

E. Becker.

Metallic Roofing.

N^o 60,848.

Patented Jan. 1, 1867.

Fig: 1

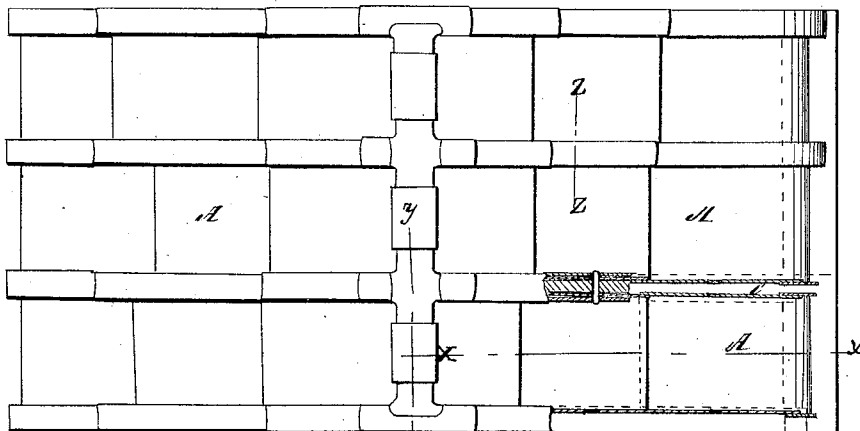


Fig: 2.

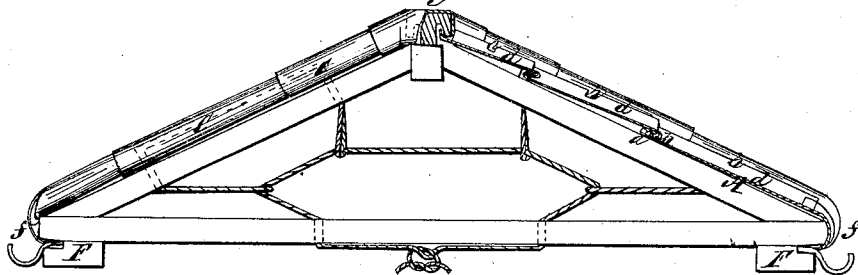


Fig: 3.

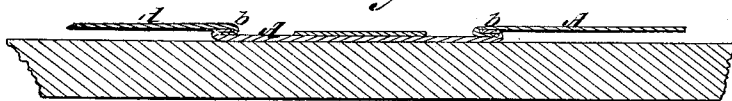


Fig: 4.

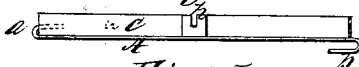
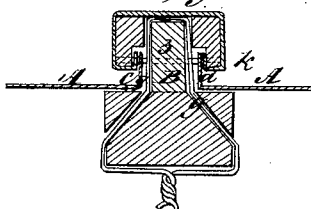


Fig: 5.



Witnesses:

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EDMUND BECKER, OF CINCINNATI, OHIO.

Letters Patent No. 60,848, dated January 1, 1867.

IMPROVED ROOFING.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, EDMUND BECKER, of Cincinnati, Hamilton county, State of Ohio, have invented a new and useful improvement in "Roofing;" 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 make and use the same, reference being had to the accompanying drawing, forming part of this specification.

Zinc has long been known, owing to its lightness and cheapness, as well as its durability, to be a metal most suitable for the covering of the roofs of buildings, but its use heretofore has been impossible in consequence of the difficulty experienced to give it sufficient solidity and yet allow the necessary expansion and contraction to the metal when subjected to the extreme variations in the temperature of the atmosphere. These variations of temperature in the roof of a building, although but comparatively slight, are yet important in their effects. If a roof is covered in spring the heat of the summer necessarily expands it, and thus the surface, smooth at first, becomes "crimped" or crinkled; when, the cold weather approaching, contraction occurs. But this contraction does not smooth the metallic sheets; and as their crimping by the heat still remains, which, of course, shortened them, they become still further shortened by the cold atmosphere, and therefore must crack or break at some one point or another; this fact destroying all the reliability and practicability of soldered metallic roofs, and especially those constructed of zinc. To obviate these difficulties has long been attempted, but, for various reasons, never successfully, three important conditions, as is obvious, being necessary and essential to a metallic roof or covering for buildings, viz: first, solidity; second, impermeability; and, third, freedom from the injury now occasioned by the expansion and contraction of the metal from the variations in the temperature of the atmosphere; and in the present invention the above conditions are fulfilled or maintained.

In accompanying plate of drawings my improvement in roofing is illustrated—

Figure 1 being a plan or top view of a roof made according thereto, with portions broken out to show its construction more fully.

Figure 2 is a partial end view of fig. 1, and transverse section taken in the plane of the line *x x*, fig. 1

Figures 3, 4, and 5, detail views to be hereinafter referred to.

