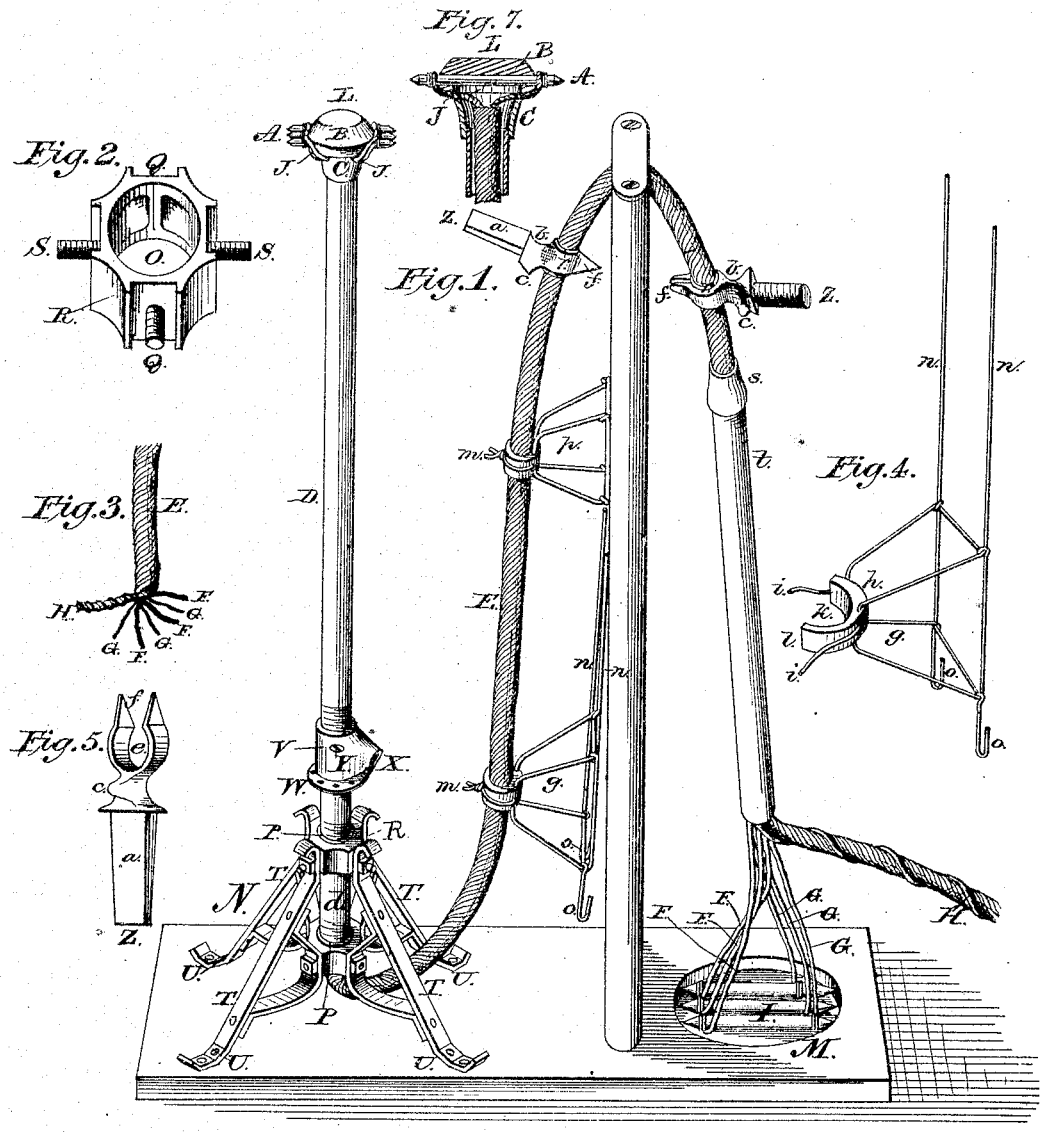
J. C. BRYAN.

Lightning-Rod.

No. 160,154. Patented Feb. 23, 1875.



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IMPROVEMENT IN LIGHTNING-RODS.

Specification forming part of Letters Patent No. **160,154**, date February 23, 1875; application filed January 27, 1875.

To all whom it may concern:

Be it known that I, JAMES CHAPMAN BRYAN, of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Lightning-Rods and Fixtures pertaining to the same, that I style "The Magnetic Electrical Lightning-Rod;" and I do hereby declare the following to be a full and correct description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification, in which—

Figure 1 represents a side elevation of the magnetic electrical lightning-rod with its arrangements and devices, as hereinafter described; Fig. 2, the center metallic casting for standard, without the lead that supports the staff; Fig. 3, the rod in detail; Fig. 4, the wire roof-fastening for supporting the rod; Fig. 5, metallic fastening for supporting the rod; Fig. 6, the lead insulator surrounding the rod; Fig. 7, the point-extension over the staff for protecting the rod.

