

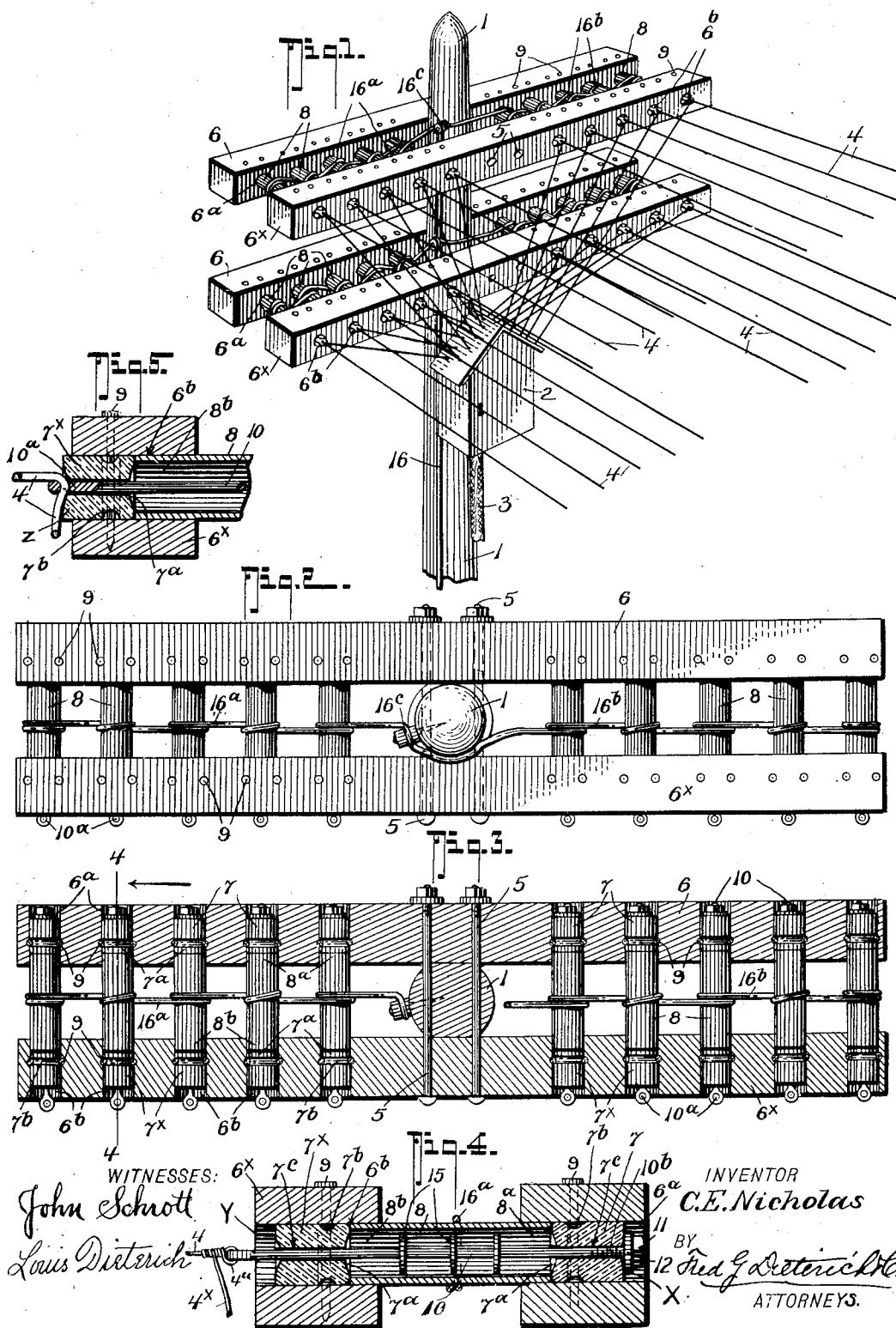
No. 745,114.

PATENTED NOV. 24, 1903.

