M. A. SHEPARD.

Iron Roof.

No. 168,587. Patented Oct. 11, 1875.

Fig. 1.

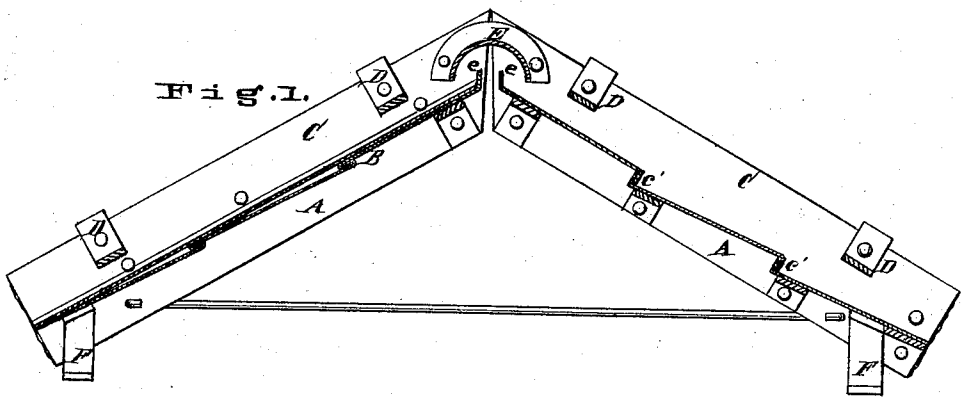
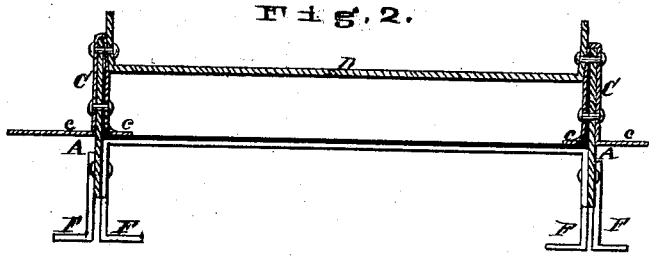


Fig. 2.



ATTEST.

Charles Pickles

Saml Knight

INVENTOR

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UNITED STATES PATENT OFFICE.

MORRILL A. SHEPARD, OF LEBANON, ILLINOIS.

IMPROVEMENT IN IRON ROOFS.

Specification forming part of Letters Patent No. **168,587**, dated October 11, 1875; application filed August 19, 1875.

To all whom it may concern:

Be it known that I, MORRILL A. SHEPARD, of Lebanon, St. Clair county, State of Illinois, have invented an Improvement in Iron Supports for Roofs, and an arrangement for securing roofing material to the same, of which the following is a specification:

The object of my improvement is to secure a light but strong iron support for iron, tile, or slate roofs, in order to have an entire fireproof roof, both internally and externally; and, in order to accomplish this, I make use of the following arrangement of iron and roofing material, as I shall describe, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a longitudinal section, and Fig. 2 a cross-section.

A A in Fig. 1 represent the rafter, which, when formed out of iron, is simply a thin and deep piece of plate-iron, say, for ordinary roofs, about one-eighth inch thick and four inches wide or deep. The only difficulty in obtaining the vertical strength of such a bar is to keep it perpendicular to a given base, and also to keep it from buckling or crimping. This I accomplish by riveting or bolting the flange-cap C and the flanged iron plates forming the roof at or near the longitudinal center of the said rafter A; and then, if necessary, I use the metal cleats or supports D, Fig. 1, fastened through their flanges near the upper and lower edges of the rafter, and on the upper side of the rafter I fasten them on by inverting their flanges, so that a portion may project above the rafter to form stays for boards to scaffold the roof with, for painting, &c. These cleats also form a ladder for climbing upon the roof. These supports or cleats, when used in connection with tile or slate roofs, and the hugging of the flange *c* of the cap C upon the tile or slate, will keep the rafter vertical, especially if the tiles with side flanges are firmly placed between the rafters. If found necessary, under any circumstances, to keep the rafter straight and from buckling, a double narrow flange, ⊥, may be formed on its lower edge. These rafters may be stayed by cross and brace rods in such a manner as the structures may require; or, when used to form nearly a flat roof, running back from the front of the building, then transverse beams of iron may be placed in the walls, reaching across the building. Upon these beams the rafters will rest at right angles to the beams, thereby making the roof and all supports fireproof. In connection with the rafter I use the cap C, with flanges *c c*, Fig. 2. The cap covers the upper edge of the rafter, and comes down on both sides thereof, with its flanges resting on the roof. This flange-cap is bolted or riveted through itself, the rafter, and the upper edge of the roofing-flange, securing all firmly together. One advantage of this over the ordinary cap is, that the flange, making a return directly over the return of the flange of the roof-plate, gives a double thickness of metal (see Fig. 2, *c c c c*) just where there is the greatest danger of cracks occurring. The whole is thoroughly painted, to insure against any leakage.

Another great advantage of the flange-cap in my improvement is, that this flange forms a strong foot resting on the roof, and, being fastened to the rafter, tends to keep said rafter in a vertical position.

In order to ventilate my roof, as iron will conduct a large amount of heat, and hence make the attic very hot in summer, I use the inverted trough E, Fig. 1, having flanges by which to securely bolt them to the rafters A A, which will form a flexible connection for the rafters, so as to readily yield to the expansion and contraction of said rafters and roof. An angular or Λ-shaped piece may be used instead of the half-circular piece for this cap and ventilator, and perhaps would be preferable. The flanges on this trough E will be placed next to the roof-plate, and then the flange-cap C will be placed over the rafters, roof-flange, and ventilator-flange, and then securely bolted or riveted, by which the joints will be protected from leakage.

When it is desired to cover a roof with tile in connection with my iron rafters and supports, the tile can be formed with turned-up edges, and the cap C′ *c′*, with notches, (see Fig. 1,) can be placed over the edges of said tile, which it will secure to its place. Three tiers of tile may readily be placed and secured between each pair of rafters. The center tier of tile can be formed somewhat similar to the

others; but they should have their edges inverted, so as to fit and cover the edges of the flanges of the parallel tiles. They also have an additional projection or lip; or one wide tile may be used to fill all the space between each pair of iron rafters.

In order to thoroughly secure the lower ends of the rafter A A to the walls I use the plate-anchors F F, Fig. 2. These plates have on each one a foot formed, which is placed in the wall about a foot from its upper edge, and the tops of said anchors are securely bolted to the rafter A, so that the roof cannot be blown off or fall in case of a fire, unless the wall is pulled down.

I claim as my invention—

1. The rafter A, extending below and above the roof B, with the latter attached to the rafter between the upper and lower edges of said rafter, substantially as set forth.

2. The combination of rafter A, extending above and below the roof B, with flange-cap C *c*, substantially as set forth.

3. In combination with the rafter A and cap C *c*, the combined braces and support-cleats D above and below, extending from rafter to rafter, substantially as and for the purpose set forth.

4. The inverted trough E at the peak of the roof, with ventilating-space *e e* between the trough and the main part of the roof, and forming a flexible connection between the two sides of the roof, substantially as set forth.

5. In combination with a tile roof, the notches or stops *c'* in the lower edges of the cap C, substantially as set forth.

6. In combination with the rafter A, the anchors F F, consisting of duplicate plates, constructed and arranged substantially as set forth.

MORRILL A. SHEPARD.

Witnesses:
J. H. ECKERT,
J. S. GILLILAND.