Similar letters of reference indicate like parts.

A, in the drawings, is a zinc metallic sheet of the usual size found in the trade, but with its two sides, *a* and *b*, bent or lapped over (one, *a*, upward, and the other, *b*, downward) into the form of hooks; the two other sides, *c* and *d*, being bent upward and vertical. At or near the middle of the upright sides *c* and *d*, but both at the same distance from the base, similar notches, *h*, are cut, about which, in case the declivity of the roof should be great, and also as a matter of precaution, the zinc should be strengthened by increasing its thickness, or in any other proper manner. When the metallic sheet is to extend to the gutter its turned-over edge *a* is to be engaged with a groove, *e*, of the joist F, and there fastened by one or more nails at or near the middle part of the sheet with small pieces of metal, *f*, soldered on to it as extensions of the upright sides *c* and *d*, fig. 2; but, if the sheet is to be placed at the ridge of the roof, the side *b* is to be bent over. B B are the binding-bars, a quite important feature of my improved roofing embraced herein, one of which bars is shown in transverse section in fig. 5, and the manner in which they are fixed to the framework of the roof. These bars B consist of a square piece of wood, to which the required form is given in any proper manner, their length being equal to the distance from the summit of the roof to its gutter, but they could, however, be made in two or more parts or sections. At certain distances, and according to the declivity of the roof, the bars B are fastened to the rafters on which they rest, by a strong wire, *g*. At points corresponding to the notches *h* of the metallic sheets A, wire pins *k* are horizontally driven (see fig. 5) through the bars B, and, for protecting the latter, sheets of zinc are used, but not nailed all around them. These sheets, being once curved or bent, remain so, and when laid upon the bars B are prevented from slipping by the pins *k* driven through such bars.

The mode of laying the roof or metallic covering is as follows:

The rows of sheets A are first laid on the surface of the roof, from its gutter to its summit or ridge, with a space, *c*, between each two, say of about one and one-quarter inches in width. In each row the edge *a* of the first sheet is inserted in the groove *e* of the joist F, the edge *a* of the second sheet being hooked or interlocked with the edge *b* of the first, etc., care being taken at each interlocking point to allow sufficient play for con-

traction. When the above is completed the wires *g* of the bars B are introduced in the rafters, fig. 1, and the said bars so laid that the upright sides or edges *c* and *d* of the sheets will enter the grooves at each side of the bar B, (see fig. 5,) and the pins *k* pass through the notches *h*, when, if the wires *k* are firmly tied or twisted under the rafters, the following result is secured, viz: The sheets can freely expand and contract in their dimensions, being free nearly one-eighth of an inch at each side; and, moreover, the sheets, at each of their notches *h*, are allowed the same freedom of action, the hooked parts *a* and *b* coming, more or less, one upon the other, according to the temperature; and with a declivity of roof of one-twelfth, at least, impermeability is fully secured.

By examining my system of roofing it will be apparent that the action of the wind on the metallic sheets has no effect, the wind, by striking the intersections of the several sheets, being brought by the bent edge *b* under the groove of the binding-bars B, which, being firmly fixed to the rafters, and, besides, presenting very little surface, the strongest gusts of wind can be sustained.

The bars of the summit or ridge of the roof, being more exposed to the wind, have a broader base and no pins. The sheets A are bent upright and play freely in grooves of the bar, the two descending bars being covered by a common sheet of zinc, which is rolled on and around the summit-bar. The summit or ridge bars, being horizontal, the space between the points of meeting of the bars or their contiguous ends is covered by sheets of metal hooked one on and to the other; these means providing for the dilations of the metal and at the same time giving an impermeable joint.

It is obvious that my principle of construction of roof, applied with care and a knowledge of how to do it, can be made to conform to every shape of roof, whether the roof has one or more surfaces, the roofing being exceeding cheap and simple in construction, and costing much less than the soldering-roofs, as heretofore practised. Moreover, as is obvious, my roofing needs no flooring; the rafters, to secure the binding-bars B upon one or two intermediate light joists parallel to and between the rafters, being sufficient. To cause the metallic sheets to lie smooth, sloping pieces *c* are nailed on the rafters and intermediate joists. The principal work of preparing the roof can be done in-doors, so that the setting or laying of the roof will present few difficulties. It is best to make the wires *g* and *k* of brass, as the presence of iron is prejudicial to the zinc.

I claim as new, and desire to secure by Letters Patent—

1. The bars B constructed substantially in the manner and secured at their base to the rafters of the roof as and for the purpose described.
2. The pins *k* driven into the bars B in combination with the notched plates A, substantially as described and for the purpose specified.
3. The construction of the metallic sheets A, provided at their upright sides with notches *h*, and secured to the roof by the bars B, so as to have full liberty to expand and contract in all directions as and for the purpose set forth.

ED. BECKER.

Witnesses:

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P. HOFFMAN.