March 10, 1953 A. B. HAMMITT ET AL 2,630,892

BUILDING CONSTRUCTION AND MEANS FOR ERECTING THE SAME

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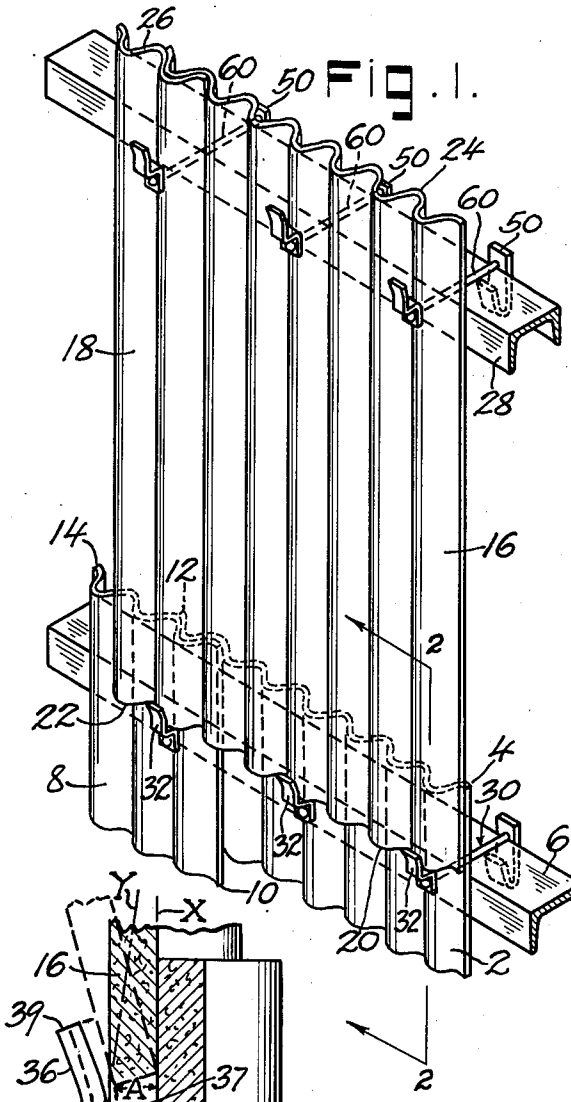


Fig. 1.

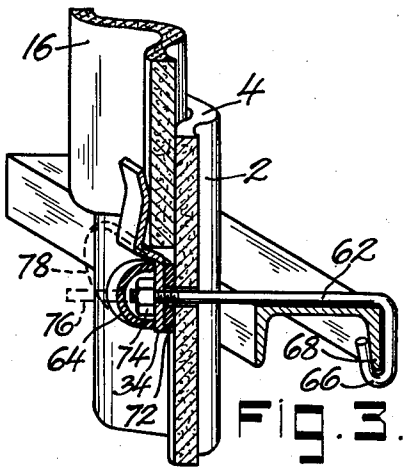


Fig. 3.

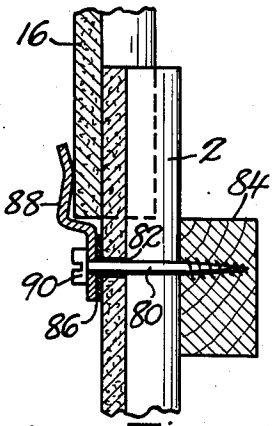


Fig. 4.

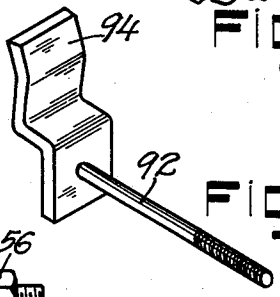


Fig. 5.

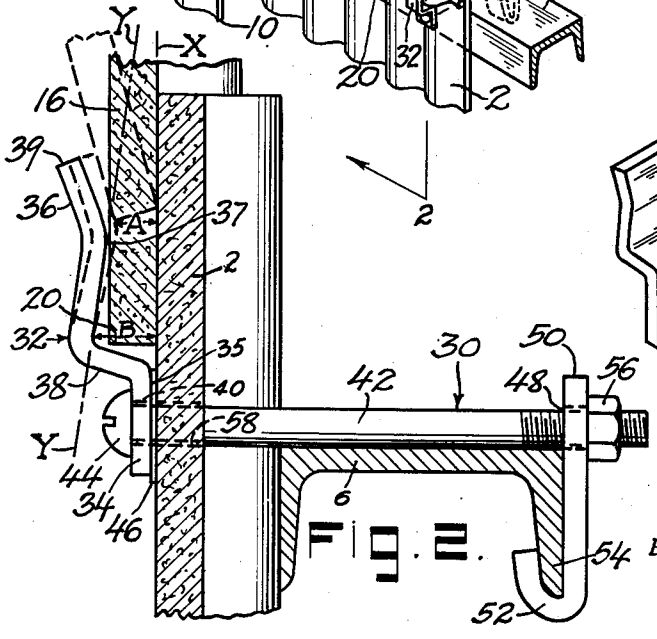


Fig. 2.

