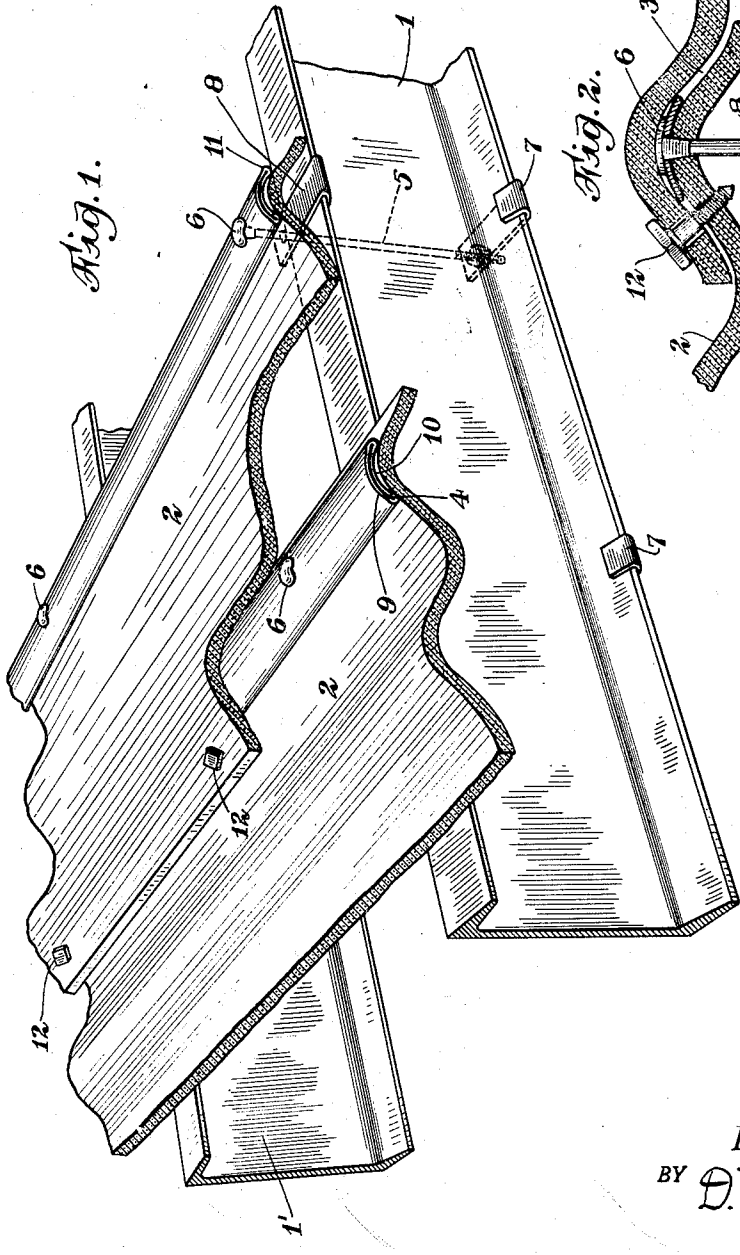
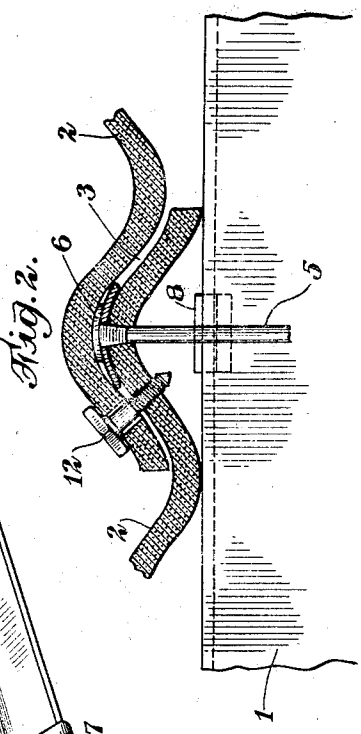
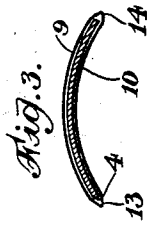
March 23, 1937. P. A. VOIGT 2,074,497

STRUCTURAL ASSEMBLY

Filed March 30, 1935







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asbestosclaims.law/library/23710/1

Patented Mar. 23, 1937 2,074,497

UNITED STATES PATENT OFFICE

2,074,497

STRUCTURAL ASSEMBLY

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Application March 30, 1935, Serial No. 13,819

10 Claims. (Cl. 108—33)

This invention relates to a structural assembly and particularly to a roof comprising a supporting substructure, corrugated sheets overlapping at their side portions to form a lapped joint, and concavo-convex reenforcing strips disposed between the lapped portions of the said sheets and secured at both ends to the substructure.

Great pains have been taken and expense incurred by the manufacturers of corrugated sheets of asbestos and Portland cement or the like to eliminate hazard to the constructor in assembling such sheets in a roof. Thus, the sheets of corrugated roofing material have been made oversize in thickness, to provide an additional safety factor, and directions issued that a man standing upon the sheets during the installation must use a load-distributing member, such as a heavy board with cleats on the upper side thereof, for supporting himself at all times.

