H. W. SPANG.

Lightning Rods.

No. 167,415. Patented Sept. 7, 1875.

Fig. 1

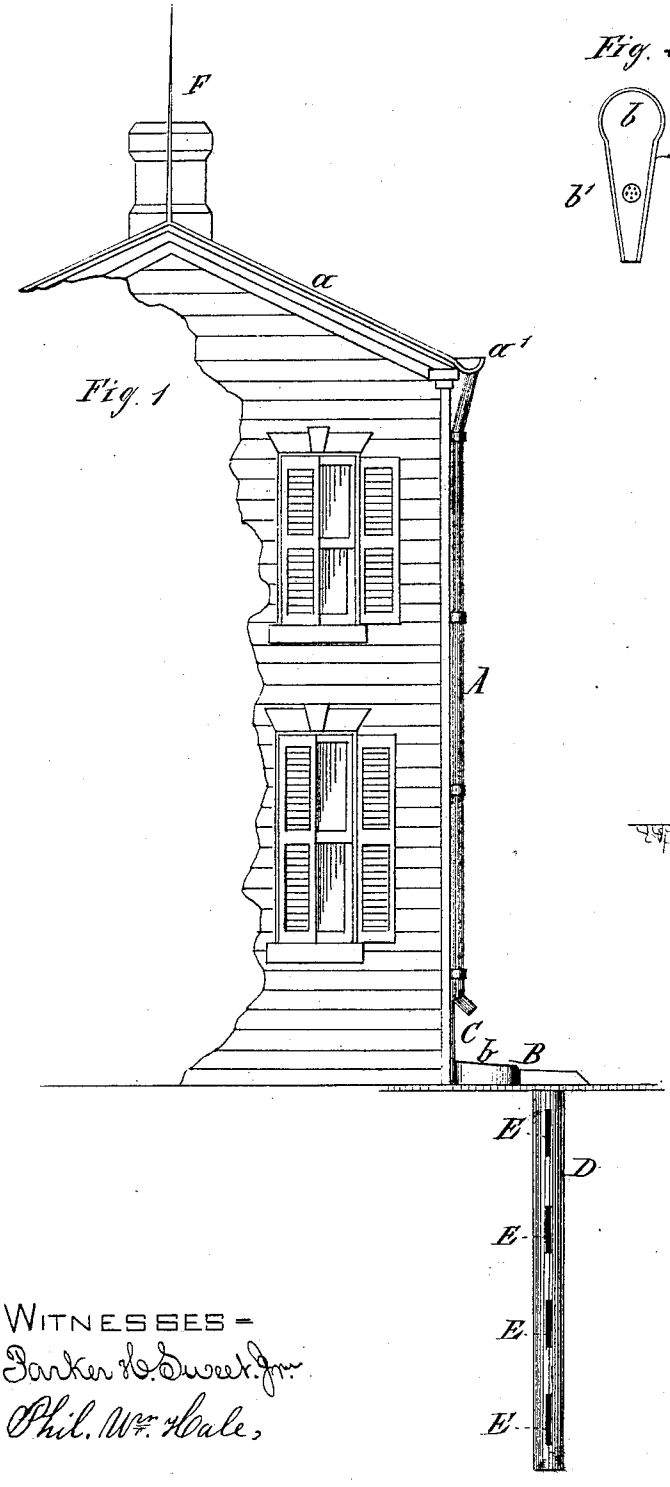


Fig. 2.

