Aug. 15, 1939 A. W. PATTIANI 2,169,428

FLAT METAL-COVERED ROOF

Filed March 20, 1939

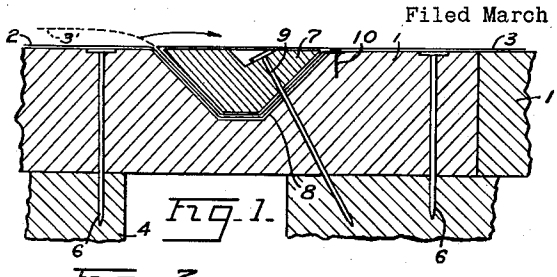


Fig. 1.

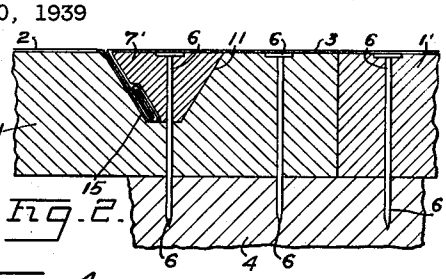


Fig. 2.

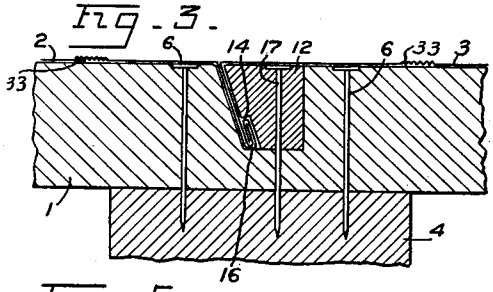


Fig. 3.

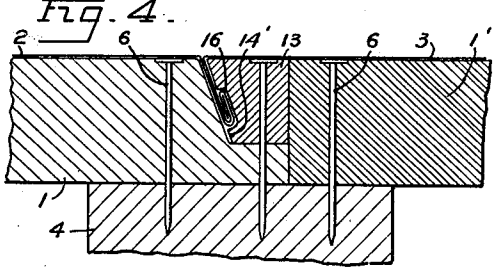


Fig. 4.

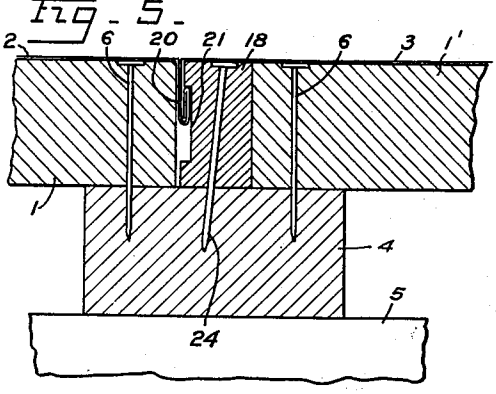


Fig. 5.

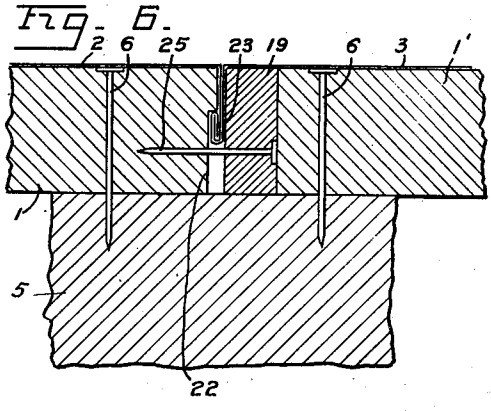


Fig. 6.

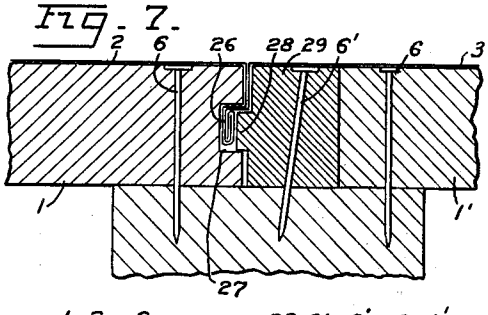


Fig. 7.