In spite of these precautions, there are unfortunate instances of breakage of the sheets under conditions of abuse during installation.

The present invention comprises means of reducing the danger of breakage of sheets of corrugated asbestos cement board or the like during installation or of reducing the danger of serious injury to a workman upon the roof at the time of breakage. The invention comprises also means of flashing the joint between overlapping sheets of building material. Other objects and advantages comprised within the invention will be evident from the description that follows.

A preferred embodiment of the invention will be described in connection with the drawing, in which

Fig. 1 shows a perspective view of a portion of my improved roof partly broken away for clearness of illustration;

Fig. 2 shows a sectional view at the joint portion between adjacent sheets in direction transverse to the length of the strip; and

Fig. 3 shows a cross sectional view of a form of flashing strip that is preferred at this time.

There are shown spaced, approximately parallel beams 1 and 1', suitably flanged beams such as channel irons, constituting a part of the supporting substructure above which are placed sheets 2 of roofing material.

A suitable type of sheet for the present purpose is one made by forming a wet mixture of asbestos fibres and Portland cement, shaping and strongly compressing the composition into a corrugated sheet, with attendant elimination of excess water, and then allowing the cement in the shaped composition to harden.

The sheets of roofing material overlap at their side portions to define therebetween lapped joints 3 extending parallel to the length of the corrugations, as illustrated.

Disposed between the lapped portions, that is, within the joints and extending therealong, are the reenforcing and flashing strips 4 of convex upper surface and concave lower surface. These strips are secured at both ends to the supporting substructure, as, for example, by means including bolts 5, extending through properly spaced holes in the strips and having heads 6, suitably saddle-shaped, engaged above the said holes. The bolts are secured to the substructure, as by J-clips 7 and 8.

Each of the sheets and reenforcing strips bridge the space between two or more of the said beams and are supported thereover.

If the bolt were secured only to the lower flange of the channel iron support by the clip 7, the reenforcing strip, under heavy loading, might become disengaged from the substructure, as by being bent in the middle and slipped at its ends away from the channel iron beams. To avoid this possibility, the clips 8 secure the bolts and, therefore, the reenforcing strips to the substructure at a position adjacent to the roofing material that is the lower sheet at the joint. With such attachment to the uppermost portion of the substructure, loading the sheet 2 at a position between adjacent beams does not cause disengagement but actually increases the tightness of the engagement to beams 1 or 1'.

To promote proper flashing, close the joint against entrance of air or moisture, and to minimize transmission of vibrations or shock from one sheet to the adjacent overlapping sheet, the strips 4 advantageously include layers 9 and 10 of vibration-damping flashing material applied, respectively, to the convex and concave faces of the metal member constituting the core of the finished reenforcing and flashing strip. The elements 9 and 10 may be of any suitable material resistant to moisture and air, such as a heavy coating of asphalt or, preferably, strips of the type of asphalt-impregnated rag felt. They should be inelastic and yieldable.

Preferably, the strips of felt or the like applied to opposite faces of the metal reenforcing strips extend laterally beyond the side edges of the metal and are adhered to each other, as at positions 13 and 14, Fig. 3, to provide a seal extending over the edges of the metal and protecting it from the atmosphere.

To provide for minor and accidental irregu-

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larities that may exist in the surfaces being flashed, there may be applied to the side edges of the reenforcing and flashing strip a layer 11, say of bulb-shaped cross section, of weather-resistant deformable material such as asphalt, the thickness of the layer being greater than the thickness of the reenforcing strip in the central portion thereof. When the assembly is made, this plastic deformable material closes the space between adjacent sheets and is caused to conform to minor irregularities of surface thereof.

To improve the flashing obtained, the curvature of the metal strips 4 is made suitably greater than the curvature of the overlapping portions of the sheets 2, so that the drawing together of the adjacent portions of the sheets, as described below, causes concentration of pressure upon the flashing strip at the ridge and edge portions thereof. Since the strip 4 is suitably constructed of a springy metal, such as steel, there is thus provided a resilient or springy flashing between adjacent sheets, adapted to distribute stresses and minimize the tendency to breakage or leakage.

It will be noted that the fastening means, including the bolt 5, do not extend through the sheet that is uppermost (or outermost) at a joint portion. On the other hand, this sheet at the said joint portion is secured to the lower (or inner) sheet by means such as bolts 12, extending loosely through the upper sheet, as, for example, through an oversize hole therein, and engaging the lower sheet tightly.

Thus, a self-tapping (self-threading) bolt, preferably, with a head of non-corrodible exterior, as of lead or the like, is inserted at its stem portion through an oversize hole in the upper sheet and then threaded into the lower sheet. In this manner, the hole through the lower sheet is no larger than the tapping portion of the bolt, and there is a tight non-leaking engagement between the stem of the bolt and the lower sheet. At the same time, the looseness of fit of the bolt in the hole of the upper sheet makes possible limited lateral movement of one sheet with respect to the other and, thereby, eliminates strains that would otherwise be set up by such factors as expansion with change in temperature or change in moisture content of the sheets.

