(No Model.)

C. S. VAN NUIS & J. H. VAIL.

LIGHTNING ARRESTER.

No. 455,955. Patented July 14, 1891.

Fig. 1

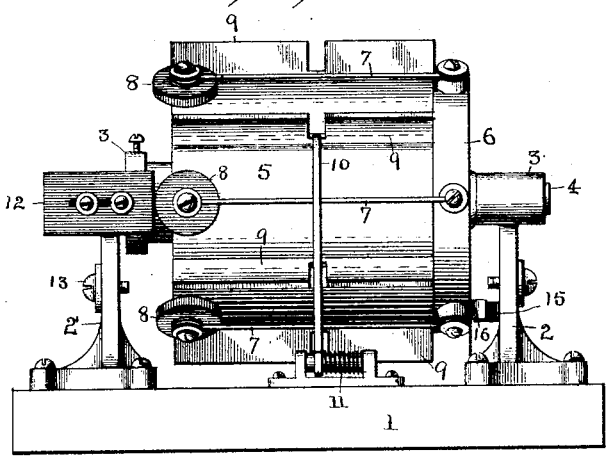


Fig. 2.

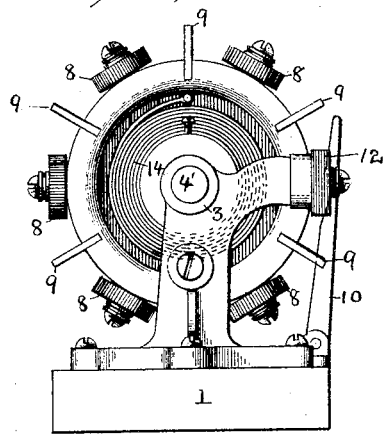


Fig. 3.

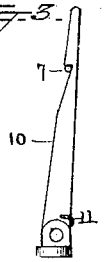
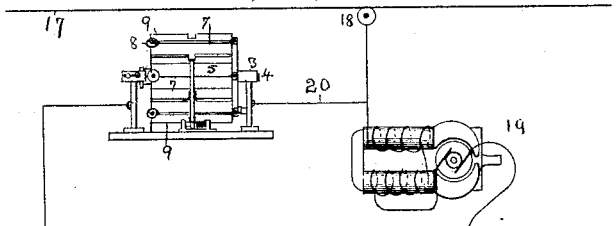


Fig. 4.



Witnesses
Norris A. Clark.
W. Pelz

Inventor
C. S. Van Nuis & J. H. Vail
By their Attorneys
Dyer & Seely.

UNITED STATES PATENT OFFICE.

CHARLES S. VAN NUIS, OF NEW BRUNSWICK, NEW JERSEY, AND JONATHAN H. VAIL, OF NEW YORK, N. Y.

LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 455,955, dated July 14, 1891.

Application filed October 16, 1890. Serial No. 368,327. (No model.)

To all whom it may concern:

Be it known that we, CHARLES S. VAN NUIS, residing at New Brunswick, in the county of Middlesex and State of New Jersey, and JONATHAN H. VAIL, residing at New York city, in the county and State of New York, both citizens of the United States, have jointly invented a certain new and useful Improvement in Lightning-Arresters, of which the following is a specification.

Our invention relates especially to that class of lightning-arresters in which there are several fusible wires arranged to be automatically thrown into circuit successively; and the invention consists in certain features of construction in an apparatus of the character described, whereby the apparatus is rendered more convenient and efficient in operation than those heretofore used.

In the accompanying drawings, which illustrate our improvement, Figure 1 is a side view of the apparatus; Fig. 2, an end view thereof; Fig. 3, a detail view of the detent, and Fig. 4 a diagram illustrating one way in which the arrester may be connected to an electrical circuit.

On a suitable base 1, of wood, slate, or other insulating material, are mounted suitable standards 2 2′, each provided with a journal-bearing 3 for the journals 4 4′ of the drum 5. The journal 4 at the right in Fig. 1 is preferably integral with a metal disk or cap 6, which is fitted onto the end of the insulating-drum 5, and which constitutes a circuit-terminal. The journal 4′ at the opposite end of the drum is preferably of insulating material, but may be of metal. In this case, however, it should be so mounted in the drum as to be insulated from journal 4. On the periphery of the drum are arranged several fusible wires 7, one end of each being connected to a binding-post or connector on the cap 6, the other end being connected with a circular lightning-arrester plate 8, which is preferably of carbon, by means of a screw and washers, as shown. These plates project beyond the end of the drum. By loosening the holding-screws the plates can be turned to bring a different portion of their periphery into operative position. Around the periphery of the drum also are, or may be, placed radiating vanes or flanges 9 for separating the fusible wires and lightning-arrester plates, and preventing all danger of lightning or an arc passing between these parts. If the drum be made of wood, the vanes may be of wood or of vulcanized fiber or similar material set in grooves in the drum. we prefer, however, to make the drum of some plastic material, in which case the vanes would be pressed or molded at the same time with the drum, and would be integral therewith. The vanes are notched to accommodate the pivoted detent-lever 10, the hooked end of which engages with one of the fusible wires 7. This lever is pressed toward the drum by a spring 11.