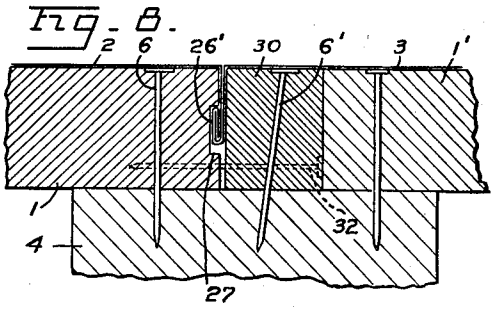


Fig. 8.

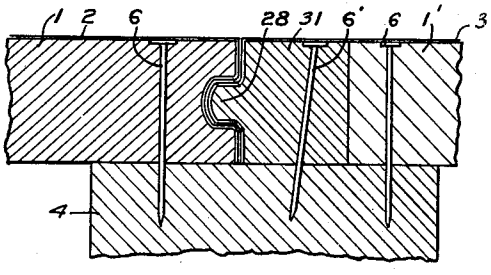


Fig. 9.

INVENTOR.
ALOIS W. PATTIANI
BY A. W. Pattiani
ATTORNEY.

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FLAT METAL-COVERED ROOF

Alois W. Pattiani, Oakland, Calif.

Application March 20, 1939, Serial No. 262,884

15 Claims. (Cl. 108—13)

This invention relates to sheet metal covered roofs, particularly roofs with a foundation covering of boards, either wood or composition boards, and the outer surface of the foundation covered with thin sheet metal, particularly thin sheet copper.

The principal objects of the invention are to provide a method and means for covering such a roof (or side walls of a building), with sheet metal in such a manner that the outer surface will be flat and free from projecting seams, so that the roof may be walked on without injury to any standing or projecting seams or joints. Also such a roof which is simply applied without the necessity of using solder along the seams, and withal a flat roof in which the seams while sunken into the foundation below the outer surface are watertight.

Other features and advantages of the invention will appear in the following description and accompanying drawing:

In the drawing the thickness of the sheet metal and in the seams is shown by a single line as has been commonly done in patents showing such thin sheet metal construction, for otherwise the folded metal at the seams would be so greatly distorted as to misrepresent the relation of the parts, as in practice very thin sheet copper (about the thickness of an ordinary sheet of paper), would generally be used, and even three or four thicknesses folded together at the seam would still be but a sixteenth of an inch or less in total thickness, and this must be considered in viewing the drawing.

Figure 1 is a vertical cross section as taken across the longitudinal joint or seam joining the edges of long strips of metal covering the roofing boards.

Figures 2 to 9 are similar sectional views to that shown in Figure 1, but show various modifications of the invention while all retaining the feature of a flat outer surface with the metal sheets joined in a sunken seam.

Briefly described the improved flat metal covered roof consists of long sheets or strips of flexible, soft, corrosive resisting metal joined to each other along their long edges, with the seam sunken in the roof boards and the sheet metal covering not only the roof boards but all holding down nails as well. A feature of the invention is the simple and effective manner in which the seams are clamped into place to make a tight joint without the use of solder.

In all the figures the foundation boards may be considered as of wood, or artificial boards such as of Cellotex or other fiber products, and as designated by the numeral 1, and 1'.

The thin flexible sheet metal is generally supplied in rolls of any width, but widths of about twelve to twenty inches are preferred for ease of working, and they are rolled out and flattened on the foundation roof before joining or seaming together along their long margins. The strips may be run horizontally on a flat or slanted roof or up and down over a slanted or gable roof. The strips are preferably long enough to extend across the roof to be covered, though they may be joined as by soldering or otherwise to make them long enough if desired.

In all figures of the drawing a joint of two adjacent strips or sheets of the thin flexible sheet metal is shown, and one of the sheets is designated 2 and the other 3, it being understood that the sheets are in contact with the supporting or foundation roof as well as in contact with each other at the joints or folds, the slight line of clearance shown in the drawing being to preserve clarity only.

In the figures, variously, the foundation or roof boards 1 are shown resting on purlins 4 or rafters 5 or other supporting structure to which they are nailed as by nails 6, the heads of which are "set" flush into the top of the boards as indicated.