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BUILDING CONSTRUCTION AND MEANS FOR ERECTING THE SAME

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Application July 19, 1948, Serial No. 39,508

1 Claim. (Cl. 189—86)

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This application is a continuation-in-part of our co-pending application, now abandoned, Serial No. 726,263, filed February 4, 1947.

Our invention relates to roofing and siding constructions wherein sheets of material are arranged in overlapping courses upon the structural framework of a building. In particular, our invention relates to novel means and methods for positioning and securing such sheet material in place.

In our copending applications Serial Nos. 642,636, filed January 26, 1946; and now abandoned applications 645,856, filed February 6, 1946; 667,682, filed May 6, 1946; 676,563, filed June 13, 1946 and 693,410, filed August 28, 1946, we have shown and described constructions and methods for securing sheet material to the structural framework of a building by workmen located on the exterior of the building. These inventions are of particular advantage in applying sheet material to the roof of a building where the workmen can then stand on the roof and do not need any scaffolding. While the inventions of said applications are also adapted for use in applying sheets of material as siding to the vertical walls of a building, it is necessary in using these and other forms of fastening means heretofore provided to provide a scaffolding located on the exterior of the building for supporting the workmen. Such a scaffold is required in order to permit fastening means to be inserted and tightened adjacent lower or overlapping edges of the sheets and at a distance too great to be reached by workmen located in the interior of the building or standing on the girts of the building framework.

In accordance with the present invention, constructions are provided which serve to eliminate the need for scaffolding in positioning and securing siding to the vertical walls of a building. With this construction workmen can stand on the horizontal girts of the framework and perform the operations necessary for positioning and securing the sheet material in place. The time and labor required to construct and move the scaffolding are thus saved, and the cost of applying the siding is considerably reduced. The present invention also insures accurate positioning of the sheet material and speeds up the application thereof to the building framework. The number of holes formed in the sheet material to secure it in place is also reduced and the holes required are positioned so as to be substantially protected by adjacent sheets whereby the danger of leakage is practically eliminated.

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One of the objects of the invention is to provide novel means for positioning and securing sheet material to the framework of a building.

Another object of our invention is to reduce the cost of applying sheet material to a building.

A particular object of our invention is to provide novel fastening means which may be applied to sheet material by workmen standing on the girts of a building framework.

These and other objects and features of our invention will appear from the following description thereof in which reference is made to the figures of the accompanying drawing.

In the drawing:

Fig. 1 is a perspective of a portion of the side wall of a building embodying our invention;

Fig. 2 is an enlarged vertical sectional view of a detail of the construction taken on the line 2—2 of Fig. 1;

Fig. 3 is a perspective of a portion of a structure illustrating an alternative embodiment of our invention;

Fig. 4 is a vertical sectional view of a further alternative form of our invention; and

Fig. 5 is a perspective of an alternative form of fastening means embodying our invention.

In that form of our invention illustrated in Figs. 1 and 2, the sheet material employed consists of corrugated cement-asbestos sheets which ordinarily are approximately 42 inches in width and from 6 to 11 feet in length. However, it will be apparent that other sizes, forms and types of sheet material, whether corrugated or flat, may be used in the practice of our invention.

As shown in Fig. 1, the sheet 2 is positioned with its upper edge 4 located approximately 6 or 8 inches above the girt 6 to which it is secured. A similar sheet of material 8 is arranged with its vertical edge 10 overlapping the edge 12 of the sheet 2 and with its upper edge 14 positioned in alignment with the upper edge 4 of the sheet 2. The sheets 2 and 8, together with other sheets arranged in a similar manner, form a lower course of the siding, whereas sheets 16 and 18 form an upper course of the sheet material and are positioned so that the lower edge 20 of the sheet 16 overlaps the upper edge 4 of the sheet 2 and the lower edge 22 of the sheet 18 overlaps the upper edge 14 of the sheet 8. The upper edges 24 and 26 of the sheets 16 and 18 respectively are positioned so that they extend 6 or 8 inches above the girt 28.