C. E. NICHOLAS.
LIGHTNING ARRESTER.
APPLICATION FILED APR. 6, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



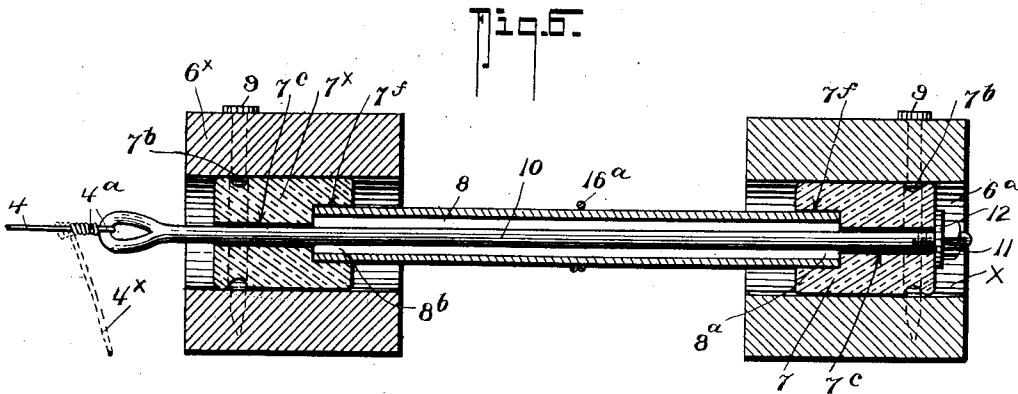
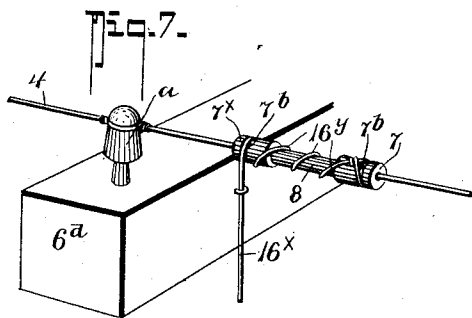
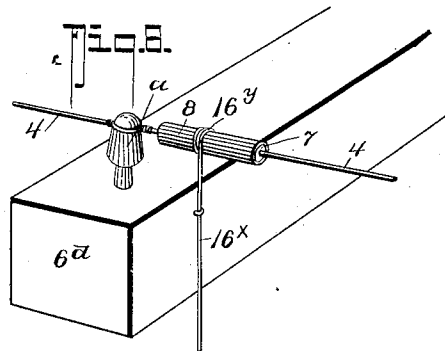
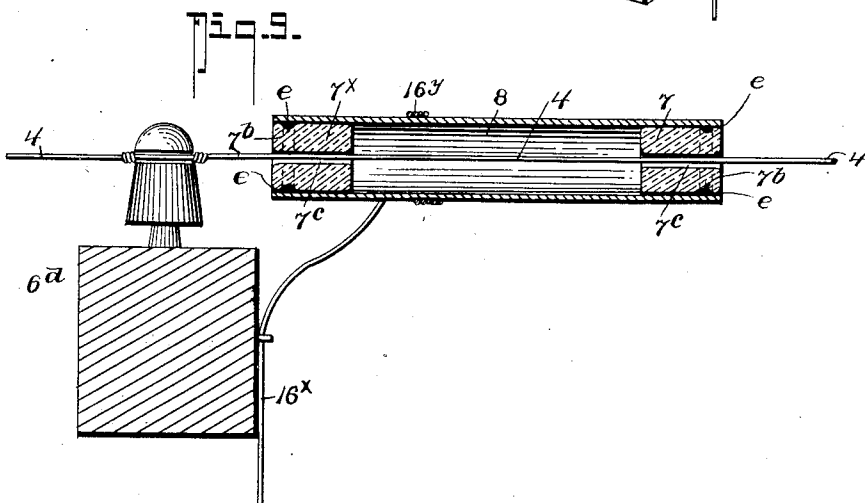
No. 745,114.

PATENTED NOV. 24, 1903.