In Figure 1 the joint or seam between metal sheets 2 and 3 includes a somewhat triangularly shaped strip of wood, flat on top and fitting within a complementarily formed groove 8 in board 1 and held in place as by nails 9 which pass through overlapped metal sheets 2 and 3 which pass under strip 7 as shown and their extreme margins are nailed or tacked to the edge of groove 8 as at 10. Sheets 2 and 3 in the finished roof completely cover all nails as well as the roof boards and seam clamping strips 7 to form a perfectly plain or flat upper or outer surface which may either be a roof or the outside wall of a building.

In applying the sheet metal of Figure 1 the roof is progressively covered from left to right in this figure, and after tacking the overlapped margins of the two sheets at 10 the strip 7 is applied and nailed into the groove 8 with sheet 3 folded back as at 3', and after strip 7 is firmly secured, sheet 3' is swung forward in direction of the arrow to cover the clamping strip 7 and is then extended over board 1 and to the groove in board 1' where it is joined to the next sheet in a similar groove with the aid of a similar clamping strip, and so on till the whole roof is covered.

Nails 9 preferably pass through board 1 and into purlins or rafters.

When making the joint as described, the overlapped facing sides of the metal sheets may be given a coat of white or red lead in oil or other sealing compound if desired, to doubly assure that no moisture ever penetrates the joint.

In Figure 2 the parts described for Figure 1 are the same where similarly numbered, the difference being that instead of tacking the overlapped margins of the sheets to the board 1, the ends of the sheets are folded or crimped by folding over one or more times as at 15, and the folded joint is positioned in a small recess 11 formed in one side of V strip 7'. Otherwise the roof would be laid in the manner described for Figure 1.

In Figures 3 and 4 the similarly numbered parts are the same as described except that the clamping strips (here designated 12 and 13) instead of being beveled on opposite sides are beveled on one side only and the other side extending vertically or at right angles from the surface of the roof. In Figure 3 the strip 12 is cut away or recessed at 14 to receive the folded overseam 16 of the two metal sheets to draw it down tightly into the recess when the strip is nailed in place by the nails 17 which are here seen to pass through the strip, the roof board 1 and into the rafter or purlin 4 as the case may be, to thus lock all three securely together.

The design of Figure 4 is slightly different in stopping the seam recess at 14' just below the seam 16 so as to preserve a larger guiding nose at the lower edge of the strip for better fitting the groove. Another feature is, that instead of forming a groove in the top face of the board to receive the seam clamping strip, one side of the groove is formed by the plain edge of the next board 1'.

In Figures 5 and 6 the clamping strips 18 and 19 are placed between the adjacent edges of the roof boards 1 and 1' and in Figure 5 the strip is recessed as at 21 at the side for the folded metal seam 20, while in Figure 6 it is the lower edge of board 1 which is recessed as at 22 for the folded metal seam 23. In Figure 5 the clamping strip is nailed from above into the purlin 4 by nails as at 24, while in Figure 6 the clamping strip 19 is nailed at right angles into the board 1 as by nails 25, but in no instance do any of the securing nails pierce a folded metal seam to possibly cause a leak.

All folded metal seams shown may be folded over several times, instead of folding but once as shown in the drawing, if desired. Also all folded seams may first be white leaded or smeared with any other sealing compound before folding to further insure water-tightness. The clamping strip may also be white leaded.

The arrangements shown in all of the preceding figures show the same general method of progressive laying of the strips and folding over the successive boards and nails, as previously described for Figure 1.

In Figures 7, 8 and 9 a somewhat different arrangement of the joint of the two metal sheets is similar to those shown in Figures 5 and 6 except that in Figure 7 the folded metal seam 26 is forced tightly into a groove 27 in the edge of board 1, by a bead or nose 28 projecting from one side of the clamping strip 29 secured as by angularly driven nails 6'.

In Figure 8 the arrangement is similar to that of Figure 7 except that the clamping strip 30 which bears against the seam 26' is plain or without the bead 28 shown for Figure 7 and an extra nail 32 is shown drawing the strip 30 against the edge of board 1.

