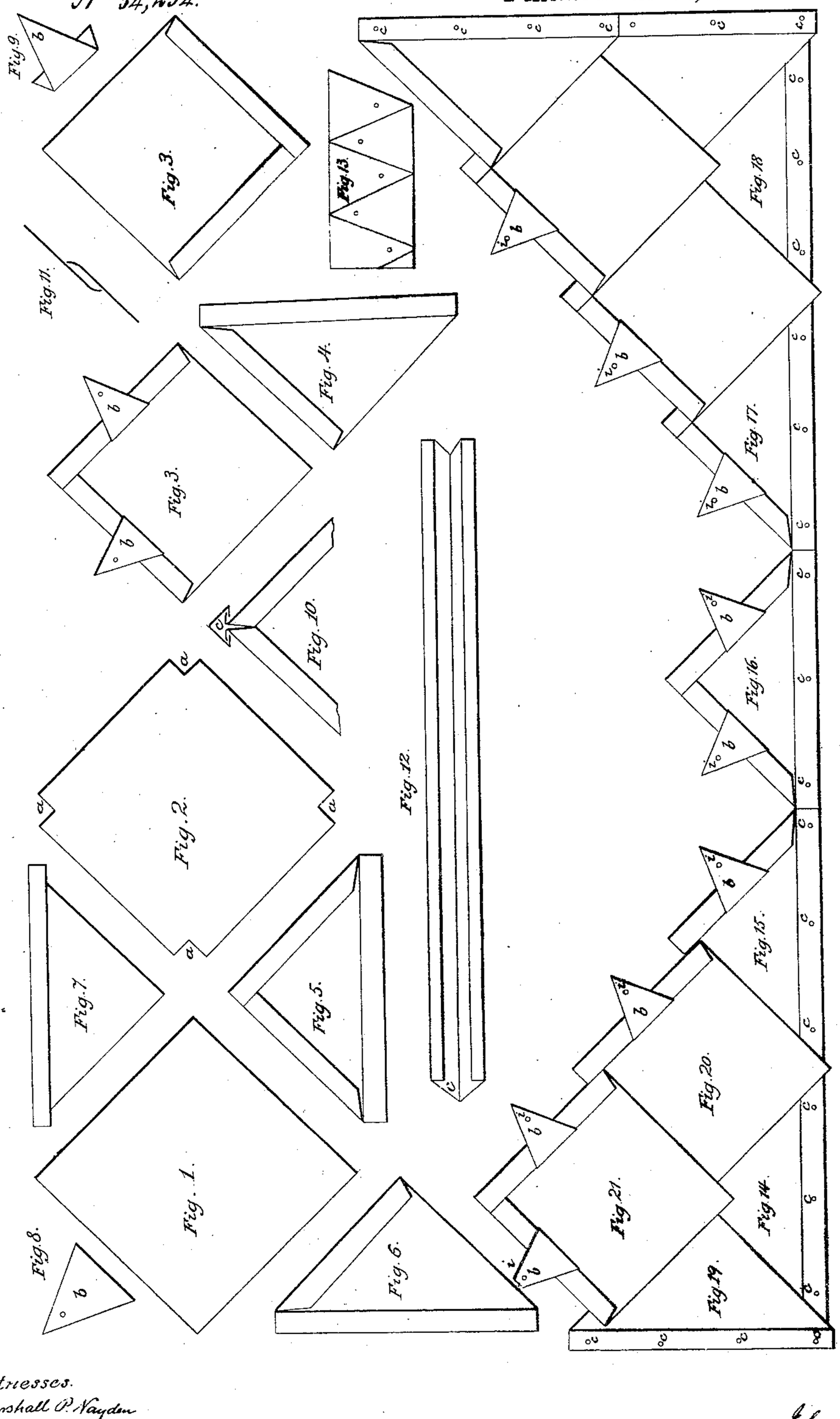
J. J. Hayden.

Metallic Roofing.

No. 34,254. Patented Jan. 28, 1862.



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UNITED STATES PATENT OFFICE.

JOHN J. HAYDEN, OF INDIANAPOLIS, INDIANA.

IMPROVEMENT IN METALLIC ROOFING.

Specification forming part of Letters Patent No. **34,254**, dated January 28, 1862.