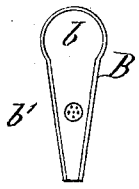
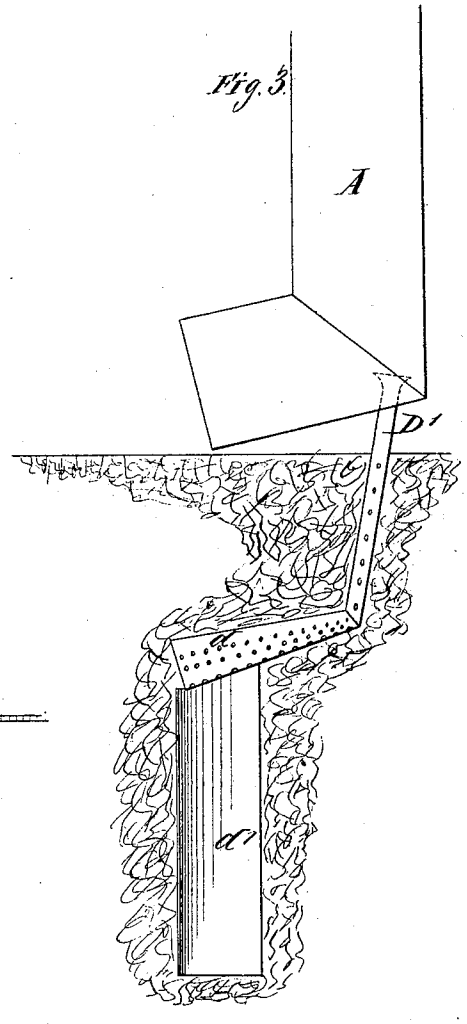


Fig. 3.



WITNESSES—
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UNITED STATES PATENT OFFICE.

HENRY W. SPANG, OF READING, PENNSYLVANIA.

IMPROVEMENT IN LIGHTNING-RODS.

Specification forming part of Letters Patent No. **167,415**, dated September 7, 1875; application filed October 29, 1874.

To all whom it may concern:

Be it known that I, HENRY W. SPANG, of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Lightning-Conductors; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings and to the letters of reference marked thereon, which form a part of this specification.

This invention consists in connecting an ordinary metallic rain pipe of a house or other structure, with a metallic roof or other lightning attractor or conductor at its top, and with a metallic drain or gutter having a perforated metallic pipe leading therefrom into the earth at its bottom or foot, so as to form a perfect line of electrical conductors, and keep the earth surrounding the said perforated pipe, and any other terminal metallic conductor connected therewith, moist by means of rain or waste water, and thereby secure a good earth-connection therefor, and also afford means by which a portion of the attracted electricity will be diffused during a thunder-storm over the flowing rain-water, and into the moist surface of the earth. The details of construction involved in my invention, and the operation thereof, will be fully explained in the following specification, with reference to the accompanying drawings, in which—

Figure 1 is a view in elevation of my invention. Fig. 2 is a plan view of the metallic drain or gutter. Fig. 3 shows a modification of my invention.

A is an ordinary metallic rain-pipe, connected with and leading from the metallic roof *a* of a house at the gutter or trough *a'* thereof. B is a metallic drain or gutter, the basin *b* of which receives the rain or waste water flowing through and from pipe A. This drain or gutter is connected to pipe A by a metallic rod, C, pipe, or other suitable metallic conductor; and near the mouth of the gutter, and in the bottom thereof, is an aperture, *b'*, at which a metallic pipe, D, having any suitable number of openings or perforations, E, of any desired form or size, is connected to the drain or gutter B, and branches downward into the earth. The aperture *b'* in the bottom of the gutter B can be covered by a perforated disk in summer, said perforated disk allowing the passage of water into pipe D, but preventing the passage of trash, by which the pipe might become clogged. In the winter the perforated disk may be replaced by a solid one, as at that season the earth is usually sufficiently moist, and there is seldom any thunder and lightning. When the house has a metallic roof, as shown at *a* in the drawing, and pipe A is connected thereto, an attracting-rod, F, should be erected directly upon the roof, and be metallically connected therewith; but in case the house has a wooden, slate, or other roof of poor conducting material, the lightning attractor or conductor, F, erected thereon must be connected directly with rain-pipe A, or with the metallic eave-trough or gutter, to which said pipe A is connected. The gutter or drain B may be of any desired length, and may, if desired, extend into the street-gutter, or into a sewer, and the perforated pipe D may be extended from any portion of the said gutter or drain. The pipe D may also have any number of perforated branches, also an enlargement at its bottom or top, so as to hold a large quantity of water during a thunder-storm; and it can also have any other metallic terminal conductors connected therewith. The drain or gutter B may be placed and arranged so that the waste-water from a hydrant or pump, or water from a gutter or stream, will also flow into the perforated pipe D, and keep the earth well moist about the said pipe during the summer.