In Figure 9 the sheets of metal 2 and 3 are not joined by a folding seam, but both are inserted one over the other entirely around the tongue and groove joint 28 of the boards 1 and clamping strip 31 which are tightly drawn together when nailed by "toe-nailing" the strip in place by nails as at 6'. The tongue and groove of the board and strip are normally a tight fit, and the addition of the two sheets of thin copper therefore form an especially tight wedged joint which, particularly if previously white leaded, will not leak if well seasoned wood be used.

As the invention is equally applicable to covering the boarded outer sides of buildings as it is for roof covering, the word "roof" as used in the claims is to be taken as including the sides of a building covered in the same manner.

Also, the word "boards" as used in the claims are to be taken as covering either wooden boards, or artificial boards made of Cellotex or similar products.

As such sheet metal roofs as herein contemplated are generally of copper of but about the thickness of ordinary paper, and the work is done by hand, there is generally slack enough to allow for contraction in cold weather. However, as a feature contributing directly for expansion and contraction, the thin sheet metal may be embossed with very small ridges at intervals between its margins running in various directions or in any desired pattern such as a herringbone or other design, such ridges being indicated in some of the figures of the drawing at 33.

While my invention is particularly adapted to the covering of solid boarded roofs with very thin flexible sheet metal, it is manifest that any other thin flexible weatherproof material may be substituted for the sheet metal where cost must be considered, and my claims are intended to cover any such substitution. Also when the method is used for covering the outer walls of buildings it is immaterial whether the outer boarding be beaded or panelled as commonly constructed.

Having thus described my improved flat sheet metal covered roof construction together with some of its possible modifications I wish to say that I am aware of similar constructions being used in roofs which were ridged, yet I am not aware of any construction embodying this type of joint in a perfectly flat sheet metal covered roof of the kind above described.

I therefore claim:

1. A flat surface sheet metal covered roof comprising roofing boards with spaced grooves extending inwardly from the outer surface of the boards, a plurality of thin flexible sheet metal strips arranged to cover the outer surface of said boards and with the longitudinal adjacent margins of the strips arranged in overlapping relation in said grooves respectively, and clamping strips filling said grooves to present a substantially flush outer surface with said boards and clamping the overlapped margins of the sheets in said grooves, and one of the overlapped sheets at each groove being bent to cover the clamping strip and extend to the next groove to join another sheet in repetition of the construction described.

2. A flat surface sheet metal covered roof com-

prising roofing boards with spaced grooves extending inwardly from the outer surface of the boards, a plurality of thin flexible sheet metal strips arranged to cover the outer surface of said boards and with the longitudinal adjacent margins of the strips arranged in overlapping relation in said grooves respectively, and clamping strips filling said grooves to present a substantially flush outer surface with said boards and clamping the overlapped margins of the sheets in said grooves, and one of the overlapped sheets at each groove being bent to cover the clamping strip and extend to the next groove to join another sheet in repetition of the construction described, said boards being nailed to supporting structure below, and said clamping strips being nailed into the grooves, and said sheet metal strips covering all nail heads.

3. A flat surface sheet metal covered roof comprising roofing boards with spaced grooves extending inwardly from the outer surface of the boards, a plurality of thin flexible sheet metal strips arranged to cover the outer surface of said boards and with the longitudinal adjacent margins of the strips arranged in overlapping relation in said grooves respectively, and clamping strips filling said grooves to present a substantially flush outer surface with said boards and clamping the overlapped margins of the sheets in said grooves, and one of the overlapped sheets at each groove being bent to cover the clamping strip and extend to the next groove to join another sheet in repetition of the construction described, said boards being nailed to supporting structure below, and said clamping strips being nailed into the grooves without puncturing the metal sheets, and said sheet metal strips covering all nail heads.