C. E. NICHOLAS.
LIGHTNING ARRESTER.
APPLICATION FILED APR. 6, 1903.

NO MODEL.

2 SHEETS—SHEET 2.



WITNESSES:
John T. Schrott
Louis Dieterich

INVENTOR
C. E. Nicholas.
BY
Fred G. Dietrich
ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES E. NICHOLAS, OF COLUMBUS, OHIO.

LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 745,114, dated November 24, 1903.

Application filed April 6, 1903. Serial No. 151,347. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. NICHOLAS, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Lightning-Arresters, of which the following is a specification.

My invention relates to that class of lightning-arresters which are more especially adapted for use on telegraph-poles for protection of the various circuits emanating from a cable through a distributing-box mounted upon the pole.

The primary object of my invention is to provide an arrester of the class described whereby the line to be protected will have a larger surface exposed to ground than is possible with the ordinary types of arresters now in common use.

The invention also seeks to provide a device of the character stated in which the grounding-terminal is held between the cross-arms of the pole by the same means which secures the line-wire and holds it in proper position and at the same time obviates the necessity of the usual insulators upon the cross-arms to which the line-wire is usually secured.

With other objects in view, which will hereinafter appear, my invention consists in the novel construction, combination, and arrangement of parts which will effectively serve their intended purposes and which will first be described in detail and then pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of the upper part of a telegraph-pole with my invention applied. Fig. 2 is a top plan view of one pair of cross-arms. Fig. 3 is a horizontal section thereof. Fig. 4 is a cross-section on the line 4 4 of Fig. 3 looking in the direction of the arrow. Fig. 5 is a detail view of a slightly-modified form of my invention hereinafter specifically referred to. Fig. 6 is a cross-section of another modified form of my invention. Fig. 7 shows my invention as adapted for use in connection with the line-wire on single-arm poles. Fig. 8 is a similar view of a further modification of my invention, and Fig. 9 is a longitudinal section thereof.

Referring now to the accompanying drawings, in which like numerals and letters of

reference indicate like parts in all of the figures, 1 indicates a telegraph-pole, (which may be of any approved construction,) upon which is mounted the usual distributing-box 2, into which the end of the cable 3 is led and from which the various wires emanate.

Mounted upon the upper part of the pole by bolts 5 or otherwise are a series of cross-arms 6 6^x, arranged in pairs for a purpose presently to appear. Each of the cross-arms 6 6^x has a series of horizontal bores 6^a 6^b, adapted to receive insulating-knobs 7 7^x, of porcelain, glass, or other like vitreous substances. The horizontal bores 6^a of one of the pair of cross-arms are in alinement with the horizontal bores 6^b of the other cross-arm 6^x.

8 designates a cylindrical tube of iron or other like metallic substance held between each pair of cross-arms 6 6^x, and the tubes 8 have their ends 8^a 8^b projecting into the horizontal bores 6^a 6^b of the cross-arms 6 6^x, and the said tube ends 8^a 8^b are furthermore adapted to abut the ends 7^a 7^a of the insulating-knobs 7 7^x, as clearly shown in Figs. 3 and 4.

To hold the knobs 7 7^x and the tubes 8 in their proper relative positions, I drive spikes 9 vertically through the cross-arms 6 6^x to engage the grooves 7^b in the knobs 7 7^x, as is clearly shown in Figs. 3 and 4.

By referring now more particularly to Figs. 3 and 4 it will be seen the knobs 7 7^x are disposed about midway the horizontal bores 6^a 6^b, whereby to leave spaces X and Y at the outer ends of the knobs 7^x.

Passing through longitudinal bores 7^c in the knobs 7 7^x and through the tube 8 is an eyebolt 10, having an eye portion 10^a at one end through which the naked line-wire from the distributing-box 2 is adapted to pass, and at the other end the bolt 10 is threaded, as at 10^b, to receive the lock-nut 11 and washer 12, as shown.

