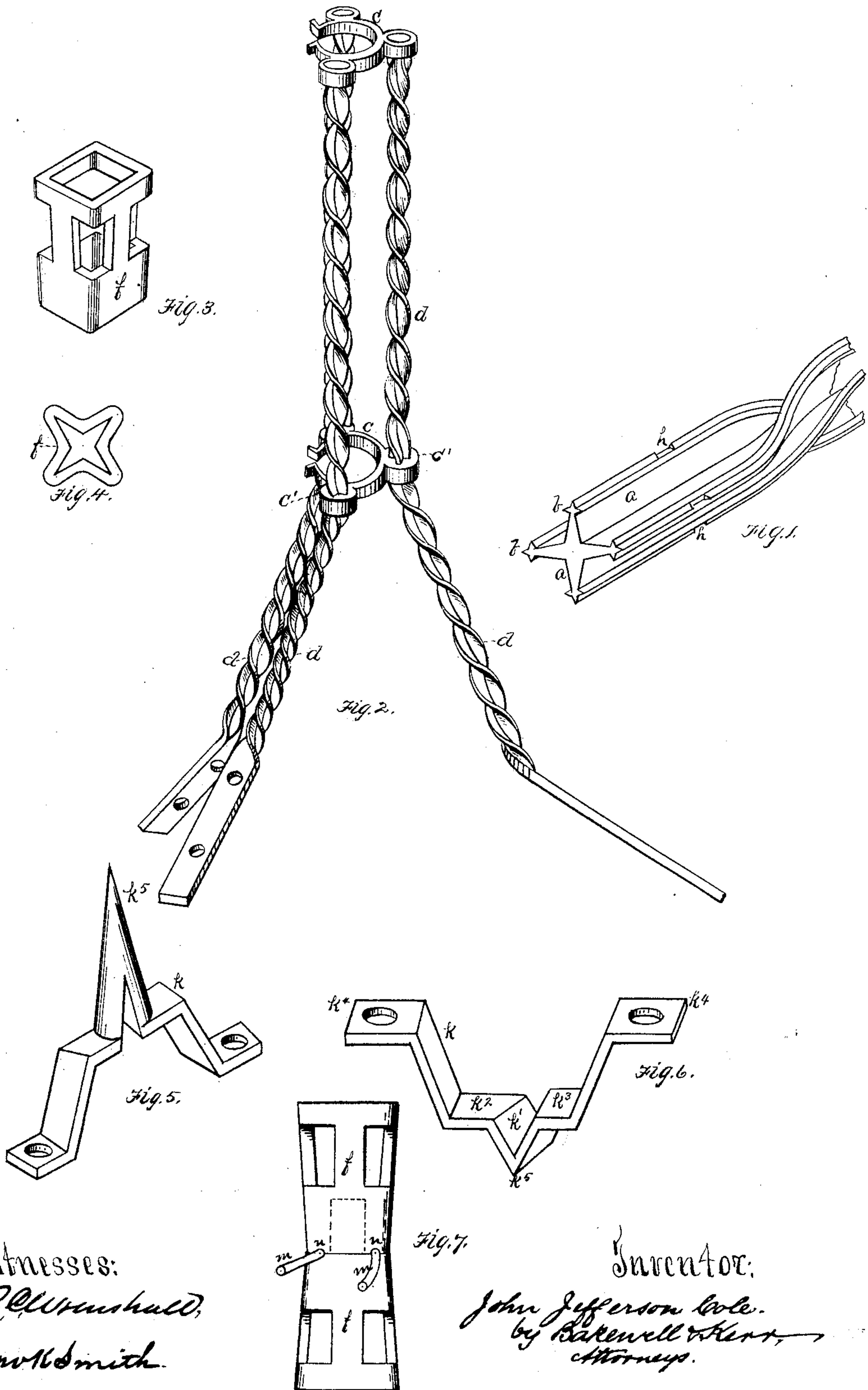


(No Model.)

