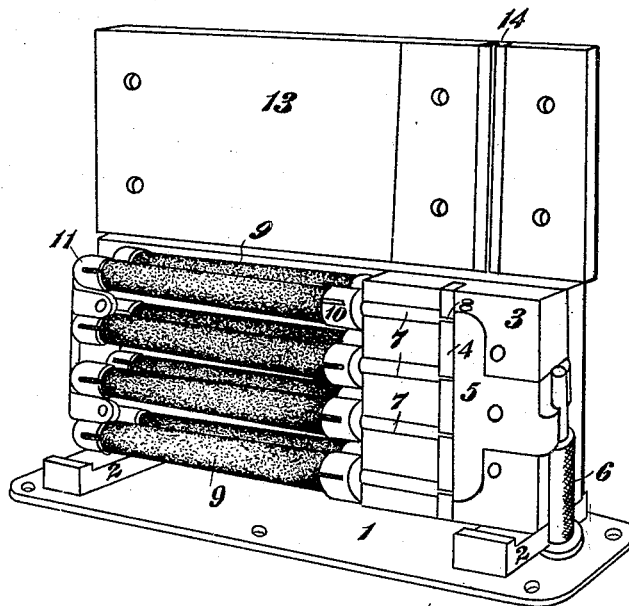
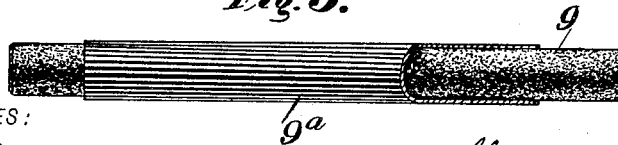


Fig. 3



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LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 649,388, dated May 8, 1900.

Application filed June 8, 1899. Serial No. 719,806. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER JAY WURTS, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Lightning-Arresters, (Case No. 838,) of which the following is a specification.

My invention relates to that class of devices known as "lightning-arresters" that are employed for protecting electrical machines and circuits from injury by charges of static electricity derived from the atmosphere.

The object of my invention is to provide a lightning-arrester which shall operate effectively to relieve an electric circuit of its static charge and at the same time be free from any danger of short circuits or other disarrangement due to continued service.

My present invention is an improvement upon the lightning-arrester covered by my prior patents, No. 509,784, of November 28, 1893, and No. 532,354, of January 8, 1895.

It has been found in practice in some instances that after a considerable period of service the conducting-paths between the sparking-terminals or one or more of such paths increase in conductivity to such an extent that a short circuit is established, which renders the device substantially inoperative for the purpose intended. It is for the purpose of guarding against the breaking down of the arrester in this particular that I have devised the improvement forming the subject-matter of this application. I have found by experiment that if there be a plurality of spark-gaps the discharge instead of dividing among the several gaps will almost invariably pass at one gap only; but if a resistance be interposed in each path, all of the resistances being substantially equal, the discharge will invariably subdivide, thus dividing the intensity of the entire discharge by the number of paths. By thus presenting a plurality of paths for the static discharges and interposing a suitable resistance in each path I am enabled to reduce the width of the spark-gaps much below what was possible with the form of arrester heretofore employed by me.

The type of resistance device and the method of its construction constitute other fea-

tures of my invention, which will be hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a perspective view of the operative portions of a single-pole lightning-arrester embodying my invention, and Fig. 2 is another perspective view of the same device with one of the cover-plates displaced from its operative position. Fig. 3 is a side elevation of one of the resistance-rods, a portion of its sheath being broken away.

Referring now to the details of construction, 1 is a base-plate of any suitable form and material for supporting the operative parts of the lightning-arrester and provided with openings or screw-holes for attaching it to a casing or other supporting-base. Mounted upon the plate 1 or upon suitable blocks 2, fastened to said plate or formed integral therewith, are the operative parts of the lightning-arrester, which will now be described.

