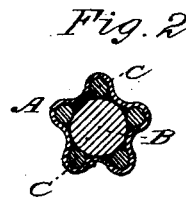
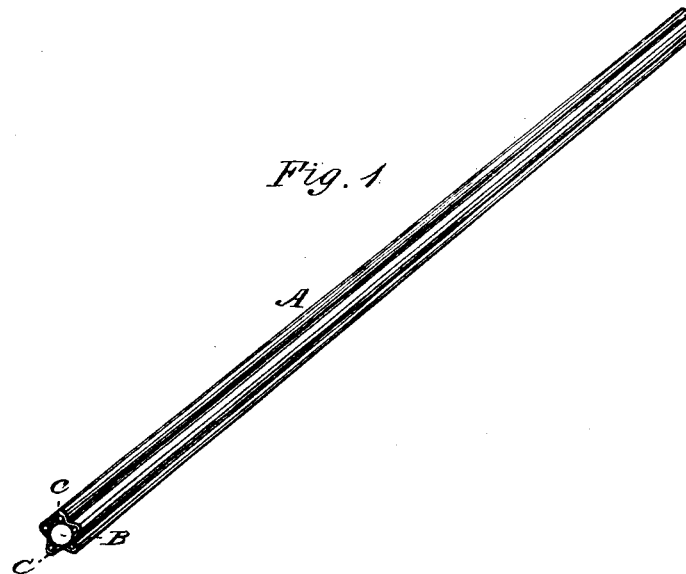


FOOT & KNAPP.

Lightning Rod.

No. 113,154.

Patented March 28, 1871.



Witnesses

Jerry King

Phil. T. Dodge

Inventors

J. A. Foot

G. S. Knapp

by Dodge & Munroe
their attys

UNITED STATES PATENT OFFICE.

DAVID A. FOOT AND GEORGE S. KNAPP, OF WINONA, MINNESOTA.

IMPROVEMENT IN LIGHTNING-RODS.

Specification forming part of Letters Patent No. **113,154**, dated March 28, 1871.

To all whom it may concern:

Be it known that we, DAVID A. FOOT and GEORGE S. KNAPP, of Winona, in the county of Winona and State of Minnesota, have invented certain Improvements in Lightning-Rods, of which the following is a specification, reference being had to the accompanying drawing.

Our invention relates to lightning-rods; and consists in the novel construction of a continuous hollow copper star-rod with a continuous steel wire filling the body of its interior, and annealed wire the spaces in its points.

In the drawing, Figure 1 is a perspective view of a portion of our rod, and Fig. 2 is a cross-section of the same.

We construct our rod of a continuous hollow copper star-tube, A, with a continuous steel wire, B, filling its body, and annealed iron wires C filling the interior of its points, as clearly shown in both figures.

In a rod thus constructed we get the largest amount of continuous unbroken surface for the passage of the electric current, and also the advantages of a combination of continuous lines of different metallic substances; and

in addition to a rod having a large amount of continuous copper surface, with steel and iron wire forming its interior structure, we also get the flexibility required in order to permit its being readily adapted to the contour of the buildings upon or about which it is to be placed.

Any suitable or convenient mechanical means may be used for making a rod formed or constructed as above described. It may be made by first taking long strips of sheet-copper of suitable width, and at the same time steel and iron wire, and then properly arranging them, and afterward drawing the whole through dies suitable for the purpose.

Having thus described our invention, what we claim is—

A lightning-rod consisting of a continuous copper star pipe or tube, with a continuous steel wire filling the body of its interior, and annealed wires the spaces in its points, substantially as herein described.

DAVID A. FOOT.
GEO. S. KNAPP.

Witnesses:

AARON B. MEAD,
AUGUST TIDHOLM.