J. J. COLE.
Lightning Rod.

No. 229,382.

Patented June 29, 1880.



Witnesses:
R. C. W. Marshall,
J. W. Smith.

Inventor:
John Jefferson Cole.
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UNITED STATES PATENT OFFICE.

JOHN J. COLE, OF ST. LOUIS, MISSOURI.

LIGHTNING-ROD.

SPECIFICATION forming part of Letters Patent No. 229,382, dated June 29, 1880.

Application filed May 3, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOHN JEFFERSON COLE, of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Lightning-Rods; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

10 Figure 1 is a perspective view of a section of my improved lightning-rod. Fig. 2 is a view of the standard. Figs. 3 and 4 are views of the coupling. Figs. 5 and 6 are views of the device for attaching the rod to the building; and Fig. 7 is a view of the ground section.

15 Like letters of reference indicate like parts in each.

A lightning-rod consists of six parts, viz: the point, the support for the end which projects above the building, the main section of the rod, the coupling between sections, the device for attaching it to the building, and the ground section.

25 For my improved lightning-rod I use a point of any known construction, but preferably the one described in my Patent No. 185,430, of December 19, 1876.

30 The shape of my improved rod is what I denominate a "double star." It is made in the following manner: I take a billet of iron and bring it to a high heat to render its particles soft and easily movable, and then pass through it a strong current of electricity, and at the same time subject it to a heavy pressure on all sides simultaneously. My theory is that the passage of the electricity through the billet of iron while it is highly heated will polarize the particles and cause those that lie in a transverse direction to arrange themselves longitudinally, in which position they will be fixed by the compression, thereby rendering the rod formed therefrom a better conductor of electricity as well as increasing its strength.

45 The pressure may be applied by means of dies working simultaneously upon the four sides of the billet, and the electrical connection made by attachments to the compressing-machine communicating with the ends of the billet. The billet thus prepared is drawn down into star shape in rolls suitably grooved to leave the flanges rather full near their edges. It is then passed through a finishing-roll properly

grooved to sharpen or throw up this fullness into a sharp lateral flange, *b*, extending out on both sides of the flanges *a*. This is done by finishing each two opposite flanges *a* at a time, it requiring two passes to finish the four flanges, the rod being turned one-quarter way over at the second pass.

The lateral flanges *b* are formed near enough the edge of the flanges *a* to give clearance to the rolls of the first-formed flanges *b* while the others are being formed in the second pass. The flanges may, if desired, be made sharper by drawing the rod through dies in the way practiced for drawing wire. The rod may be made of any desired metal suitable for the purpose, or it may be made of iron covered with sheet-copper or other suitable metal in the manner well known to those skilled in the art.

70 This form of rod presents a great number of sharp angles, and has its utility in the rapid dissipation of the electricity on all sides, thereby rendering it harmless, and also in the presentation of a greater number of sharp receiving-edges. It has also the advantage of great strength in a given amount of metal.

80 The upper end of the rod, which projects above the building, is supported by a standard composed of the holders *c*, made of flexible metal, such as wrought or malleable cast-iron, and two or more legs, *d*, extending from them and fastened to the building. The legs are attached to the holders in a circle equidistant, or nearly so, from each other and from the rod, and are preferably spread apart as they descend, and serve thereby to brace the rod, which is in the center. I prefer to have three legs, so as to form a tripod which braces the rod on all sides. The rod passes up through the holders *c*, which may or may not contain insulators, as desired. The holders, being flexible, are then compressed around the rod itself or around the insulators.

95 I prefer to use star-iron for the legs, and to have the eyes *c'* of star shape. Then, as the rod is twisted, the legs *d* may also be twisted, and thus present a uniformity of appearance with the rod. This twisting has also the merit of making a firm fastening between the holder and the legs. To give the legs a greater spread at the lower holder the eyes *c'* may be extended.

