(No Model.) 2 Sheets—Sheet 1.

# G. S. PRESCOTT.

## LIGHTNING ROD.

No. 303,591. Patented Aug. 12, 1884.

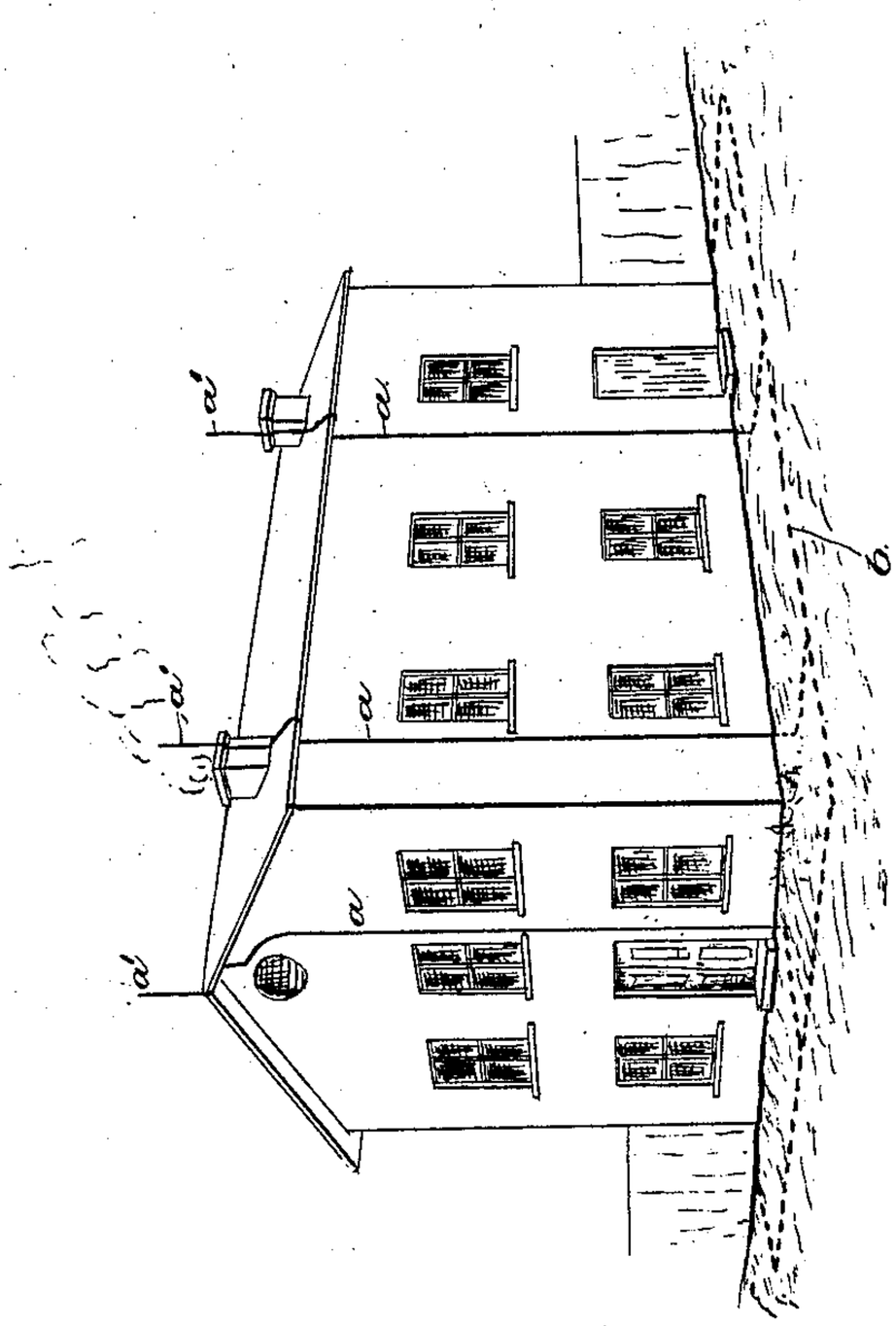

Fig. 1.

Witnesses.
John F. C. Preinkert
Fred A. Powell

Inventor:
George S. Prescott.

By Crosby & Gregory attys.

(No Model.) 2 Sheets—Sheet 2.

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No. 303,591. Patented Aug. 12, 1884.

