

H. W. SPANG.
Lightning-Conductor.

No. 204,257.

Patented May 28, 1878.

Fig. 1.

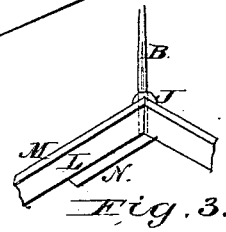
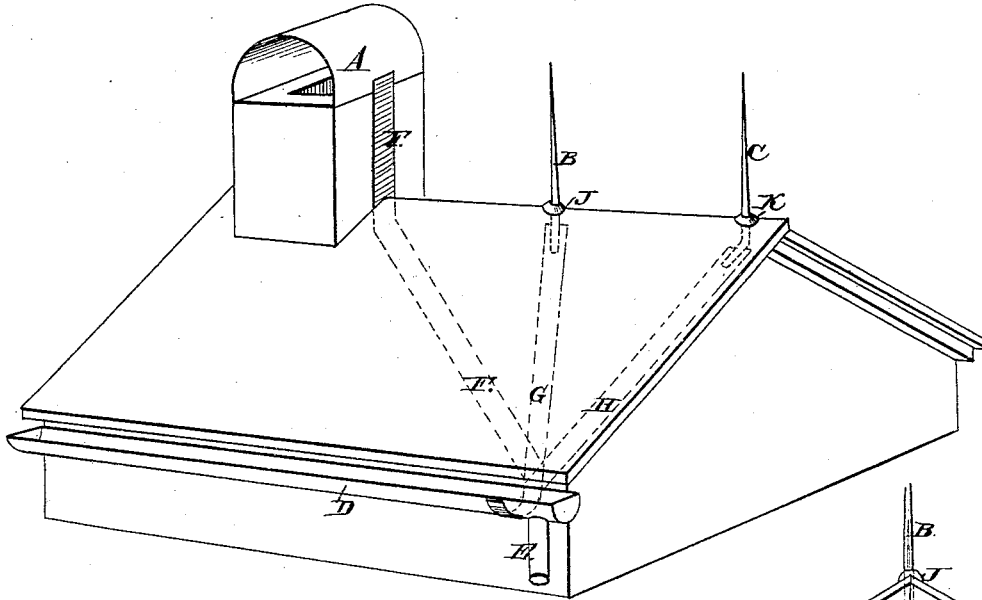
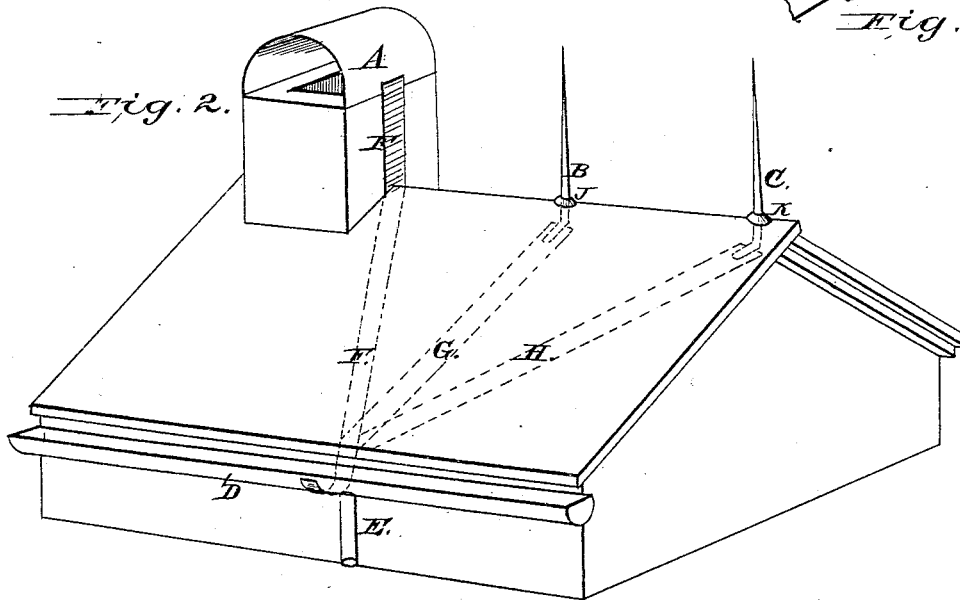


Fig. 2.



Attest
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IMPROVEMENT IN LIGHTNING-CONDUCTORS.

Specification forming part of Letters Patent No. **204,257**, dated May 28, 1878; application filed April 18, 1878.

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, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, and the letters of reference marked thereon, which form a part of this specification.

Figures 1 and 2 are perspective views of a wooden, slate, or gravel roof of a building, with metallic conductors applied thereto, so as to illustrate my invention. Fig. 3 is a side elevation of the lower portion of an air-terminal lightning rod or conductor, showing an improved method of attaching it to the roof of a building.

My invention consists in the combination of bands of tin-plate or other suitable sheet-metal conductors with the elevated or air-terminal lightning-conductors upon the roof of a building, or projections thereof, and the rain-pipes leading from the eaves of the roof to the earth, the said metallic bands or connecting-conductors being placed in as short and direct lines as possible, so as to afford a downward and easy path or paths for a lightning-discharge between the conductors named, and to prevent the roof from being damaged thereby.

It also consists in placing the said metallic bands or connecting-conductors beneath the wooden rafters, slate, felt, or other poor conducting material employed upon a roof, steeple, or observatory, to prevent it from being disfigured and damaged by the said conductors; also, in an improved method of supporting the air-terminal lightning-rods without requiring standards or uprights to be attached to the roof.

