

(No Model.)

J. W. GIBBONEY.
LIGHTNING ARRESTER.

No. 520,776.

Patented June 5, 1894.

FIG. 1.

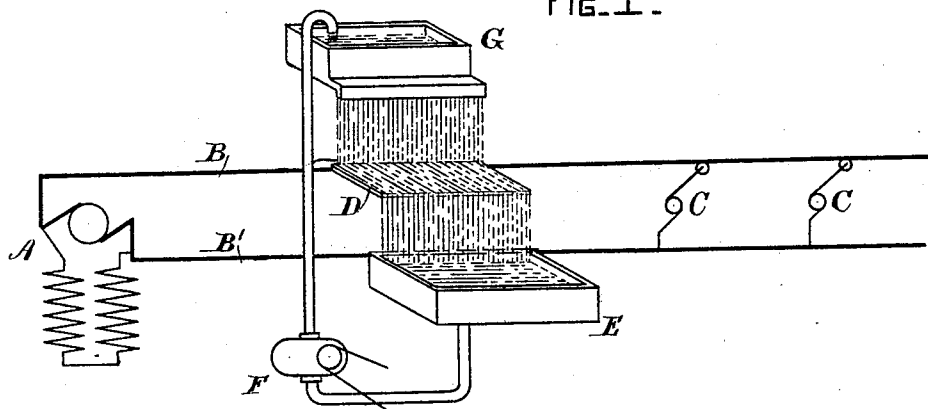
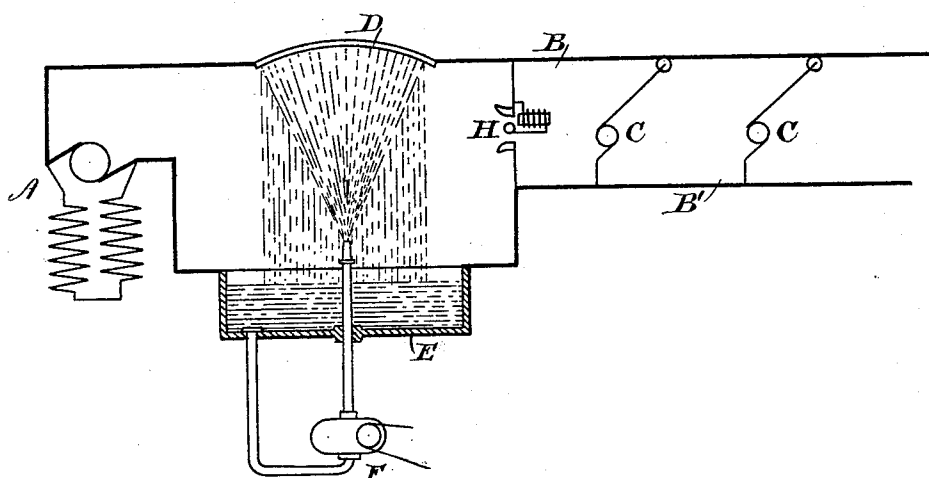


FIG. 2.



WITNESSES -

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UNITED STATES PATENT OFFICE.

JOHN W. GIBBONEY, OF LYNN, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF BOSTON, MASSACHUSETTS.

LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 520,776, dated June 5, 1894.

Application filed February 6, 1893. Serial No. 461,176. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. GIBBONEY, a citizen of the United States, residing at Lynn, county of Essex, and State of Massachusetts, have invented certain new and useful Improvements in Lightning-Arresters, of which the following is a specification.

My invention relates to devices for protecting electric circuits from injurious or destructive static discharges. Its especial object is to relieve the work circuit of a dynamo electric machine from the danger of a short circuit which may be established by a static discharge of high potential. A further object is to thoroughly protect the generator from heavy disruptive discharges.

The invention consists in a constantly maintained short circuit of sufficiently high resistance to prevent any leakage of the working current, but permitting free passage to static charges. In connection therewith I prefer to use a spark gap lightning arrester to carry off heavy static charges which would be liable to injure the generator and might not be readily conveyed away by the constantly maintained short circuit.

The medium which I prefer to use for the constantly maintained short circuit is a liquid, such as acidulated water, and it is kept flowing from one main-line conductor to the other by any suitable means, so as to present a constant path for the static discharges. It is, moreover, indestructible, being constantly renewed from the source of supply. It is therefore always ready for action, and requires no resetting or attention.

The invention is applicable to either continuous current or alternating current systems.

The accompanying drawings illustrate two modes of applying it to a continuous current railway system.

Figure 1 shows an apparatus in which the liquid flows by gravity from an upper to a lower reservoir. Fig. 2 shows an apparatus in which the liquid is forcibly projected against a spray plate, whence it falls into a receptacle.

Let A represent a generator of continuous currents and B B' the two main-line conductors supplying current to the translating devices, such as railway motors C. One main,

as B, is connected to a metallic spray plate D, below which is a receptacle E connected with the other main and with the earth. Means are provided for discharging upon the spray plate a supply of acidulated water. This may consist of a pump F drawing water from a suitable source, such as the receptacle E, and delivering it either into an upper reservoir G, from which it overflows upon the plate D, as in Fig. 1, or directly against the spray plate from a nozzle, as in Fig. 2. In either case, the water flows in fine streams or drops across the space between the mains B B', forming a constant short circuit, but of such high resistance as to practically prevent any leakage of the generator current, though offering no obstacle to the passage of static charges of high potential. This short circuit therefore provides a constantly maintained means for establishing an equilibrium between the mains B B' with respect to charges of abnormally high potential.

Lest this device should not be capable of carrying off very heavy disruptive discharges, which might flow through the generator and seriously injure or even ruin it, I prefer to use also a spark gap lightning arrester H, preferably one having an arc rupturing device, such for instance as is shown in the patent to Wood, No. 460,289. By thus combining these two arresters, I thoroughly protect the line and the apparatus from static discharges, both small and quiet ones, and those which are heavy and sudden.

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

1. The combination with an electric generator and a work circuit supplied therefrom, of a constantly maintained short circuit composed of liquid flowing from one main-line conductor to the other, substantially as described.

2. The combination with an electric generator and a work circuit supplied therefrom, of a constantly maintained short circuit composed of liquid flowing in fine streams or drops from one main-line conductor to the other, substantially as set forth.

3. The combination with an electric generator and a work circuit supplied therefrom, of a spray plate connected with one main-line conductor, a grounded receptacle connected

with the other conductor below the spray plate, and means for conveying liquid to the spray plate, substantially as described.

4. The combination with an electric generator and a work circuit supplied therefrom, of a spray plate connected with one main-line conductor, a grounded receptacle arranged below the spray plate and connected with the other conductor, and a pump delivering liquid
10 to the spray plate, substantially as set forth.

5. The combination with an electric generator, and a work circuit supplied therefrom,

of a constantly maintained short circuit of high resistance, and a spark gap lightning arrester, both connected across the main line
15 conductor and to ground, substantially as described.

In witness whereof I have hereunto set my hand this 2d day of February, 1893.

JOHN W. GIBBONEY.

Witnesses:

BENJAMIN B. HULL,
JOHN T. BRODERICK.