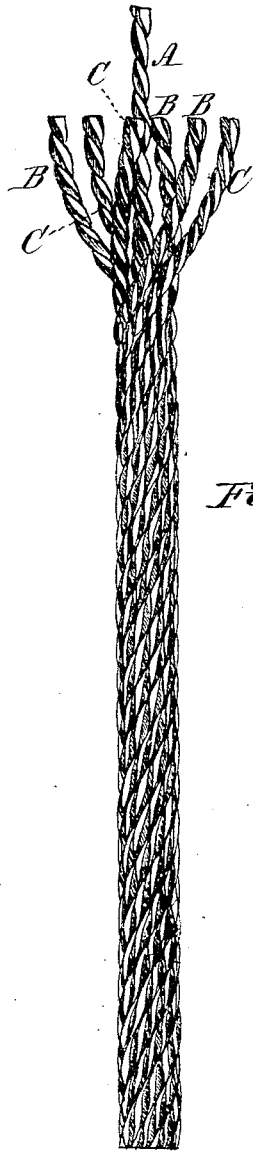


D. MUNSON.  
LIGHTNING-RODS.

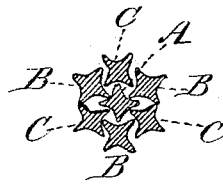
No. 184,164.

Patented Nov. 7, 1876.



*Fig. 1.*

*Fig. 2.*



*Witnesses:*

*J. West Wagner.*  
*J. A. Rutherford.*

*Inventor:*

*David Munson*  
*by Johnson & Johnson.*  
*Attys.*

# UNITED STATES PATENT OFFICE.

DAVID MUNSON, OF INDIANAPOLIS, INDIANA.

## IMPROVEMENT IN LIGHTNING-RODS.

Specification forming part of Letters Patent No. **184,164**, dated November 7, 1876; application filed April 1, 1876.

*To all whom it may concern:*

Be it known that I, DAVID MUNSON, of Indianapolis, in the county of Marion and State of Indiana, have invented new and useful Improvements in Lightning-Conductors, of which the following is a specification:

My invention relates to certain novel features in the construction and arrangement of the several parts of a lightning rod or conductor, designed for the protection of buildings from the injurious and destructive effects of lightning; the nature, objects, and relations of which will be fully set forth in the following description, reference being had to the accompanying drawings, in which—

Figure 1 represents a portion of a lightning-rod constructed according to my invention; Fig. 2, a cross-section.

A is one of the rods, made of copper, which constitutes a central stem or core, around which are wound the others, B C. The rods are all formed four-sided, or, properly speaking, with four deep V-formed or concave recesses, equal in depth, so that the sections of one of the rods or strands form a Greek cross. The central core and the surrounding strands may be of exactly the same size, so that the same kind of rod may serve both for core and strand, and thus cheapen the construction. Both the core and the strands are twisted, as shown, so that the ribs of each run spirally around the rod, and present thousands of points around the cable formed of these strands, dividing the attracted electric fluid into small parts, and diminishing or destroying its compactness of body, and consequent power of injury.

I prefer the four-sided core or strand to an angular form of a less number of sides, first, because it affords a greater surface of wire in proportion to the material, and consequently saves the latter, while increasing the special efficiency of the rod by the increased number of attracting-points presented; and, secondly, because it can be more compactly wound around the core than either a round, square, or triangular form, and a greater number of points of contact between the adjacent parts of the core and of the several strands than either of the forms before mentioned, and is, externally, more nearly cylindrical in shape.

The core A and the alternate strands B I form simply of copper, without coating of any kind. The other alternate strands C I form likewise of copper; but I plate its surface with tin or nickel plating, completely covering its periphery with that metal, so that it is effectually protected from corrosion by exposure to the weather.

By plating these rods or strands C their attracting power is maintained undiminished for years, as the oxidation produced by exposure tends to insulate the several parts of the rod, and thereby diminish its efficiency.

As, however, the sole use of plated rods or strands in the formation of the rod would increase the cost of the manufactured article, I alternate the strands of plated copper C with strands B of the simple unplated metal, the conducting power of which, as it has many points throughout its length of contact with the plated strands, is preserved by this contact for a much longer period of time, as well as preserved from corrosion thereby.

The process of galvanizing metallic wire—particularly copper wire—tends to destroy those qualities of the wire which fit it for the purposes of a lightning-conductor. My use of plated wire is free from this objection.

If desired, all the strands may be plated instead of alternately; but the latter I prefer, as being more effective or economical.

The state of the art shows that sheet-copper, formed in folds or fluted, has been tinned on one side, as in my patent of February 11, 1868; and that three or more round iron wires, covered with zinc or tin, and three or more round copper wires have been laid together to form the body or core of the rod without a central core, the copper wires being laid between the iron-plated wires in rope form at the outside of the rod, so as to bring an iron-plated wire between any two adjacent copper wires, as in the patent of Cushman, of March 7, 1871. An iron core, of angular cross-section, incased in a copper strip, and twisted to present sharp edges, has been used, as in the patent of Vermilya, Reyburn, and Hunter, of July 13, 1869. Several strands of copper wire, of triangular or square cross-section, have been twisted round each other to form a rope without a central core, as in the patent

of Otis, of July 21, 1868. A central straight copper core, of circular cross-section, surrounded by three or more twisted iron wires of the same form, has been used, as in the patent of M. D. Phelps, of December 19, 1871; while in the patents granted to me June 23, 1872, I have combined a plurality of angular copper wires, each separate wire being twisted round its own axis, and a number of such twisted wires formed into a rope, and a number of such ropes twisted round each other, and in which such twisted wire ropes have been laid around an iron core, of circular cross-section, and in which two or more separate and distinct ropes of such angular twisted copper wires have been combined with a like number of iron core-rods, of circular cross-section, both being intertwisted with each other. These forms of conductors, as patented to me, have been shown to produce good results; but my present improvements are designed to render them still more perfect.

It is important that the metal used for lightning-rods should be as rough and sharp-cornered as possible, to give it the best receiving-power; and hence I have combined such a sharp-cornered core with sharp-cornered outer wires, so that both the interior and ex-

terior shall present innumerable sharp lines throughout the rod. Copper is the best metal for lightning-rods, and the square form is the safest; hence I employ a copper core, of four-edged form and twisted, to obtain the best effect by interior and exterior sharp points, as the lightning-discharges spread immediately over the whole surface of twisted points, and thereby become weakened.

The plating of the twisted strands gives an important advantage in keeping the spaces between the sharp folds of the wires clean and smooth.

I claim—

A lightning-rod in which are combined a central core, A, of twisted copper wire, having four recessed sides, forming receiving-edges, and strands B C of similar shaped and twisted copper wire, twisted spirally around said twisted core, each said alternate twisted wire being plated, the whole forming a new lightning-conductor, as herein set forth.

In testimony whereof I have affixed my signature in the presence of two witnesses.

DAVID MUNSON.

Witnesses:

J. A. RUTHERFORD,  
J. WEST WAGNER.