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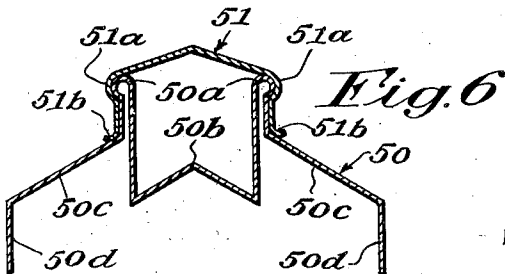
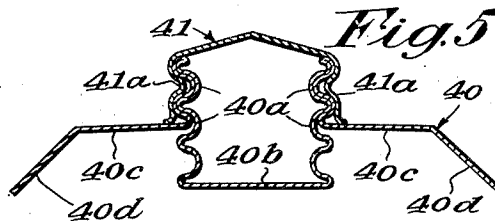
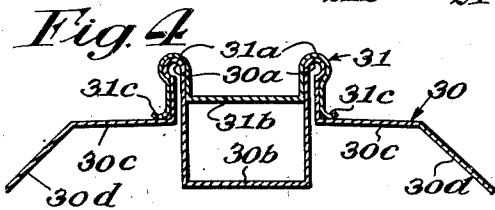
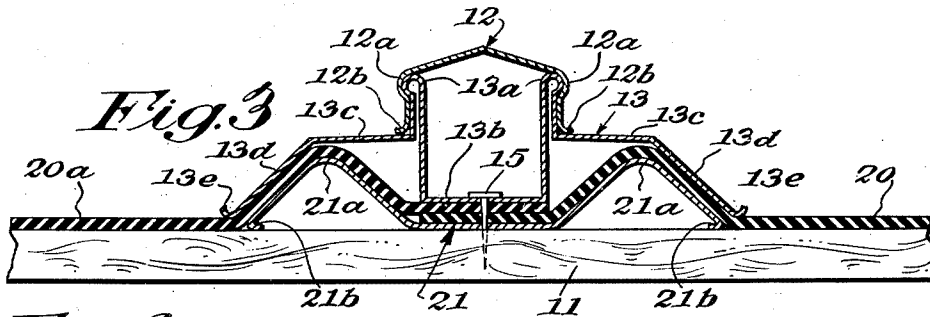
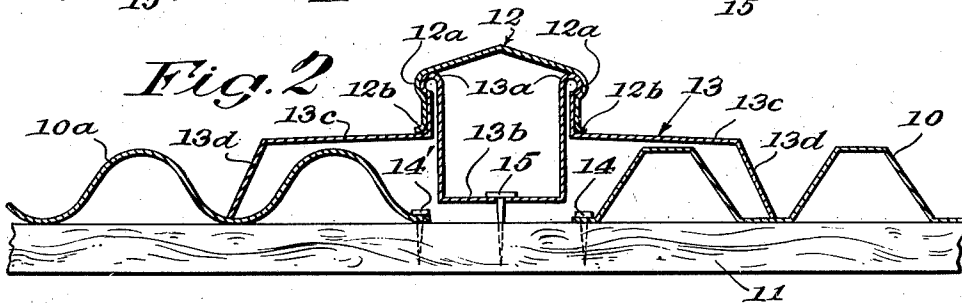
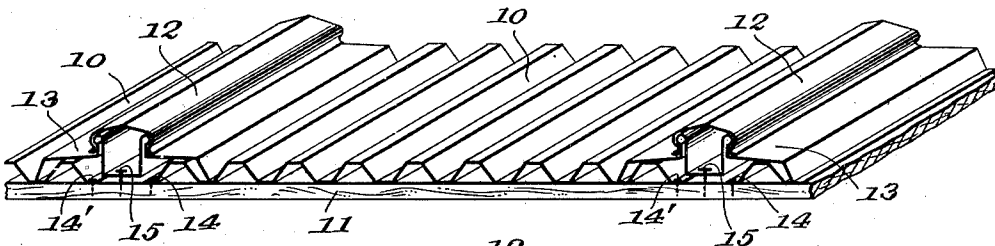
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2,234,799

ROOFING OR LIKE STRUCTURE

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*Fig. 1*



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## UNITED STATES PATENT OFFICE

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## ROOFING OR LIKE STRUCTURE

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4 Claims. (Cl. 108—13)

This invention relates to roofing and like structures and particularly to a novel watertight joint for use with sheet roofing or other surfacing material. For example, (a) with rigid sheets, generally of metal but may be of composition or plastic formed, as asbestos or other composition, and as generally used in roofing, but may be used for siding and other surfacing purposes. (b) With flexible sheets, either metal, composition or other materials generally used for the same purposes. The joint applies to either or both, the basic differences being that with flexible sheets I provide an additional part which is used as an underpiece and lap the sheets instead of separating adjacent courses.