The object of my invention is to produce a lightning-rod that will attract from the atmosphere or the earth, and disperse the heaviest charge of electricity through several channels, thereby causing an equilibrium between the positive and negative powers of that element; further, to so erect and fasten a rod in position that, while firm and substantial, no stains on building, leakage, or injury to roofs may be caused.

My invention consists of those features more particularly hereinafter described and claimed.

I take three straight double-pointed nickel-plated steel magnets, A, Fig. 1, and around their centers I cast, by aid of any suitable mold, a flattish ball of chemically-pure zinc, B, which creates a galvanic action in the steel magnets A. This arrangement I call the magnetic battery, L, the magnets of the battery L being placed north and south on top of the rod, according to the magnetic poles, for the purpose of collecting and dispersing electricity. The zinc ball B has a cavity in the lower part that allows it to extend over socket C, as represented in Fig. 7, thus keeping the water from entering the hollow staff D. The rod E, Fig. 3, consists of six large insulated copper wires of different numbers, (say, Nos. 9 and 10,) F and G, arranged in alternate numbers to surround a center copper wire, H. These wires F G, F G, F G, and H may be twisted together or straight, as desired. They are surrounded or protected on the outside by small ropes, composed of small copper wires (seven of No. 25 wire-gage) twisted around F G F G F G at the angle of forty-five degrees, so as to inclose the surface, thus making the complete rod E. I use two sizes or numbers of wire for rod E, so that the different connections to the batteries used may be readily traced and followed. At the other end of the rod I plant in the earth what I call my magnetic earth-battery, M, consisting of three straight double-pointed nickel-plated steel magnets, placed north and south to be affected by the earth's magnetic currents, to attract and disperse the electricity.

In erecting, I place the magnetic battery L on staff D *d*, resting on socket C, which is part of D *d*. I pass rod E through staff D *d*, which is made of tubing; then lap the copper insulated wires F F F around the positive poles of the magnets A, to near the end of poles or points, without insulation. The same way lap G G G around the negative poles of the magnets A. In socket C, apertures being made for wires F F F and G G G to pass from staff D *d* at J J, take the other end of rod E, and connect it with the magnetic earth-battery M; lap F F F around the negative poles of the magnets I, to near the end of poles or points, without insulation, and in the same way lap G G G around the positive poles of the magnets I, to near the end of poles or points without insulation.

The large copper insulated wires F F F and G G G act as the keeper of a horseshoe-magnet, between the magnets A and I of the batteries L and M, connecting them and conveying a current of electricity through G, I, F, and A.

The large copper wire H, with the protector of rod E, passes to one side of the magnetic earth-battery M, aiding as a discharger. I designate this arrangement as the "Magnetic Electrical Lightning-Rod," as the electricity is

collected and dispersed through magnetic points of batteries placed in the atmosphere, and earth current from the negative points of the atmosphere through several channels to the positive points of the magnetic battery of the earth-current; also, the negative electricity of the earth is collected by the positive points of the magnetic battery of the earth, and conveyed through several channels to the magnetic battery on top, where it is dispersed by the negative points in the atmosphere, thus causing an equilibrium. Of the standard N, in Fig. 1, that supports staff D *d*, center piece R (see Fig. 2) is made of malleable iron or brass. Its center O has cavities on the inside, in which lead P (see Fig. 1) is run, allowing staff D *d* to pass through the upper and to screw in the lower block R, which is surrounded on the inside by P, so as to hold D *d* firmly and not allow the lead P to get loose. The block R has channel Q on each of its sides, with bolts S, extending out from center of Q, each holding a leg, T, which is composed of two pieces of wrought-iron or brass riveted together, with screw-holes in the lower curve at U for screws to enter to hold it in its position on the building, and with a hole in that portion that passes through channel Q of block R, fitting the bolt and secured thereto by nuts.

By the above arrangements I procure a firm pliable standard that can be taken apart for transportation.