It will be noted, also, that the bolts 12 engage the lower of the sheets, at the joint portion, on the side of a corrugation remote from the side edge of the lower sheet, so that the slope of the lower sheet at the locality of the engagement is away from the side edge of the lower sheet, thus promoting drainage, away from the said edge, of water that may pass through the oversize hole in the overlying sheet.

The roof constructed as described contains essentially a metal skeleton including beams and reenforcing strips extending transversely with respect to each other. It will be noted also that the reenforcing strips are disposed at the side portions of the sheets of roofing material, this being the position of greatest danger of breaking during assembly.

Furthermore, the reenforcing strips are concealed from view from a position either above or below the roof, the exposure, if any, being limited to the relatively inconspicuous ends of the strips.

When the construction of the type described is used for a vertical wall of a building, the strips disposed in the joints serve largely as improved flashing and clamping members.

The details that have been given are for the purpose of illustration, not restriction, and variations within the spirit of the invention are intended to be included within the scope of the appended claims.

What I claim is:

1. An assembly including a substructure, corrugated sheets supported thereupon and overlapping at their side portions to form lapped joints extending between adjacent sheets, in direction parallel to the length of the corrugations, and springy concavo-convex reenforcing and flashing strips extending continuously between the overlapping portions of adjacent sheets, the curvature of the said strips being normally greater than the curvature of the overlapping portions of the sheets, whereby resilient close contact between the side edges of the reenforcing and flashing strips and the said overlapping portions is obtained.

2. A roof including supported sheets of roofing material overlapping at their edges to form joints between adjacent sheets and springy reenforcing and flashing strips, of cross section normally non-conforming to the said adjacent portions, disposed in the joint, extending continuously therein, and providing springy flashing therefor.

3. An assembly including a substructure, corrugated sheets supported thereupon and overlapping at their side portions to form lapped joints extending between adjacent sheets, in direction parallel to the length of the corrugations, springy concavo-convex reenforcing and flashing strips disposed between the overlapping portions of adjacent sheets and extending continuously in the joint therebetween, and vibration-damping material of the type of felt applied over opposite faces of the said strips.

4. An assembly including a substructure, corrugated sheets supported thereupon and overlapping at their side portions to form lapped joints extending between adjacent sheets, in direction parallel to the length of the corrugations, springy concavo-convex reenforcing and flashing strips disposed between the overlapping portions of adjacent sheets and extending continuously in the joint therebetween, and deformable weather-resistant plastic material of the type of asphalt applied to the side edges of the said strips in thickness greater than the thickness of the strips, whereby contact and flashing of the edges of the strips with the sheets of roofing material is promoted.

5. A structural assembly including supported corrugated sheets of building material overlapping at their side portions to form lapped joints extending between adjacent sheets, in direction parallel to the length of the corrugations, and fastening members of the type of self-tapping bolts extending through the lapped portions of the sheets that are outermost at the joints and engaging in tight non-leaking manner the lapped portions of the inner sheets.

6. A structural assembly including supported corrugated sheets of building material overlapping at their side portions to form lapped joints extending between adjacent sheets, in direction parallel to the length of the corrugations, and fastening members of the type of self-tapping bolts extending loosely through the lapped portions of the sheets that are outermost at the joints and engaging in tight non-leaking man-

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ner the lapped portions of the inner sheets, whereby lateral movement of the lapped portions of adjacent sheets with respect to each other is promoted and a non-leaking joint is provided.

7. A structural assembly including supported corrugated sheets of building material overlapping at their side portions to form lapped joints extending between adjacent sheets, in direction parallel to the length of the corrugations, and fastening members of the type of self-tapping bolts extending loosely through the lapped portions of the sheets that are outermost at the joints and engaging in tight non-leaking manner, the lapped portions of the inner sheets at positions on the sides of corrugations remote from the edges of the said inner sheets, whereby drainage in the localities of the fastening means is caused to be in direction away from the edges of the inner sheets.

8. A roof including a supporting substructure comprising spaced approximately parallel beams, sheets of roofing material placed thereabove, bridging each a space between two of the said beams, and overlapping at their side portions to form lapped joints between adjacent sheets, reenforcing strips disposed within the said joints and bridging each a space between two of the said beams, and means securing the reenforcing strips at both of their ends to the said beams.

9. A roof including a supporting substructure comprising spaced approximately parallel beams, sheets of roofing material placed thereabove, bridging each a space between two of the said beams, and overlapping at their side portions to form lapped joints between adjacent sheets, reenforcing strips of convex upper surface and concave lower surface disposed within the said joints and bridging each a space between two of the said beams, and means securing the reenforcing strips at both of their ends to the uppermost part of the said beams, whereby displacement of the ends of the strips with respect to the said uppermost part of the beams is prevented.

10. A reenforcing and vibration-damping member adapted for use as one of the flashing strips in the assembly described in claim 6, the said member comprising a narrow metal strip of concavo-convex cross section and yieldable vibration-damping and flashing material applied to opposite faces thereof.

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