G. S. KNAPP.
Lightning Rod.

No. 212,608. Patented Feb. 25, 1879.

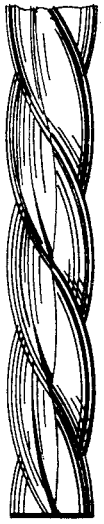

Fig. 1.

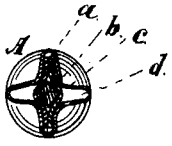

Fig. 2.

Fig. 4.

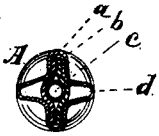

Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE S. KNAPP, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN LIGHTNING-RODS.

Specification forming part of Letters Patent No. **212,608**, dated February 25, 1879; application filed November 18, 1878.

To all whom it may concern:

Be it known that I, GEORGE S. KNAPP, of the city of Chicago, Cook county, State of Illinois, have invented a new and useful Improvement in Lightning-Rods, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of a section of a rod; Figs. 2, 3, and 4, cross-sections, showing modified forms of the interior plates or strips.

The object of this invention is to construct a lightning-rod of sheet metal that will bend or yield without crinkling or straining the metal, and be strong and rigid when in place; and its nature consists in making the interior in longitudinal parts or sections, held in place and bound together by the exterior covering or case.

In the drawings, A represents the outer section or casing of a completed rod; *a b*, the interior strips or sections; *c*, a central rod, wire, or tube; and *d*, the open space or spaces within the rod.

The outer shell or casing, A, is made of copper or other suitable material, and is formed in cross-sections, as shown. The interior strips, *a b*, are formed of sheet-iron, zinc, or other suitable material, and are alike, except that they are swelled or creased in opposite directions, so as to leave a central opening, which is filled by the rod, wire, or tube *c*, which may be left in the rod or be withdrawn after the rod is twisted and completed, the principal object and office of such rod being to keep the strips *a b* in place and to prevent them from slipping past each other while the rod is being formed and twisted. The form of the rod is square, as shown at Fig. 2. It is a round tube, as shown at Fig. 3, and the square rod used in making the form shown at Fig. 4 is withdrawn. This last form, in which the beads of the interior strips conform to and fill the flutings or corrugations of the outer shell, can be constructed with the use of a center rod or guide.

The completed rod may be formed straight and be afterward twisted; or, by the use of suitable machinery, it may be twisted as it is being completed.

By making the interior of two disconnected corrugated strips passing across the interior of the rod, the strips in binding the rod will slip one upon the other sufficiently to prevent kinking or crinkling. They also yield much more readily in twisting the rod, and at the same time furnish a strong interior support.

I am aware that a copper rod has been heretofore made having a single plate or bar crossing the interior; but this does not twist or bend readily and evenly as the double thin strips, or support the corrugations beyond the ones in which it is placed, and in order to support even these it must have considerable thickness and unnecessary weight.

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

A lightning-rod composed of the interior strips, *a b*, swelled or creased in opposite directions, so as to leave a central opening, and then twisted, and the outer case or shell, A, surrounding the strips, substantially as and for the purposes herein set forth.

GEORGE S. KNAPP.

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