In the practical application of my invention the line-wires are securely fastened to the eyebolts 10 in any approved manner, either by passing the line-wire 4 through the eye of the bolt 10 and winding it back upon itself, as at 4^a, (see Figs. 4 and 6,) or it may be held in place by simply drawing the eye 10^a of the eyebolt 10 tightly against the knob

7^x; but when this method of fastening the line-wires is used I prefer to arrange the insulating-knobs 7^x in the manner best shown in Fig. 5, from which it will be seen the knob 7^x has its end *z* projecting slightly beyond the front face of the cross-arm 6^x to prevent the live line-wire coming in contact with the cross-arm 6^x, and thereby obviate any danger of a ground. This arrangement is not, however, absolutely necessary, since the line-wire may or may not be insulated up to the point where it passes through the eyebolt 10.

Mounted upon the eyebolt 10 within the tubular member 8 are a series of thin metallic washers 15 of slightly less diameter than the internal diameter of the tube 8, and while I prefer to use these washers as shown, since they increase the efficiency of my arrester, yet I may dispense with them entirely.

16 designates a ground-wire having one end grounded in the usual manner, and this wire is preferably strung up the side of the pole to near the upper pair of cross-arms 6 6^x.

Secured to the tubes 8 by wrapping around them or in any approved manner and in electrical connection therewith are wires 16^a 16^b, joined at 16^c to the ground-wire 16, whereby the tubes 8 are brought into electrical connection with each other and with the earth.

So far as described the manner in which my invention operates is best explained as follows: The static charges set up in the line-wire by the electrical stresses in the atmosphere will be discharged from the washers 15 and eyebolt 10 to the tube 8 and from thence conducted to ground. This discharge under ordinary conditions—*i. e.*, when the charge is not excessive—will be in the nature of a brush discharge; but should lightning strike the line-wires 4, and thereby cause the line-wire to become excessively charged, the charge will pass along the line-wires 4 to the eyebolt 10 and thence discharge to the tube 8. From thence it will be conducted through the wires 16^a 16^b and the ground-wires 16 to earth.

By arranging my invention in the manner shown and described it will be readily apparent that should any of the parts of the device become injured it will only be necessary to remove the fastening-nuts of the eyebolt 10 and the spikes 9, when the tube 8 and insulating-knobs 7 7^x may be withdrawn and replaced as desired.

In the modified form shown in Fig. 6 the insulating-knobs 7 7^x have countersunk bores 7^f, into which the tube 8 is adapted to fit, and in this form the tube 8 is of a small diameter, so as to lie close to the eyebolt 10.

When it is desirable to use my arrester in connection with the ordinary single-arm pole, the line-wire 4 is fastened to the usual insulator *a* upon the cross-arm 6^a and strung through the knobs 7 7^x and the tube 8, the eyebolt being omitted. To hold the knobs 7 7^x and tube 8 in proper correlative positions, the grounding-wire 16^x is wrapped

around the insulating knobs and tubes, as indicated by 16^y in Fig. 7.

In Figs. 8 and 9 I have shown a slightly-modified form of my invention which is more particularly adapted for use in connection with the single-arm poles. In this form the tube 8 is made of sufficient diameter to receive the insulating-knobs 7 7^x at its ends, which knobs 7 7^x are suitably cemented, as at *e*, in the tube 8 to hold the same in proper position.

The grounding-wire 16 is wrapped around the tube 8, as at 16^y, which serves in this form as a sufficient grounding connection and also to hold the arrester in position on the line-wire.

In the practical arrangement of my invention I find it convenient to place the form shown in Figs. 8 and 9 at intervals at from one to two miles, as may be desired.

By providing the space *x*, as shown, the nut end of the eyebolt, together with its nut and washer, will be protected from accidental displacement, the outer face of the nut being flush with the outer face of the cross-arm 6. Furthermore, while I have shown but two sets of cross-arms carrying sufficient arresters for twenty line-wires yet I do not desire to limit myself to this particular number of cross-arms, since any desired number of cross-arms may be used without departing from the scope of the appended claims. Neither do I desire to limit myself to the manner of arranging the cross-arms upon the poles, and although I have shown the cross-arms arranged for all the wires running in the same direction yet they may be arranged to allow the wires to be strung in different directions. I desire it furthermore understood that slight changes and modifications in the structure and arrangement of parts may be made without departing from the scope of the appended claims.