The sheets are held in place by fastening means which have a securing element 30 that extends through the sheets of a lower course and into

retaining engagement with the framework of the building and are provided with an outer retaining element 32 which bears against the sheets of both a lower and an upper course to secure the sheets in place.

As shown in Figs. 1 and 2, the retaining element 32 of the fastening means is in the form of a metal member having a lower portion 34 for engagement with the outer surface of a sheet of a lower course and having an upper portion 36 for engagement with the outer surface of a sheet of an upper course. The portions 34 and 36 are connected by an offset 38 which serves to support and position the sheet of an upper course.

The portion 34 has an opening 40 therein through which a bolt 42 extends to serve as the securing element of the assembly. The head 44 of the bolt 42 bears against the outer face of the lower portion 34 of the retaining element whereas a lead or other sealing washer 46 is located between the portion 34 of the retaining element and the outer face of the sheet 2. The inner end of the bolt 42 extends through the opening 48 in a conventional toe clip 50 which has a lower hooked portion 52 embracing the downwardly facing edge of the web 54 of the girt 6. A nut 56 engages the inner end of the bolt 42 and serves to hold the toe clip 50 in place while drawing the head 44 of the bolt into securing engagement with the lower portion 34 of the retaining element 30.

When the nut 56 is drawn up tightly against the toe clip 50, it serves to draw the head 44 of the bolt into forcible engagement with the lower portion 34 of the retaining element 30 to hold the upper portion of a sheet of a lower course in firm contact with a girt of the building framework. At the same time the bolt serves to force the sealing washer 46 into engagement with sheet 2 so as to seal the opening 40 therein. The bolt also serves to force the upper portion 34 of the retaining element inward against the outer face of the sheet of the adjacent upper course so as to secure the lower edge of the latter sheet firmly in place.

As shown more fully in Fig. 2, the inner surface 37 of the upper portion 36 of the retaining element is inclined inward toward the plane in which the inner surface 35 of the lower portion 34 of the retaining element is located. Surface 35 therefore lies in the plane X whereas surface 37 lies in the plane Y when the retaining element is unstressed prior to the insertion of the lower edge of sheet 16 into engagement with the offset portion 38 of the retaining element. The upper extremity 39 of the portion 36 is inclined outward to receive and guide the lower edge 20 of the sheet 16 when the latter is inserted into place.

When bolt 42 is drawn up tightly to cause the surface 35 to bear firmly against the outer face of the sheet 2 of a lower course, the distance between the innermost part of the surface 37 and the outer face of the sheet 2, as indicated at A, is less than the thickness of the sheet 16 to be inserted into place in positioning an upper course of sheets. The spacing of the lower part of inner surface 37 directly above the offset 38 is indicated at B and exceeds the distance A and the thickness of the sheet 16. Therefore when the lower edge 20 of the sheet 16 is slipped downward into place, it first engages the outwardly turned extremity 39 of portion 36 and on being forced downward, the portion 36 is sprung outward from the dotted line position to the full line position of Fig. 2. The edge 20 may then be forced down so as to seat against the offset 38 of the retaining element whereas the portion 36 serves to urge the sheet 16 forcibly against the outer face of the sheet 2 insuring a tight contact between the adjacent faces of the sheets of adjacent courses. This formation of the retaining element also permits manipulation of the sheet 16 in forcing it downward and allows for possible variations in the thickness or contour of the corrugations of the sheets.

With this construction workmen standing on the ground may secure the lowermost course of sheets in place and thereafter they may secure each of the upper courses of sheets in turn to the structural framework while standing on the girts 6, 28, etc. In performing these operations, the workmen can readily reach over the upper edge of the sheets of the lower course to form the bolt holes 58 in the upper portion of the sheets 2 and 8 in position directly above the upper face of the girt 6. The bolts 42 are then passed through the openings 40 in the lower portion 34 of the retaining element and the lead washer or other sealing means 46 is applied to the bolt. The threaded inner end of the bolt is then passed through the bolt hole 58 in the upper portion of the sheet 2 so that it extends across the upper face of the girt 6. The toe clip 50 is then applied to the web 54 of the girt and to the inwardly extending end of the bolt passing through the opening 48 in the toe clip. Thereafter the nut 56 is applied to the bolt and drawn up tightly to hold the ice clip in place on the girt and to draw the lower portions of the retaining elements into forcible retaining engagement with the outer surfaces of the sheets of the lower course of material.