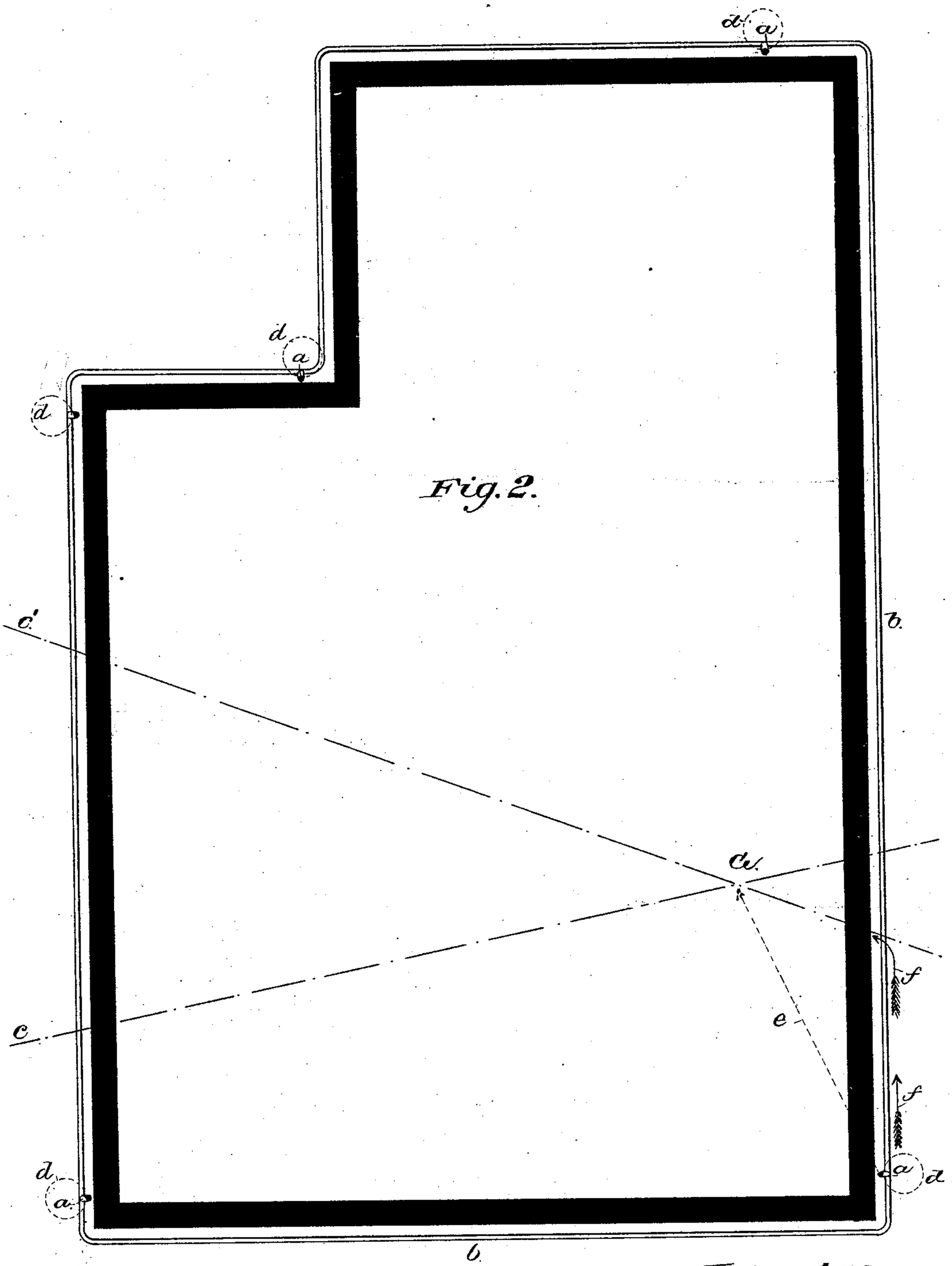


Fig. 2.

Witnesses.
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Inventor.
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# UNITED STATES PATENT OFFICE.

GEORGE S. PRESCOTT, OF MERRIMAC, ASSIGNOR OF ONE-HALF TO EDWIN PRESCOTT, OF ARLINGTON, MASSACHUSETTS.

## LIGHTNING-ROD.

SPECIFICATION forming part of Letters Patent No. 303,591, dated August 12, 1884.