100 When support to the rod above the lower

holder is not required, that part of the stand-
ard above the lower holder may be left off, or
when only a limited support is required above
the lower holder two of the legs may terminate
5 at the lower holder, leaving but one leg to ex-
tend up and form an attachment for the upper
holder.

The sections of my rod are secured together
by the coupling f , which may be made in one
10 piece or in two pieces. When made in two
pieces the parts may be united by a male and
female screw-thread, by a dovetail, or other-
wise, as desired. The part which applies to
the section of the rod is provided with ribs or
15 bars corresponding in number and shape to
the grooves in the rod, and expanding at the
upper and lower end into bands polygonal in
form, intended to encircle the end of the sec-
tion of rod, the flanges of which are recessed
20 or notched at h . This coupling is placed upon
the end of the rod-section, and by a suitable
implement the ribs and bands are compressed
firmly into the grooves until it conforms in
shape to the star-section of the rod, which
25 causes the upper band to enter the notches h ,
thereby forming a firm attachment to the rod-
section. The sections are then secured to-
gether.

The advantages of this construction are sim-
30 plicity, cheapness, strength, and thoroughness
of metallic contact.

The rod is then placed against the building
and secured to it by means of a fastening, k ,
of a peculiar staple shape. It has to fit the
35 flanges of the twisted rod, and consequently
is provided with a central cavity, k' , which
runs diagonally to its length, so as to bear
upon the apex-flange of the rod, two shoul-
ders, k^2 and k^3 , one of which, k^2 , inclines down-
40 ward in one direction, and the other, k^3 , in the
opposite direction, so as to bear evenly upon
the two side flanges of the rod, and ends k^4 ,
which are cast with holes or punched or tapped
for the fastening nails or screws. A point, k^5 ,
45 is provided to receive and discharge electricity.
When used where it is liable to receive a lat-
eral discharge of electricity, I make the point
 k^5 longer and sharper, and plate it with a non-
corrosive metal.

50 The end of the rod terminates in the earth
in the usual way; but, as under certain con-
ditions the earth does not take off the elec-
tricity from the rod with sufficient rapidity, I
divide the current and lead it off in a number
55 of different channels by the provision of one

or more metal bars, strips, or wires, m , of any
desired size or shape, but preferably round
copper wire extending from the rod into the
ground in any desired direction and to any
desired depth, and terminating preferably in 60
a pointed U-shaped end. These branch wires
may pass through the flanges of the rod or
be secured in place in grooves n , made in the
meeting-faces of the coupling of the lower
section, so that when the said coupling is 65
brought together the wires will be clamped
between its meeting-faces, as at n .

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

1. A flanged lightning-rod having one or 70
more longitudinal ribs upon the main flange
or flanges, substantially as and for the pur-
poses described.

2. A standard for supporting the rod above
the building having a holder or clamp of flexi- 75
ble metal for grasping the rod or insulator
and two or more legs arranged around and
equidistant from the rod, substantially as and
for the purposes described.

3. A standard for supporting the rod above 80
the building having a holder or clamp of flexi-
ble metal for grasping the rod or insulator
and two or more legs arranged around and
equidistant from the rod, one or more of which
legs extends above the holder and is fitted at 85
its upper end with a second open flexible rod
or insulator holder, substantially as and for
the purposes described.

4. The flanged rod-section having a coup-
ling connected thereto by being compressed 90
into notches or recesses in the edges of the
flanges, substantially as and for the purposes
described.

5. The flanged rod-section having a coup-
ling connected thereto by a ring which is 95
compressed into notches in the flanges, and
bars which are compressed into the angles of
the rod, substantially as and for the purposes
described.

6. A lightning-rod having a ground section 100
united thereto by a coupling, the meeting-
faces of which are grooved for the attachment
of additional conducting bars or wires, sub-
stantially as and for the purposes described.

In testimony whereof I, the said JOHN JEF- 105
FERSON COLE, have hereunto set my hand.

JOHN JEFFERSON COLE.

Witnesses:

JNO. K. SMITH,
JAMES H. PORTE.