It has long been desired to obtain a joint for standard (not specially preformed) roofing sheets of so-called corrugated or V-crimp type. Such sheets are used extensively as shipped from the factories in closely nested packs and carried in stock by dealers of such materials in all parts of the country. In use they are almost invariably overlapped and nailed down, the nails being driven through the high ridges (high parts of the corrugations or crimps) on the theory that water will not seek an opening at the top of such exposed ridges, but will run off into the low areas. This, however, has proven a fallacy, for the nails are exposed and work loose and up and water penetrates. Various methods have been proposed to overcome this defect, but most of them require working of the standard sheets in the field, such as flanging the edges, which requires special tools, so that these standard sheets intended to be applied by laymen without working or without special tools, are really limited in use to roofers or artisans with such equipment and skill in so working if waterproofness is to be obtained.

Other methods have been advocated which require the manufacturer to make a special sheet, but this defeats the use of standard sheets with obvious manufacturing, distribution and application drawbacks. With few exceptions, even when working of the sheets in the field is done, or specially manufactured sheets are used, exposed nails are still involved, and the surfacing does not prevent the access of water. Further, overlapped sheets use extra material, flanged sheets do likewise, and special sheets limit usefulness and generally use additional material in the production, and labor in applying.

My concept is a joint that is universally useable with standard sheets, generally of the so-called corrugated or V-crimp type, which does not require any working in the field, which does

not lap the sheets but utilizes material, formerly wasted in the lap, in an ineffective joining manner, and which does not require any special tools or skill in applying and which eliminates all exposed nails. Further, in order to obtain this desired and sought for result, I utilize the practical equivalent in material that would otherwise have been used in ineffective lapping, flanging and other working, so that the total amount of material used to cover any given area with the employment of my joint is substantially the same as when other means are ineffectively used, with the result that the ultimate cost by my method is not materially, if at all, increased.

It has been long recognized that direct nailing-on of such sheets affords the best results in use, so that the nailing-on and down through the sheets themselves is the most positive and effective manner to secure them in place. My joint so provides. Some methods require the joint to hold down the sheets, which imposes upon the joint (of that type) excessive function, possibly heavier materials, which also is made more difficult with flanges or similar worked parts which may not fit into tight relationship because of the roof boards or surface irregularities and contour. The nails that hold my joint down and in tight relationship and contact with the adjoining yet separated sheets are independent of the nails which hold down the sheets. As all nails are widely spaced, and one row of nails is not depended upon to do all of the holding, no more nails are required in the three rows of nails I use than if a single row were used.

Where courses of sheets equipped with my joints are so placed as to bring the joints in different courses in alinement with each other with their adjacent ends overlapped, I preferably swell the lower ends of my joint pieces at the factory so that they overlap in tightly fitting relationship. My joint is advocated for any surface with sufficient pitch, or inclination, to drain off water freely without water building up before draining.

The width and shape of the "apron" used on my joint may vary somewhat to the shape of special edged-shaped sheets, instead of as per the universal type used with standard sheets, if such would be desirable.

Also, modifications as to provide cut-outs in way of opposite run ridges, as at ridge of roof, may be done, all without affecting the principle of my joint.

For flexible sheets I use my joint substantially identical except that I also use another part called

underpiece, which forms the flexible sheets into pyramids or equivalent form, which shape they cannot hold in themselves. With flexible sheets I overlap their edges under the center portion of my joint in order that one row of nails will hold them and afford pressure as well, in order to relieve the comparatively weak flexible material from the strain of tearing at the nailing line.

Illustrative embodiments of my joints and characteristic uses are shown in the accompanying drawing. Throughout the specification and claims like reference numbers are employed to indicate corresponding parts, and in the drawing:

Fig. 1 is a fragmentary perspective view of a roofing structure in accordance with my invention.

Fig. 2 is a sectional view illustrating the use of one of my joints with corrugated sheet material on one side and V-crimp on the other side of the joint to illustrate universal applied principle of the joint.

Fig. 3 is a similar sectional view where the roofing material is flexible and a shaped underpiece in peak form is used.

Fig. 4 is a section showing another form of cap for joint.

Fig. 5 shows another modification of the joint body, and

Fig. 6 is a further modification of the joint for application to a ridge.

I have shown in the fragment of roofing illustrated in Fig. 1 sheets 10 of a continuous V-crimp type. These I have indicated as laid on the boarding 11 of the roof to be covered and to it their free edges are nailed direct as at 14.