3 is a block of non-conducting material, preferably of wood, provided approximately midway of its ends and at each side with a plate or strip 4, this plate or strip also being preferably of some hard wood arranged with its fibers substantially perpendicular to the faces of the block 3, substantially as set forth in my Patent No. 532,354. Set into each face or side of the block 3 adjacent to the strip 4 is a sparking-terminal plate 5, of brass or other suitable metal, the two plates 5 being electrically connected to one of the leads 6 for connection either to one side of the circuit to be protected or to the ground. Each face or side of the block 3 is also provided with a plurality of metal strips 7, four of these strips being shown in each face, the inner ends of which terminate at the adjacent side of the strip 4. A shallow charred groove 8 is preferably provided in each strip 4 between each of the sparking-terminals 7 and the corresponding sparking-terminal 5. The function of these charred grooves is fully set forth in my prior patents, hereinbefore referred to.

The resistance interposed in the circuit is in the form of rods 9 of a suitable composition for providing the amount and character of resistance desired, there being one rod for each sparking-terminal strip 7. The ends of these rods are seated in metal sockets 10 and

11, the sides of which are split, so that they can be pressed into close contact with the rods. The sockets 10 are either formed integral with the strips 7 or so soldered or brazed thereto as to constitute in effect a continuation thereof. The sockets 11 are joined to a conducting-lead 12, designed for connection with either one side of a circuit to be protected or with the ground. Closely and securely fastened to each side of the portion of the arrester thus far described by means of screws or similar means is a plate 13, provided with a transverse grooved strip 14 in position to engage with the strip 4. This strip 14 and its groove correspond to the similar parts shown and described in my Patent No. 532,354, already referred to.

I have found that a desirable material for the resistance-rods 9 consists of a mixture of graphite, kaolin, and some binding material—such, for example, as starch. While rods formed of this mixture are sufficiently strong and durable for transportation and ordinary usage when thoroughly baked, I have found that they are much better adapted for use in the relations here shown and described if they are merely compressed and allowed to dry at ordinary temperatures. Under such circumstances the rods are fragile and will not withstand transportation and ordinary handling without breakage to a greater or less extent. I therefore propose to provide each rod with a stiffening-sheath 9^a, which extends either throughout the whole or the greater portion of its length. For my present purpose I leave the extreme ends of the rods unprotected in order that they may be inserted into the terminal sockets 10 and 11.

While stiffening-sheaths of any suitable material may be employed, I have found that tough paper is well adapted for this purpose, and in order to apply it I moisten it until it becomes pliable, allowing it to partially dry out, if necessary, then apply a coat of shellac or other adhesive material to the surface of the rod, then wind on a layer of paper and, if more than one layer is desired, apply to that layer another coating of shellac or other adhesive material and over that wind the second layer. This may be repeated until the thickness of sheath desired is obtained, when the last coating of paper may be covered with a coating of shellac.

It will be understood that the number of coats of paper or other stiffening material and shellac or its equivalent may be anything desired, and I therefore do not limit myself in this regard.

The particular form and arrangement of parts shown in the drawings are employed in order to provide an arrester of large capacity which shall occupy a minimum amount of space. The duplication of sparking-terminals and sets of resistance-rods is not essential, however. I desire it also to be understood that the composition and the form and dimensions of the resistance-pieces may be different from what is here specifically set forth, though I have found the form illustrated in the drawings and the composition specified to be admirably adapted for the relations in which the resistance-pieces are used.

I claim as my invention—

1. A lightning-arrester comprising a base-block of non-conducting material, a terminal plate embedded therein, a plurality of terminal strips also embedded in said base-block and severally separated from the terminal plate by spark-gaps and a plurality of resistance-rods having their inner ends respectively connected to the outer ends of the terminal strips and their outer ends joined to a circuit-terminal.

2. A lightning-arrester comprising a base-block provided with a terminal plate and with a plurality of strips the inner ends of which are separated from the inner edge of said plate by spark-gaps, a covering-block for said plates and strips and a plurality of resistance-rods the inner ends of which are severally connected to the outer ends of the strips and the outer ends of which are connected to a circuit-terminal.

3. A lightning-arrester comprising a pair of sparking-terminals at least one of which is subdivided, a block in which said terminals are embedded and a plurality of resistance-pieces severally connected in series with the terminal-subdivisions.

In testimony whereof I have hereunto subscribed my name this 6th day of June, 1899.

ALEXANDER JAY WURTS.

Witnesses:

WESLEY G. CARR,
H. C. TENER.