4. A flat surface sheet metal covered roof comprising roofing boards with spaced grooves extending inwardly from the outer surface of the boards, a plurality of thin flexible sheet metal strips arranged to cover the outer surface of said boards and with the longitudinal adjacent margins of the strips arranged in overlapping relation in said grooves respectively, and clamping strips filling said grooves to present a substantially flush outer surface with said boards and clamping the overlapped margins of the sheets in said grooves, and one of the overlapped sheets at each groove being bent to cover the clamping strip and extend to the next groove to join another sheet in repetition of the construction described, the overlapped margins of the metal sheets being folded over one another in the form of a seam.

5. A flat surface sheet metal covered roof comprising roofing boards with spaced grooves extending inwardly from the outer surface of the boards, a plurality of thin flexible sheet metal strips arranged to cover the outer surface of said boards and with the longitudinal adjacent margins of the strips arranged in overlapping relation in said grooves respectively, and clamping strips filling said grooves to present a substantially flush outer surface with said boards and clamping the overlapped margins of the sheets in said grooves, and one of the overlapped sheets at each groove being bent to cover the clamping strip and extend to the next groove to join another sheet in repetition of the construction described, the overlapped margins of the metal sheets being folded over one another in the form of a seam and positioned in a recess in the side of the clamping strip.

6. A flat surface sheet metal covered roof comprising roofing boards with spaced grooves extending inwardly from the outer surface of the boards, a plurality of thin flexible sheet metal strips arranged to cover the outer surface of said boards and with the longitudinal adjacent margins of the strips arranged in overlapping relation in said grooves respectively, and clamping strips filling said grooves to present a substantially flush outer surface with said boards and clamping the overlapped margins of the sheets in said grooves, and one of the overlapped sheets at each groove being bent to cover the clamping strip and extend to the next groove to join another sheet in repetition of the construction described, the overlapped margins of the metal sheets being folded over one another in the form of a seam and positioned in a recess in the side of the groove.

7. In the construction as set out in claim 1, said clamping strips formed with a beveled edge and said grooves being complementarily formed.

8. In the construction as set out in claim 1, said clamping strips formed with opposite edges beveled and said grooves being complementarily formed.

9. In the construction as set out in claim 1, the grooves being formed by a space between the edges of adjacent boards, and the clamping strip fitting within said space.

10. In the construction as set out in claim 1, the grooves being formed by a space between the edges of adjacent boards, and the clamping strip fitting within said space and nailed into the edge of one of the boards to clamp the overlapped joint of the metal sheets thereagainst.

11. In a sheet metal covered roof, a layer of boards covering the roof and presenting a flush outer surface, said boards provided with a groove along the edge, sheets of metal covering said boards a folded seam joining adjacent sheets of metal, and a clamping strip engaging said seam and forcing said seam tightly against the side of said groove of the roof boards.

12. In a flat surface sheet metal covered roof of the character described, the adjacent sheets of metal joined by overlapping margins, foundation boards with flush outer surfaces covered by said sheet metal, and means forcing the overlapping margins of the metal into tight marginal contact against the wall of a recess in the edge of the boards.

13. A flat surface sheet metal covered roof comprising roofing boards with spaced grooves extending inwardly from the outer surface of the boards, a plurality of thin flexible sheet metal strips arranged to cover the outer surface of said boards and with the longitudinal adjacent margins of the strips arranged in overlapping relation in said grooves respectively, and clamping strips filling said grooves to present a substantially flush outer surface with said boards and clamping the overlapped margins of the sheets in said grooves, and one of the overlapped sheets at each groove being bent to cover the clamping strip and extend to the next groove to join another sheet in repetition of the construction described, said boards being nailed to supporting structure below, and said clamping strips being nailed into the grooves, with nails passing through said boards and into the supporting structure below so as to tie all three together, and said sheet metal strips covering all nail heads.

14. In a sheet metal covered boarded roof, a

layer of boards covering the roof structure and presenting a flush outer surface, sheets of metal covering said boards and provided with folded seams joining adjacent sheets, and said folded seams positioned respectively against the edges of the boards, and a clamping strip engaging said seam and forcing said seam tightly against the edge of one of the roof boards, the clamping strips also covered by the metal sheets and with the adjacent roof boards all presenting a flush outer surface.

15. In a sheet metal covered boarded roof as set out in claim 14, said clamping strips being tapered in cross section.

ALOIS W. PATTIANI.