In the case of the ordinary corrugated type sheet 10a, shown at the left of Fig. 2 for the purposes of illustrative comparison, the free edges are nailed down as at 14'. Nails may be driven at an angle into sheet edges when sheet edges do not have flat margins. Such edges of either type used on a roofing job are preferably slightly spaced apart to gain increased coverage and an economy which is made entirely practical by my joint system which covers and waterproofs these entire zones of marginal adjacency.

In carrying out my concept I provide joint members as at 13. The form shown in Figs. 1 and 2 includes a central valley portion with a turned edge 13a from which its side walls support a flat bottom 13b. This bottom affords a nailing strip for a row of nails 15 wholly independent of the nail rows 14 and 14'.

The joint 13 has its horizontal apron 13c provided with a downturned edge 13d which contacts the sheet 10 preferably in one of its valleys adjacent its edge nailing 14.

The sheets 10 are therefore firmly held down independently of that nailing by the central row of nails 15 through the bottom 13b of the joint valley. This central nailing 15 is covered and tightly sealed by the cap 12 which preferably has a slight beading as 12a corresponding and co-operatively engaging with the turned edges 13a of the valley wall. The spring-on cap edge should preferably be slightly flared outward as at 12b, to readily guide the tight fitting cover (cap) into protecting position.

In Fig. 3 I have illustrated a joint according to my invention applied to flexible roofing sheets 20 and 20a. Such roofing preferably has its margins or lateral edges overlapped on a rigid underpiece 21 formed with lateral peaks 21a over which the flexible sheets are applied and spot nailed in

overlapping position before joint 13 is applied. In this form the central row of nails 15 not only pierces and draws down the valley bottom 13b, but passes through the overlapped edges of the sheets 20 and 20a and bottom of the underpiece 21, and enters the boarding 11 on which the flexible sheets are laid. For such relatively soft and/or flexible sheets I usually finish my joint aprons with a turned-up flare 13e at its edges. The edges of the underpiece 21 may likewise have a turned-in flare 21b to protect the flexible sheets.

Joint members according to my invention may have their central valley portions variously modified in construction. For example, I have shown in Fig. 4 a joint member 30 having its valley bottom 30b which is to be used for nailing (not shown) sealed by a cap 31. Such a cap I preferably form with an open fold 31a which turns in and forms the bottom 31b of what is really a metal stopper portion which fits internally to close the valley and grips on externally as at 31c.

For increased tightness in such caps I may provide the type 41 (Fig. 5) with corrugated edges 41a for multiple fitting over a joint section 40. In this form I have shown the valley portion as formed of a separate corrugated wall 40a having a flat nailing bottom 40b for holding down the edge 40d of the apron 40c.

For joint sections of ridges of different angles I may provide a metal member adjustable by simple bending, as indicated in Fig. 6.

Such a ridge joint section 50 has its central valley reversely angled as at 50b. It may have beads or folds 51a from which the apron portion 50c extends with its edge 50d turned downward.

The foregoing modifications are illustrative and will be found suggestive of others that will thus be seen available to those familiar with roofer's arts. All such will be understood to be in accordance with my invention and thus afforded protection.

What I therefore claim and desire to secure by Letters Patent is:

1. In a roofing or surfacing structure including covering sheets disposed in marginal adjacency over surface to be protected and having their margins disposed as substantially flat edges lying in the plane of the surface to be protected, a joint comprising a walled valley piece having its bottom nailed down, lateral aprons on the valley walls having downturned edges retentively contacting marginally spaced sheet surfaces, and a longitudinal cap interengaging the valley wall exteriorly in sealing relation to the nailing of its bottom.

2. In a roofing or surfacing structure including covering sheets disposed in marginal adjacency over a surface to be protected and having their margins disposed as spaced substantially flat edges lying in the plane of the surface to be protected, and nailed thereto, a joint comprising a walled valley piece having its bottom nailed-down independently of the marginal nailing of said sheets, lateral aprons on the valley walls having downturned edges retentively contacting marginally spaced sheet surfaces, and a longitudinal cap interengaging the valley wall exteriorly in sealing relation to the nailing of its bottom.

3. In a roofing or surfacing structure including corrugated or peaked rigid covering sheets disposed in marginal adjacency over a surface to be protected and having their margins disposed as substantially flat edges lying in the plane of the surface to be protected, a joint comprising a

walled valley piece having its bottom nailed-down, lateral aprons on the valley walls having downturned edges retentively contacting marginally spaced depressed portions of the sheet surfaces, and a longitudinal cap interengaging the valley wall exteriorly in sealing relation to the nailing of its bottom.

4. A structure according to claim 1, the covering sheets being of relatively flexible material and

a corrugated or peaked formed underpiece is provided to form and retain the applied sheet edges in peak form, and the lateral aprons of the valley piece being clampingly imposed upon the sheet margins to clamp them against the underpiece and to cover the deformed portions of the flexible sheets.

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