It is well known that in order to diffuse lightning readily into the earth and secure the proper action of lightning-conductors, it is necessary that the said conductors must terminate in, or at least come in contact with, a moist portion of the earth. Dry earth is a poor conductor, into which the atmospheric electricity does not readily flow from the terminal conductor of a metallic rod, pipe, or other lightning-conductor erected upon a house, and when said conductor does not have a suitable reservoir of moist earth into which to quickly and readily discharge its attracted electricity, it becomes worthless as a protec-

tion, as the electricity is then apt to leave the conductor, pass into the building, and damage or destroy it, and endanger the inmates. The object, therefore, of employing the perforated pipe D, and extending it downward into the earth from drain or gutter B, is in order that a portion of the rain or waste water may flow into pipe D, and moisten the earth surrounding and beneath said pipe, and thereby provide a suitable reservoir of moist earth, and particularly during a thunder-storm, for the diffusion of lightning into the earth.

I carry the pipe D to a distance below the surface of the earth, where there is approximately permanent moisture; but as the depth to which the heat of the sun dries the earth varies during the summer, I aim to have my pipe or terminal conductor so placed that if not actually within the line of permanent moisture, communication therewith will be very soon established, after the commencement of a thunder-storm, by means of the rain-water flowing through the lower opening and perforations of pipe D.

Water is a conductor of electricity, and during a thunder-storm the greater portion of rain-water flowing from rain-pipe A passes over drain or gutter B, and spreads over the surface of the earth, or a brick or stone gutter or pavement, and reaches the earth through the interstices of the pavement, or flows into a running gutter or sewer, and the said rain-water assists in diffusing the attracted electricity from said drain or gutter B over the moist surface of the earth along the gutters, pavements, sewers, &c.

The gas-pipes in a building, or any other metallic conductor, may be used as part of the lightning-conductors, in connection with gutter B and perforated pipe D, and care should be taken that a good electrical connection is made between the joints of the gas-pipes by soldering or brazing them together, or by an additional conductor, as the red lead used at the joints of such pipes is a poor conductor of electricity, and the meter must also be shunted by means of copper sheet or wire, or other good conductor having greater conductivity than the material of the meter and joints thereof, so as to prevent the meter from being damaged and the gas set on fire.

Instead of employing a solid iron pipe, D, round, square, or of any other suitable form, perforated with openings or holes, several pieces or bars of iron can be used, and be fitted and held together at the top and bottom by means of metal hoops or rings, so that there will be a suitable space between each piece or bar, which will allow the water to pass through and moisten the earth surrounding and beneath said pieces or bars, and thereby answer the same purpose as a solid cast-iron perforated pipe, and be more convenient to handle in placing them into a hole in the earth made by an earth-auger.

In the modification shown in Fig. 3, the perforated pipe D′ connects above ground directly with the metallic rain-pipe A, which is supposed to be in metallic connection with a lightning attractor or conductor at its top, and it has a perforated funnel or enlargement, *d*, connected therewith by an elbow-joint at the foot thereof, so as to hold a large quantity of water, and a terminal metallic plate, *d′*, is connected to and extends vertically downward from the perforated funnel or enlargement *d*, as shown In this arrangement the pipe D is supplied with water directly from main pipe A, and the gutter or drain is dispensed with. I prefer, however, to also make use of the gutter or drain B, as it affords a better outlet for the attracted lightning over the moist surface of the earth through the flowing rain-water during a thunder-storm.

Having now fully described the construction and operation of my invention, I claim—

The combination of pipe A with drain or gutter B and perforated pipe D, all electrically connected, and forming a lightning-conductor, substantially as described.

In testimony that I claim the foregoing as my own invention I affix hereto my signature in presence of two witnesses.

HENRY W. SPANG.

Witnesses:
C. T. SELLERS,
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