To all whom it may concern:

Be it known that I, JOHN J. HAYDEN, of the city of Indianapolis, county of Marion, and State of Indiana, have invented a new and Improved Mode of Metal Roofing; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the combination, in diamond-sheet-metal roofing of the particular character described, of the reversely-bent hawk-bill-shaped points—that is, the upper point of the diamond sheet being turned with a hawk-bill upward and the lower corner with a hawk-bill downward. By this combination the surfaces of the sheets at the points where the corners of the sheets lap over are kept apart, say, about one-sixteenth of an inch, and by this means, together with the overlapping of the point, say, from one-half to three-fourths of an inch, causes the point to extend down upon the surface of the sheet so far that capillary attraction at this point, which has always been the greatest difficulty, is completely overcome. (See section, Fig. 11, taken through the line *z z* of Fig. 18.) Beside this, the system of hawkbilling renders the groove-lapped surfaces as secure as though they were soldered.

I am aware that sheet-metal roofing with notched corners and reverse lap-joints is old—that is, such as is seen in the rejected application of one Mr. Davis. Experience, however, has proven that horizontal or parallel seams will not stand the test of use even when soldered, as expansion and contraction break the soldering.

I also am aware that diamond-metal roofing is not new—that is, such as is seen in the rejected application of one Mr. St. John—but in this style of roofing, previously to my invention, there was nothing to prevent undercurrents of air from lifting the sheets if unsoldered; and if soldered, then the same objection obtains as in Davis's plan, so far as soldering is concerned.

I might with safety admit that the plans of sheets used by both the parties referred to are similar to mine, yet they are not like mine, the combination in my plan completely overcoming all objections urged against metal roofing, all capillary attraction upon mechanical and philosophical principles being obviated without the use of solder in any way; and here I will remark that no soldered roof will stand the test of use for the following reasons: First, the action of wood and coal smoke and soot falling upon the roof corrodes and unsolders the seams as certainly as quicksilver would, and, more than this, the soldering is a very expensive part of the process of laying a sheet-metal roof; second, with soldered joints and seams one vast sheet of metal which will contract and expand very considerably is formed, and this contraction and expansion of itself will break the soldered seams; third, it forms a large metallic sheet, which is always liable to be lifted upward and downward by undercurrents of air, and this motion of itself breaks the seams and causes the roof to blow off very easily, as there is no vent, and, fourth, in all such roofs the frost in the cold months accumulates on the underneath side of the metal, and there being no vents, the warmth of the sun condenses it into water, and it will run down and spoil the ceilings and side walls.

In my plan the particular formation of the sheets causes these objections to be overcome. The grooves standing at an angle of forty-five degrees or diamond shape from the eaves, sides, and comb of the roof makes it impossible for capillary attraction to carry the water under and over the grooved edges, whereas in Davis's plan, the seams being parallel to the edges and ends of the roof, does not overcome this kind of attraction, and it cannot be made impervious except by the most careful soldering. But in the manner in which I fasten the sheets expansion and contraction are not perceivable and produce no objectionable results. Cleats soldered to the sheets, as in St. John's plan, will work loose, no matter how securely fastened. The expansion and contraction of the wood and metal both combine to break them loose. In my plan this is not experienced, as they are separate and independent of each other.

Another great advantage in my combination is that the seams being unsoldered leave vents or escapes in every joint for the escape of steam formed by melting of frost in cold weather on the under side of the sheets, and

where this is the case no drip will ever be experienced from this cause.

The manner in which I form the eaves, side, and comb or saddle triangular pieces in my combination also has its particular benefit, there not being a nail-hole, all being secured independently by the grooving and cleats.

To enable others skilled in the art to make and use my invention, I proceed to describe its construction and application.