The spire-protector V consists of malleable iron or brass casting, with a hole through the center, in which threads are cut in, so that the tubing D may be screwed therein from above and tubing *d* from below. The lower part of V is made several inches wider than the top, and into a flat surface, as at W. Through the top of a spire or pinnacle a hole is bored, the lower part of staff *d* passing down into the hole, while W rests on top, being held firmly in its position by screws. Through V there is a side hole, X, inclining upward above W for the rod E to pass through up the staff D. The upper part of X extends over so no water can enter staff D *d*. The screw Y holds V and L together, so that, if vanes be erected on staff D *d*, indexes will not get out of position. By these means I convey the rod E outside of the building, and no water can enter the wood around the staff, while the cardinal-points indexes are kept in their true position. Of the fastening Z, composed of malleable iron or brass, *a* is the section that is screwed or driven into the building. *b* is an inclined shoulder between *a* and rod E. *c* is a dip or extension on the lower part of Z, below *b*, to carry the water from the building, so that no stains be caused on the same. *e* is a hollow cavity with two extensions or tapering points, *f*, as shown in Fig. 5, and surrounded on the inside by an insulator, Fig. 6. When the rod E is placed in cavity *e*, and surrounded by insulator Fig. 6, the two tapering points of *f* are pressed together to hold rod E in position, and *f* answers for a point to collect and discharge electricity. The shingle or slate fastening *g* is composed of iron or brass wires, bent or formed over a mold, so that they will be three and a half inches apart at the base, and cross each other at a height of three inches, and in a three-quarter-of-an-inch square, as at *h*. *i* represents a wire that crosses at *h*, for tying, as shown in Fig. 4. The top *h*, with wire *i*, is inclosed in lead by a mold made for the purpose, with a lead or hollow cavity, *k*, for the rod E to lie in, and with an extension of lead, *l*, to lap over rod E when the ends of *i* are closed together, as at *m*. At the base extend two wires, *n n*, to be placed under the layer of shingles or slates above where it is placed on the roof, and *o o* designate two bent wires from the opposite side *n n*, to be placed under the shingles or slates it sits upon, all being firmly joined together. By removing the wires *n n* and *o o* I have a tin or gravel roof fastening, as at *p*, Fig. 1. The application of these fastenings does not injure the roof, and the rod E has a chance to contract and expand, winter and summer, and no rubbish collects on the roof. Fig. 6 represents a piece of flat lead used as an insulator for Z, with a groove through the center, on one side, as at *q*, to fit cavity *e*, Fig. 5, which leaves a shoulder, *r*, Fig. 1, on each side of Z, when the tapering points *f* are closed. It is used on account of its pliability, keeping the water from entering between the rod E and fastening Z, and also because it is considered the best non-conductor of all the metals.

It is customary to pass the rod through a piece of tubing before it enters the earth, then staple the tubing firmly to the building, so that the rod cannot be disturbed. In winter, the water enters the tubing, freezes, and bursts the tubing. To prevent this from occurring I have made a mold to run lead, and make a socket, *s*, Fig. 1, to fit around rod E and to extend down on the outside of tubing *t*, pressing the lead tight around rod E, so no water can enter the tubing *t*, and thus protecting rod E from being disturbed.

What I claim as my invention is—

1. The combination, with the upper terminal of a lightning-rod, of the series of steel magnets A and the ball of zinc partially inclosing the magnets and extending over socket C, substantially as herein set forth.

2. The rod composed of the series of insulated wires F, F, F, G, G, G, and H, wound as described, and wrapped with a protector, substantially as herein set forth.

3. The combination, with a lightning-rod composed of the series of wires, as described, of the terminal magnets, batteries L and M, each single magnet of either battery being connected to one magnet of the other battery by insulated wires connecting their opposite poles, substantially as and for the purpose set forth.

4. The combination, with a lightning-rod, of the series of magnets placed at the lower end thereof, and forming a magnetic earth-battery, substantially as and for the purpose herein set forth.

5. The supporting-standard N, consisting of the central portion O and lead P, provided with cavities Q, bolts S, and grooves, constructed as shown, the parts being arranged and combined substantially as and for the purpose herein set forth.

6. The spire-protector, consisting of the tube provided with flange W, orifice X, and fastening-screw Y, substantially as and for the purpose herein set forth.

7. The inclined shoulder *b*, dip *c*, tapering points *f* of the metallic fastening Z, as herein set forth.

8. The roof-fastenings consisting of the frame and tie wire *i*, secured together by the lead fillet or band *h l*, cast thereon, and extensions *n o*, substantially as and for the purpose herein set forth.

9. The insulating strip of lead having a groove along its center to fit within the arms *f* of support Z, and the side flanges for extension over the arms *f*, substantially as and for the purpose herein set forth.

10. The combination, with the rod and the protecting-tube *t*, of the lead socket or protector *s*, extending over the top of the tube and grasping the rod, substantially as and for the purpose specified.

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Witnesses:
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