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

1. As a new article of manufacture, a lightning-arrester comprising a longitudinally-disposed conductor and a cylindrical metallic tube, insulators at each end, said tube adapted to be electrically connected to the ground, said insulators being longitudinally apertured whereby to receive the longitudinally-disposed conductor electrically connected to the line-wire, for the purposes specified.

2. A lightning-arrester of the class described, comprising in combination with a pair of cross-arms; of a line-terminal and a ground-terminal, said ground-terminal being mounted between the cross-arms and in electrical connection with the earth, and said line-terminal being mounted on and insulated from the cross-arms and in electrical connection with the line-wire, for the purposes specified.

3. A lightning-arrester comprising in combination with a pair of apertured cross-arms,

of a line-terminal and a ground-terminal, said ground-terminal being held between the cross-arms with its ends projecting into the apertures therein and in electrical connection with the earth, and said line-terminal mounted in the apertures of the cross-arms and insulated therefrom, said line-terminal being in electrical connection with the line-wire and passing through the ground-terminal, for the purposes specified.

4. In a lightning-arrester of the character stated, a pair of supports having apertures therethrough, a cylindrical member mounted between said supports with its ends projecting into the apertures therein, means for holding said cylindrical members in position and from lateral movement, said means including longitudinally-apertured, insulating-knobs mounted within the apertures of the supports and having their ends in contact with the cylindrical member, and a metallic line-terminal adapted to pass through the insulating-knobs and the cylindrical member, for the purposes specified.

5. In a lightning-arrester of the character stated, a pair of supports having apertures therethrough, a metallic tube mounted between the said supports, said tube having its ends projecting within the apertures in the supports, insulators mounted at the ends of said tube within the apertures of the supports, said insulators having longitudinal apertures and circumferential grooves, means engaging with the circumferential grooves for securing the insulators in position, and a rod passing through the insulators and the tube, said rod being held out of contact with the said tube and including an eye portion and a nut-receiving portion, for the purposes specified.

6. In a lightning-arrester of the character stated including a pair of supports having apertures therethrough, a metallic tubular member mounted between the said supports, said tubular member having its ends projecting within the apertures in the supports, insulators mounted at the ends of said tubular member within the apertures of the supports, said

insulators each having a longitudinal aperture and a circumferential groove, means for engaging with the circumferential groove for securing the insulators in position, a rod passing through the insulators and the tube, said rod including an eye portion and a nut-receiving portion, said rod being held out of contact with said tubular member, and a series of disks arranged upon said rod within the tubular member, said rod adapted to be connected with the line-wire, and means for connecting said tubular member with the earth, for the purposes specified.

7. A lightning-arrester comprising in combination with the apertured supporting-arms of a metallic tube 8 held between said arms with its ends projecting into the apertures thereof, insulators 7 arranged at each end of the tube within the apertures of the arms, said insulators having apertures, an eyebolt 10 adapted to pass through the apertured insulators and the tube 8, a series of washers 15 mounted upon the eyebolt within the tube 8, means for securing the insulators in position, said means including spikes 9 driven through the supporting-arms and engaging with the insulators, and means for connecting the tube 8 to the earth, said last-named means consisting of conductor-wires connected to the tube 8 and to the ground, as specified.

8. A lightning-arrester for cable-terminals, comprising in combination with a pair of cross-arms; of a series of tubular members mounted between the cross-arms, each of said tubular members being in electrical connection with each other and with the earth, a series of eyebolts, one for each tubular member, said eyebolts passing through said cross-arms and said tubular members and insulated therefrom and from the earth, each of said eyebolts being in electrical connection with a line-wire, substantially as shown and described.

CHARLES E. NICHOLAS.

Witnesses:

J. D. PARK,

W. H. MILLER.