I take sheets of metal (say of tin) and cut them exactly square (see Fig. 1) of any given dimensions—say ten or twelve or fourteen inches square—and clip a half-inch square notch from each corner preparatory to grooving, as seen in Fig. 2, at the corners marked *a a a a*. I then turn grooves a half-inch in depth on the two upper conveying edges, as seen in Fig. 3, and then groove the two lower underneath edges, as seen in Fig. 3, reverse side. It will be seen that the upper and lower corners lap just the width of the groove. I then bend the upper point *s* upward and the lower point *s'* downward in the shape of a hawk-bill, so that when the sheets are properly adjusted these two points will hold the sheets apart, say, to the extent of about one-eighth of an inch, as seen in Fig. 11, by which means I completely overcome all capillary attraction. I next proceed to construct my eave, side, and top or comb triangular sheets. The eave-sheets are formed by cutting a square sheet, as above described, crosswise from left to right and distant below and parallel with a line—say one inch or one inch and a half—drawn from the left to the right corners, the underneath groove flattened out and cut square on the one or one-and-a-half inch strip, as seen in Fig. 5. The side and top triangular sheets are prepared in a similar manner, cutting them with reference to the places they are to occupy, as seen in Figs. 6, 7, and 4. The one-and-a-half inch strips at the base of the triangular sheets are to be turned square down for the purpose of nailing the strip to the edge of the sheeting, except the top one, which is to be grooved the same as the sides, only on the reverse or top side, as seen in Fig. 7, so that when all the sheets are properly adjusted and fastened, as hereinafter described, the saddle-strip (see Fig. 12) may be slipped endwise along the grooves, as seen in Fig. 10, and when extended from one end of the comb to the other is to be gently tapped with a wooden mallet until the grooves close snugly together, making a perfect finish on the comb of the roof. The fastening-cleats are simply scraps of metal—say of tin—cut in triangular shape, as seen in Fig. 8, and grooved at the bottom, as seen at Fig. 9, out of strips, like Fig. 13.

I now proceed to describe the manner of properly applying the sheets and securing the same to the sheeting. I begin with an eave triangular sheet, Fig. 5, at the lower left corner of the roof, and nail the strip with flat-headed copper or tinned nails to the edge of the sheeting, working to the right until all the eave-sheets are put on, as seen in Figs. 14, 15, 16, 17, and 18, nailed at the points lettered *c c c c c c c*. Then I secure my left-side triangular sheets in the same manner, hooking the underneath groove of the first one into the top groove of the eave-sheet at the left and nailing the outer edges. (See Fig. 19.) I then secure the sheets to the surface of the sheeting by means of the triangular cleats, as shown at the letters *b b b b b b*, as shown at the bottom tiers of sheets, showing how admirably they adjust themselves to each other, and nailing through the points *i i i i i i*, &c. The triangular sheets being secured as above described, I begin with a square sheet, Fig. 20, hooking the underneath grooves of the lower corner into the top grocves of the triangular sheets No. 14 and No. 15, and, drawing the sheet firmly upward until it fits snug and nice, secure it in the manner before described with the small triangular cleats *b b b*, &c. Then the next square sheet, No. 21, hooks in like manner into the top groove of the left side triangular sheet, No. 19, and the upper left groove of Fig. 20, thus progressing from left to right and from bottom to top until all the sheets are properly adjusted and fastened, the top triangular sheets to be secured by the saddle-strip No. 12, as hereinbefore described, and my roof is complete, and it will be discovered that the hawk-bill points of the sheets drop onto the surface of the sheet below and elevate the top sheet about one-eighth of an inch at this point from the lower sheet, which has the effect to effectually overcome all capillary attraction, as the water flows as freely from the point as ink does from a pen. The grooves all being at an angle of forty-five degrees from the eave, sides, and top of the roof obviates the necessity and expense of soldering the seams, as it is impossible that the water can be forced up and under the grooves while forming such an angle. The grooves, having a half-inch lap, allow each sheet to contract and expand independent of its fellow, and being unsoldered allow a vent to the seams for the escape of undercurrents of air in time of high winds, which, with the secure manner in which each sheet is fastened, renders it impossible that the metal shall be blown off the roof. When it goes, sheeting, rafters, and all will go with it. The roof being finished presents the appearance of diamond-shaped tile or slate roofing, and is so simple in its construction and application that a person of ordinary skill may make and use it with perfect certainty of success in all that is claimed for it—viz., cheapness, durability, easiness of construction and application, overcoming capillary attraction, also expansion and contraction from heat and cold, security against under currents or upper currents of air in time of storms, together with the advantage that it may be put on and taken off without injury, and can be adapted to the sides of buildings as well as to the roof, if

desired, and can be manufactured in large quantities for market and shipped cheaper than any other metal roofing heretofore used in the United States.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in diamond-sheet-metal roofing of the peculiar character described, of the upward and downward bent or curved points *s s'*, substantially in the manner and for the purposes described.

2. The combination of the diamond sheets, eave, side, and comb or saddle triangular pieces and cleats, with the roof of a house, the said parts being all constructed and applied in the manner and for the purposes described.

JOHN J. HAYDEN.

Attest:
JOHN W. HAMILTON,
W. J. GATLING.