

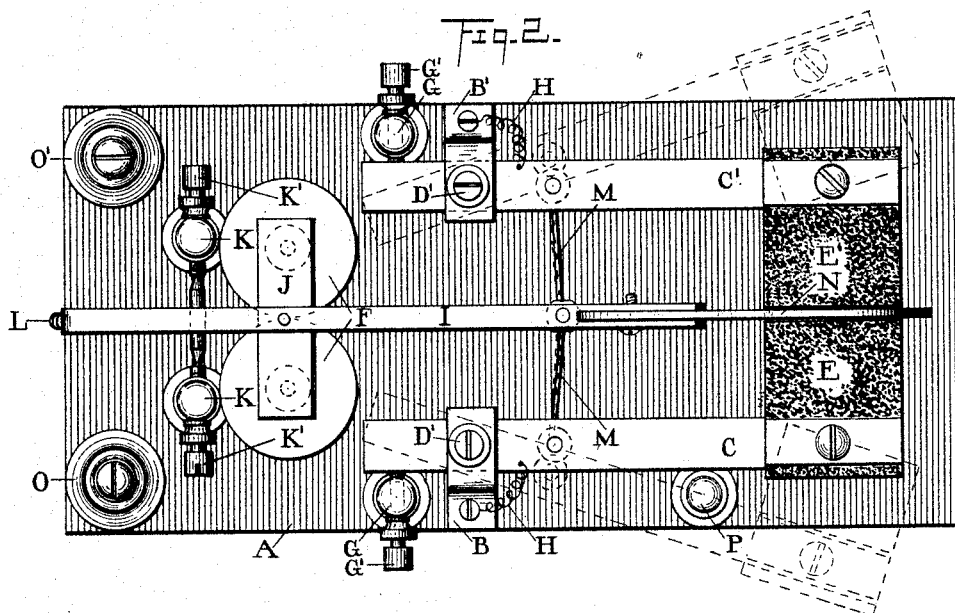
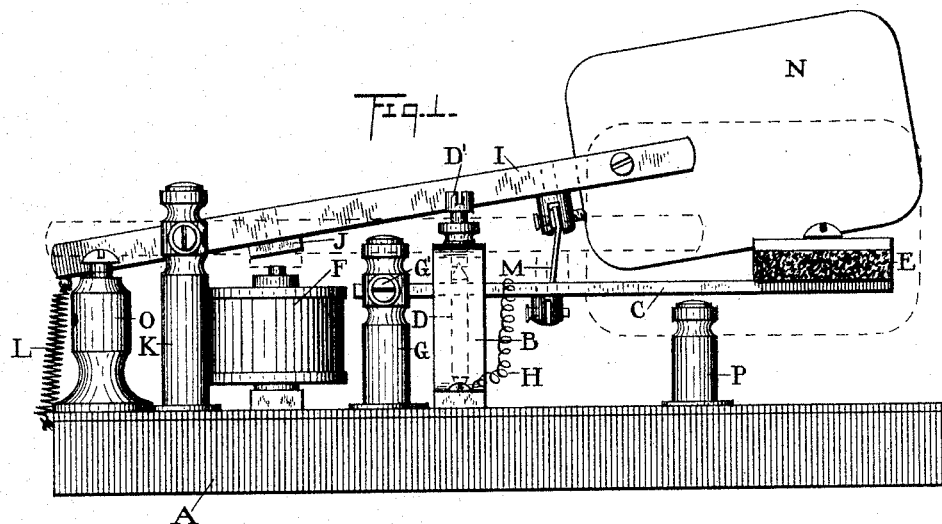
(No Model.)

2 Sheets—Sheet 1.

A. B. LYMAN.
LIGHTNING CONDUCTOR AND ARRESTER.

No. 492,219.

Patented Feb. 21, 1893.



WITNESSES.

P. S. Lowrie.

O.E. Shrock

INVENTOR.