On the standard 2′, at the left in Fig. 1, is supported an adjustable plate 12, preferably of carbon, which constitutes the second plate of the lightning-arrester, and when in use is adjusted so as to leave a very narrow space between it and the adjacent plate 8. The standard on which this plate 12 is mounted is provided with a connecting device 13, to which a ground or other wire may be connected. 14 is a spring or other suitable motor for turning the drum when released by its detent.

15 is a projection on one of the standards, and 16 a projection on the drum or cap, so arranged as to strike against each other, and thus prevent more than one revolution of the drum.

In Fig. 4 the arrester above described is diagrammatically shown as applied to an electric-railway circuit. 17 is supposed to be an overhead conductor, and 18 a trolley for taking current therefrom, said trolley being connected through the car-motor 19 to earth. 20 is a branch shunting the motor and containing the lightening-arrester constructed as heretofore described.

The operation will be as follows: The spring or motor is wound by turning the drum in the proper direction until projections 15 16 come in contact, and in this position the hook of the detent-lever engages with the first fusible wire 7. Should lightning strike the line, it will pass over wire 7 to the plate 8, jumping across the narrow space to plate 12, thence by proper connection to ground. As

is well known, there is danger in systems employing heavy currents that the line-current will follow the arc established by the lightning-discharge and by finding a low-resistance circuit to ground short-circuit the line. Wire 7, however, is of such size and material that the passage of the line-current at once fuses it. This allows the motor to turn the drum until the hook of the lever 10 engages the succeeding wire and carries the first plate 8 away from plate 12, breaking the arc, preventing the flow of current, and bringing the second plate 8 into position. This operation may be repeated as many times as there are fusible wires and lightning-arrester plates on the drum. When the fusible wires have all been burned out, new wires may be put in their place and the circular plates turned to bring new faces forward, if necessary, when the apparatus will be in condition for further use.

Having thus described our invention, what we claim is—

1. The combination, in a lightning-arrester, of a turning drum, a motor therefor, fusible conductors at intervals around the periphery of the drum connected at one end of the drum to lightning-arrester plates and connected at the other end of the drum to a line-terminal wire, a co-operating lightning-arrester plate supported adjacent to the end of the drum carrying the plates, and a detent for the motor operated by fusing of a wire and permitting the drum to turn to bring a new fusible conductor and lightning-arrester plate into operative position, substantially as described.

2. The combination, in a lightning-arrester, of a drum, a motor therefor, fusible conductors at intervals around the periphery of the drum, connected at one end of the drum to lightning-arrester plates projecting beyond the end of the drum and at the other end adapted for connection to a line-wire, a co-operating lightning-arrester plate supported adjacent to the end of the drum, and a detent-lever engaging with the fusible wires successively, substantially as described.

3. The combination, in a lightning-arrester, of a drum, a motor therefor, a detent, a metal cap and journal at one end of the drum, means for connecting said journal to a circuit-wire, an insulating or insulated journal at the opposite end of the drum, fusible wires connected to the cap and extending along the length of the drum and each connected to a lightning-arrester plate and co-operating with the detent, and a stationary arrester-plate, substantially as described, whereby when a wire fuses the drum turns one space, throwing the succeeding wire and arrester-plate into operative position.

4. The combination, in a lightning-arrester, of a drum, a motor therefor, a pivoted and spring-pressed detent-lever, a metal cap and journal at one end of the drum, means for connecting said journal to a circuit-wire, a journal at the opposite end of the drum, fusible wires connected to the cap and extending along the length of the drum and each connected to a circular lightning-arrester plate and co-operating with the detent, and a stationary lightning-arrester plate, substantially as described.

5. The combination, in a lightning-arrester, of an insulating-drum having projecting vanes or flanges at intervals around its periphery, fusible conductors between the vanes connected at one end of the drum to a lightning-arrester plate and at the opposite end of the drum to a line-terminal, a co-operating lightning-arrester plate supported adjacent to the end of the drum and adapted for connection to a line leading to earth, a motor for the drum, and a detent liberated by the fusing of a conductor and allowing the drum to turn a definite distance to bring a new wire into operative position, substantially as described.

6. The combination, in a lightning-arrester, of a drum, a motor therefor, several fusible wires arranged at intervals around the periphery of the drum and lengthwise thereof, one end of each of said wires being connected to a common circuit-terminal and the opposite end of each of said wires being connected to a lightning-arrester plate, and a stationary lightning-arrester plate supported near the end of the drum in position to co-operate with the first-mentioned lightning-arrester plates, substantially as described.

This specification signed and witnessed this 26th day of September, 1890.

CHARLES S. VAN NUIS.
JONATHAN H. VAIL.

Witnesses:
CHARLES M. CATLIN,
E. COURAN.