Application filed May 31, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE S. PRESCOTT, of Merrimac, county of Essex, State of Massachusetts, have invented an Improvement in Protection against Lightning, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention, relating to an improvement in the means employed for protecting buildings from lightning, is based on facts that have been observed by me during a long period of time. It has been stated as a law by other observers that lightning strikes or seeks the bed of moist earth or water below the dry surface soil, and that the lightning follows some definite path which affords the best conductor between the water-bed of the earth and the storm-cloud, although, so far as I am aware, no law has yet been announced for determining such path. I have discovered that there are definite places where the lightning will strike or enter the earth, it never striking at any other point in the vicinity, and I have found that such striking-points lie over the underground streams of water flowing through fissures or pervious strata, and distinct from the general bed of water below, the lightning being especially likely to strike where two or more such underground streams cross one another. This law is confirmed by numerons facts, as follows: Buildings provided with lightning-rods have been struck, and although the conductor had a well-grounded earth-terminal, the lightning has left the conductor and passed through the building to reach the point which may, for convenience, be called "the natural grounding or striking point." The same building has afterwards had the rods changed to enter the earth at the point where the lightning had previously entered, and the building been again struck, when the rod conducted the lightning to earth without injury to the building. The lightning has in no case left rods which have been grounded at a point where lightning had previously struck. The above facts indicate and long experience has shown that no matter how perfectly a lightning-rod is grounded the building is nevertheless not protected if it is located at or near a natural grounding-point which the conductor fails to reach, and, furthermore, the mere increase in the area of ground-contact of the earth-terminal of the lightning-rod, if it does not reach nor extend toward such natural grounding-point, is of no avail. To afford protection the conductor must reach the natural grounding-point, or must approach more nearly to it than any part of the building to be protected, because if there is a good metallic conductor to the grounding-point the lightning will follow it, rather than break through the less conductive material of the building; but if the good conductor fails to reach such point the lightning will leave it and traverse the inferior conductor to reach the said point, as it must arrive there by some path. When it is possible to discover the natural grounding-point in the neighborhood of a building, the building may be perfectly protected by a suitable lightning conductor or rod entering the earth at that point, as the lightning will follow such conductor rather than the less conductive material of the building. It is not, however, always easy nor even possible to discover where such grounding-points exist, and the points, if found, might subsequently shift or vary, just as other changes take place in the topography of a locality.

The present invention has for its object to obviate the necessity of discovering the natural grounding-point, if any exist, and it consists in providing a metallic conductor arranged to connect with all points in the neighborhood of the building; or, in other words, provided with an earth-terminal extending around the building, so that it will reach any natural grounding-point which may exist in the neighborhood of the building, or may approach more nearly to such point than any part of the building itself. This is accomplished by connecting the usual lightning-rods, descending from the roof or top of the building to the ground, with a metallic conductor extending around or nearly around the base of the building, and connected with the said vertical conductors or lightning-rods at or near their lower extremities. The horizontal or connecting conductors or earth-terminals serve to connect the vertical conductors with the point or places in the

earth in the neighborhood of the buildings that are best adapted to conduct the currents or discharges of electricity, and the building is thus perfectly protected therefrom.

Figure 1 shows in perspective view a building provided with means to protect it against lightning, in accordance with this invention, and Fig. 2 a plan view illustrating the operation.

The building is provided with one or more of the usual vertical conductors or lightning-rods, *a*, having the proper tips or air-terminals, *a'*, extended upward from the roof or chimneys in the usual manner, and passing down the walls of the building toward the ground. The said conductors *a* are connected at or near their lower extremities with a substantially horizontal connecting-conductor or earth-terminal, *b*, surrounding or nearly surrounding the base of the building. In case the vertical conductors *a*, distributed in the usual manner, do not enter the ground at a natural grounding-point near the building, the surrounding conductor or earth-terminal *b* will form a continuation of the said vertical conductors, leading to the best point in the neighborhood of the building for conducting the electrical currents away from the said building.

While the conductors *a* are spoken of as vertical conductors, and the earth-terminal *b* as a horizontal conductor, it is of course not essential that the said conductors should be exactly vertical or horizontal, although this will generally be nearly their position with relation to one another.

In the diagram, Fig. 2 *c c'* represent two underground streams, the directions of which cross, producing a natural grounding-point, G, beneath the building, which is thus very dangerously situated. The areas inclosed by the dotted lines *d* represent very large earth-connections of the kind commonly employed for the conductors *a;* but, in spite of such great area of earth-connection, the lightning would be likely to leave the conductor *a* and break through the building, as indicated by the dotted arrow *e*, to the point G, as this will be the most direct path to the said point. When, however, a metallic earth-terminal, *b*, is used, extending around the building, the lightning will follow the path indicated by the arrows *f* from the conductor *a* along the conductor *b* to the stream *c'*, as this path is nearly as direct as that through the building, and is a far better conductor.

It will be seen that, in order to afford equal protection without the metallic ground-terminal *b* extending from one to another of the vertical conductors around the base of the building, it would be necessary to place the vertical conductors so close together that their ground-connection would be practically continuous around the building; but such increased number of vertical conductors would be many times more expensive than a horizontal earth-terminal extending from one to another of the vertical conductors, and forming a continuous earth-terminal leading to every point around the building.

I claim—

The combination, with a building, of a vertical conductor *a*, extending from the top of the building to the ground, and an earth-terminal, *b*, consisting of a metallic conductor connected with the said vertical conductor and extended around the base of the building, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE S. PRESCOTT.

Witnesses:
FRANK. C. DELANO,
R. R. SCRINSON.