A. B. Symon

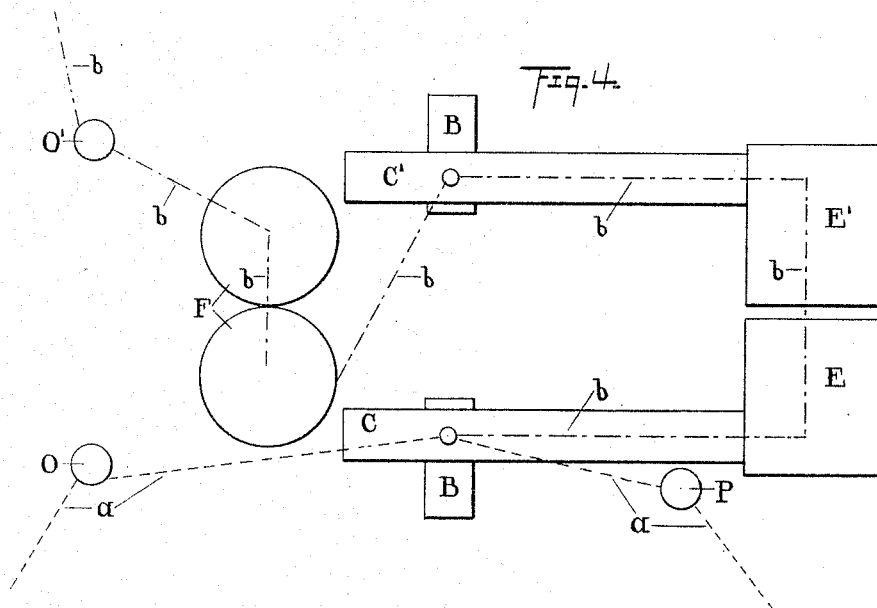
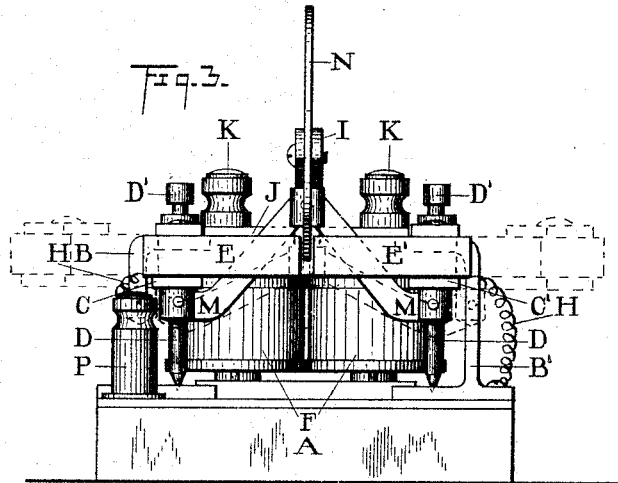
By W. A. Burdick

ATTORNEY.

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UNITED STATES PATENT OFFICE.

ADELVIN B. LYMAN, OF CLEVELAND, OHIO.

LIGHTNING CONDUCTOR AND ARRESTER.

SPECIFICATION forming part of Letters Patent No. 492,219, dated February 21, 1893.

Application filed October 28, 1892. Serial No. 450,244. (No model.)

To all whom it may concern:

Be it known that I, ADELVIN B. LYMAN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Lightning Conductor and Arrester, of which the following is a full, clear, and complete description.

My invention consists of two vibrating arms having carbon, or other electrically conducting material, attached to the outer ends thereof; a central lever connected with said arms and having an armature operated by an electro-magnet, when said electro-magnet becomes charged by a current of electricity in the manner hereinafter fully described, whereby the carbons are separated.

The object of my improvement is to provide a conductor and arrester for the protection of electrical machinery, but more particularly street-car motors, against an overcharge of electricity as by a flash of lightning, without depriving said machinery or motor of its propelling power.

That my invention may be seen and fully understood, by those skilled in this art, reference will be had to the following specification and annexed drawings forming part thereof, in which—

Figure 1, Plate 1, is a side view of my device, showing the central lever depressed in dotted lines; Fig. 2, Plate 1, a top view, with the forward ends of the arms and the carbons shown separated, in dotted lines; Fig. 3, Plate 2, an end view, showing the carbons separated, in dotted lines and Fig. 4, Plate 2, a diagram of the circuit.

Similar letters of reference designate like parts in the drawings and specification.

Secured to the base A are the posts B and B' which support the arms C and C'. The arms C and C' are pivoted to the posts B and B' by the pinions D, D, Figs. 1 and 3, said pinions being held in place by means of the adjusting-screws D', D'; thus permitting the arms to swing freely. To the forward ends of the arms C and C' are fastened the carbons E and E' respectively, while the opposite ends of said arms extend beyond the posts B and B' toward the electro-magnet F. The posts G, G, Figs. 1 and 2, having the adjusting-screws G', G' are placed between the

electro-magnet F and the posts B and B' for the purpose of regulating the distance between the carbons E and E', by reason of the rear ends of the arms C and C' coming in contact with the screws, when said arms are closed. A wire H connects the arm C with the post B and the arm C' with the post B', for the reason hereinafter explained.