In the application of lightning-conductors to a wooden or slate roof of a building, it has been customary to place them along the ridge and down one or both gable ends or sides of the building, and in other indirect and horizontal paths across the roof, between their air-terminals and the portions of the conductors leading from the eaves or edges of the roof to the earth. This arrangement is defective, as the electricity in a lightning-discharge has a strong downward tendency toward the earth,

and will not follow a long horizontal path. A downward and as direct path or paths as possible across the roof from the air-terminals to the conductor leading to the earth is required, in order to effect its safe and easy passage.

The application of lightning-conductors upon the outside of a wooden, slate, or gravel roof, steeple, observatory, or skylight, and particularly in short and direct lines, is objectionable, as the roof is disfigured by the conductors, and the fastenings of the conductors are apt to break the slate and split the shingles or wood-work, so as to allow water to enter the interior of the building during a rain-storm or from melting snow. Lightning-conductors placed upon the outside of slate roofs are also apt to be torn from their fastenings and carried to the earth by the large quantity of snow which generally accumulates and presses against them during the winter season.

The defects named in applying lightning-conductors to a wooden, slate, or other roof of poor conducting material can be remedied by arranging the conductors as shown in Figs. 1 and 2.

A is a metallic chimney-cap, made preferably of galvanized sheet or cast iron, and which serve as an air-terminal lightning-conductor. B and C are round iron rods, about five feet long and half an inch in diameter, which also serve as air-terminal conductors. D is an ordinary metallic rain trough or gutter along the eave of the roof. E is an ordinary metallic rain-pipe, preferably four inches in diameter, which is well connected with the trough or gutter D near a corner of the building, as shown in Fig. 1, or about the center of the building, as shown in Fig. 2. It should extend to or near the earth, and be connected with a suitable earth-terminal.

F, G, and H are metallic bands or conductors, made preferably of tin-plate or galvanized sheet-iron, which are well connected with the air-terminal conductors A, B, and C and trough or gutter D, or directly with rain-pipe E, or any other suitable vertical conductor extending to the earth. The conductivity of each of the said bands must be about the same as that of rain-pipe or vertical conductor E.

The said bands or connecting-conductors

are arranged in as short and direct lines as possible, so as to effect a downward and easy passage across the roof from the air-terminal or elevated conductors to the rain-pipe, or other vertical conductor leading from the eave of the roof to the earth, for the electricity in a lightning discharge. They are also placed beneath the wooden sheathing or rafters, slate, or other material employed upon the roof, so as not to deface or otherwise damage the roof, as hereinbefore described.

In Fig. 1, band or conductor G is attached, preferably by soldering, to the most convenient part of the trough or gutter D at or near its connection with rain-pipe E, and bands F and H are attached to band G near the eave of the roof, as shown.

In Fig. 2, band or conductor F is attached to trough or gutter D at or near the rain-pipe E, and bands G and H are attached to band F near the eave of the roof, as shown.

The conductor G, Fig. 1, or F, Fig. 2, can be extended from the eave to the earth-terminal, and be connected therewith, where no troughs and rain-pipe are employed about the building.

I prefer to employ tin-plate, galvanized sheet-iron, or any other sheet metal of good conductivity for the bands or connecting-conductors F, G, and H, as the said form of conductor is well adapted for the great expansive action of the electricity in a lightning-discharge, and can also be neatly covered by the slate, wood, felt, or other poor conducting material upon a roof or other parts of a building. Any other form of conductor can, however, be employed and arranged in short and direct lines across the roof, either upon the upper or outside portion thereof, or beneath the wooden sheathing or rafters.

The metal valleys between two roofs, also the metal flushings between the roofs of dormer windows and the main roof, can be used as the connecting-conductors, or parts thereof, between the air-terminal or elevated conductors upon the roof and the rain-pipes leading from the eaves to the earth.

The rain-pipes or other metallic conductors usually placed along the angle-beads or corners and sides of a Mansard roof can be used as the connecting bands or conductors between the metal covering upon the deck-roof and the metallic gutters above the house-cornices, provided they are in direct lines

with the rain-pipes leading from the eaves or cornices to the earth.

Instead of metallic cap A, an iron rod, like rod B or C, can be employed as an air-terminal conductor, and extend along and above the chimney, and be connected with the metallic band or conductor F at the roof.

The air-terminals of the stranded-wire, spiral-twisted, and other forms of lightning-conductors heretofore employed are generally supported by uprights or braces fastened to the roofs of buildings, to prevent them from being blown over or bent by the wind.

By the arrangement of the lower portion of the air-terminal rod B as shown in Fig. 3, an upright or braces can be dispensed with. It passes through a hole in the wooden rafter L, ridge-pole, or a cross-piece between two rafters, and is screwed into or otherwise connected with flat bar N, which is fastened to rafter or cross-piece L by screws or nails. To prevent the rain from passing down the rod B or C into the interior of the roof, a shield, J or K, of tin-plate or sheet metal, should be soldered to the rod above the slate or wooden sheathing M of the roof.

When the conductor G is beneath the wooden sheathing or rafters of the roof it should be soldered or otherwise well connected to bar N, and, when above the wooden sheathing, to shield J.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of metallic conductors, arranged in downward and direct lines beneath the wooden sheathing or rafters or slate covering of the roof of a building, or of a steeple or other elevated projection, as described, with the air-terminal or elevated metallic conductors thereon, and the rain-pipes or vertical conductors leading from the eaves of the roof to the earth, as and for the purposes set forth.

2. The combination of sheet-metal bands or conductors F G H, arranged as described, with chimney-cap A, rods B C, gutter or trough D, and rain-pipe E, as set forth.

3. The combination of air-terminal rod B with rafter or cross-piece L and bar N, as set forth.

Witnesses: HENRY W. SPANG.
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