The central lever I, having the armature J attached thereto over the electro-magnet F, is carried on the posts K, K by the adjustable trunnions K', K', Fig. 2, and the spring L, Figs. 1 and 2, extends from the rear end of said lever I to the base A. Short levers M, M, composed of rubber-fiber or other non-conducting substance, are pivoted to the lever I and the arms C and C' in such a manner that, when the forward end of the lever I is depressed, the carbons E and E' on the arms will be caused to recede from each other, to be drawn together again when the spring L depresses the rear end of said lever I. A piece of asbestos N, or other suitable non-combustible, non-conductor is received into a slot in the free end of the lever I and necessarily passes between the carbons, when said lever is depressed. The binding-posts O, O' and P are secured to the base A, as best shown in Figs. 1 and 2.

In the diagram, Fig. 4, the main line wire, which conducts the current of electricity to the motor, is represented by the dotted line *a*. The wire *a* is attached to the binding-post O and passes from thence, through the posts B and P, to the motor. The carbons E and E' are separated sufficiently to prevent the ordinary current from forming an arc between them, although the arm C and carbon E are charged by the current passing over the wire *a*. When lightning strikes the main wire *a*, it will follow the shortest route to the ground, represented in the diagram by the broken line *b*, and form an arc between the carbons E and E', because of its increased voltage. The connection between the posts B and B' is formed by the arms C and C', the carbons E and E' and the arc between said carbons. Suitable wires connect the post B' with the electro-magnet F, said electro-magnet with the binding-post O' and the binding-post O' with the ground.

It is a well established fact that, when an

arc is formed between two conducting bodies, said arc will maintain an electrical connection between said bodies and will divert a strong current from its original course. In view of this fact, it becomes necessary to destroy the arc, formed by my device, at once, in order to allow the line-wire current to return to the motor. This is accomplished in the following manner: The instant an arc is formed between the carbons E and E', the electro-magnet F becomes magnetized and attracts the armature J, thus depressing the forward end of the lever I and separating said carbons, as hereinbefore described. The various parts will now assume the appearance indicated by the dotted lines in Figs. 1, 2 and 3 and the arc will be broken by the separation of the carbons. As soon as the arc is broken, the electric current from the main-line returns to the motor, the armature J is released and the spring L draws the lever I into place again ready for another super-charge of electricity.

In order to render the breaking of the arc more certain the asbestos N, descends between the carbons, as before described. The wires H, H are for the purpose of insuring a perfect connection between the posts B and B' and the arms C and C' respectively, in case the points of the pinions D, D should become rusted or otherwise rendered non-conductive. In place of the carbons E and E' any electrically conducting terminals may be used, but the carbons are preferable.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a lightning conductor and arrester, the vibrating arms C and C' mounted on suitable posts and having electrically conducting terminals, normally separated by adjusting screws situated back of the pivotal connections of said arms, in combination with the lever I having non-combustible, insulating material in its free terminal, an armature,

and the insulating levers M, M connecting said lever I with the arms C and C', and an electro magnet and spring for actuating the lever I whereby the terminals of said arms C and C' are widely separated or drawn near together, in the manner substantially as and for the purpose set forth.

2. In a lightning conductor and arrester, an electro magnet and the vibrating arms C and C' having separate electrically conducting terminals and the insulating levers M, M, in the circuit between a line and ground wire, in combination with the lever I having an insulating, non-combustible substance attached to its free terminal, an armature, the spring L, and connected to the insulating levers M, M, said lever I being attracted by said electro magnet when charged, thereby separating the conducting terminals of said arms C and C' sufficiently to destroy an electrical arc formed between said terminals, in the manner substantially as and for the purpose set forth.

3. A lightning conductor and arrester consisting of an electro magnet connected to the ground wire and the post B', said post supporting the vibrating arm C', the vibrating arm C supported by the post B in electrical connection with the line wire, said arms C and C' having electrically conducting terminals, the posts G, G and adjusting screws G', G', the lever I carried on the trunnions K', K' and provided with an armature, the spring L and the insulating levers M, M connecting said lever I with the arms C and C', in the manner substantially as and for the purpose set forth.

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

ADELVIN B. LYMAN.

Witnesses:

W. H. BURRIDGE,
W. A. BIDDLE.