Ordinarily, three bolts and three retaining elements are applied to each sheet and are positioned so that the bolts pass through openings in the crown of the corrugations in the sheet of a lower course. As shown in Fig. 1, the bolts secure each sheet to the girt adjacent its opposite vertical edges and at a point substantially midway between its opposite vertical edges. When the sheets 2 and 8 and the remaining sheets forming a lower course in the assembly have been secured in place as described above, the sheets 16 and 18 of the next adjacent upper course are placed in position by slipping the lower edges 20 and 22 of the sheets downward into engagement with the outwardly turned upper extremity 39 of the retaining elements 30. The sheets are then forced downward into the space between the upper portion 36 of the retaining element and the outer face of the upper edge of the sheets of the lower course. The portion 36 is then sprung outward while the lower edge of each sheet is set in position against the offset portion 38 of the retaining elements. In this way each of the sheets 16 and 18 of an upper course are accurately placed so that their lower edges are in alignment and substantially parallel with the upper face of the girt 6. At the same time the lower edge of each sheet is held tightly against the outer face of a sheet of a lower course.

The retaining elements 32 are preferably drawn up tightly so that the inner surface 37 of the upper portion of the retaining element must be sprung or bent outward slightly in moving sheet 16 into place. However, the nut 56 on the bolt 42 need not be finally tightened to draw the retaining element forcibly against the outer face

of the lower edges of the sheets 16 and 18 until these sheets have been secured at their upper ends to the girt 28. The sheets may instead be placed with their lower edges supported on the offsets 38 of the retaining elements secured to girt 6 and loosely held in place by the upper portions 36 of the retaining elements. The upper end of the sheets 16 and 18 then projects above the girt 28 and the workmen may reach over the top of the sheet and drill bolt holes in the upper portion thereof while standing on girt 6 or 28. The fastening means 60 which hold the upper ends of the sheets 16 and 18 in place can then be passed through the bolt holes and secured to the girt 28. When thus positioned and loosely secured in place, the nuts 56 on the fastening means applied to girt 6 may be fully tightened to insure a rigid construction and assembly of the sheets.

The nuts 56 may of course be fully tightened before the bolt holes in the upper portion of the sheets are drilled or the sheets may be drilled on the ground and before they are raised into place if desired. In any event, the workmen applying and tightening the fastening means do not require any scaffolding from which to work since they may stand upon the girts 6 and 28 and reach over the upper edges of the sheets in securing the upper portions thereof in place and in forming holes therein for receiving the fastening means. Similarly, workmen standing on the girts 6 and 28 may guide the lower edges of the sheets of the next upper course into place so that they rest securely on the offset portions 38 of the retaining elements and behind the upper portions 36 thereof. The operation of tightening the nuts 56 to draw the fastening means firmly into engagement with the sheets does not require any manipulations which cannot be performed by workmen on the interior of the building.

In that form of our invention illustrated in Fig. 3, the securing element 62 of the fastening means is in the form of a member which is threaded on its outer end at 64 and provided on its inner end with a laterally extending portion 66 which is formed to embrace the inner flange 68 of the girt 70. A lead or other deformable washer 72 is placed over the projecting end 64 of the bolt and beneath the lower portion 34 of the fastening means. A nut 74 is applied to the projecting end of the bolt 62 and many be drawn up by workmen reaching over the upper edge 4 of the sheet 2 or reaching about the vertical edges of the sheet 16 to secure the sheets in place. After the nut 74 has been tightened in place, the projecting end 76 of the bolt 62 is cut off close to the nut and the exposed nut and cut portion of the bolt are covered or sealed to protect them from rusting or corrosion. As shown in Fig. 3, the washer 72 is provided with a laterally extending wing 78 and is deformable so that it may be turned over the cut end of the bolt and hammered or otherwise forced inward about the nut and end of the bolt to form a waterproof protecting cover for the nut and extremity of the bolt.

In the construction illustrated in Fig. 4, the fastening means embodies a securing element in the form of a driven screw or lag bolt 80 which passes through the opening 82 of the sheet 2 and into the wooden girt 84. A sealing washer 86 is located between the retaining element 88 and the outer face of the sheet 2 to seal the opening 82 while the retaining element, washer and both of the sheets 2 and 16 are urged toward the girt 84 by engagement of the head 90 of the drive screw with the outer face of the retaining element.

In the alternative construction illustrated in Fig. 5, the fastening means is formed as a unitary construction wherein the bolt or securing element 92 is welded or otherwise permanently attached to the retaining element 94 of the assembly.

In each of the embodiments of our invention shown and described, the retaining element is generally Z-shaped in form so that it has an offset portion with one retaining portion extending upward therefrom and another retaining portion extending downward whereby the oppositely extending retaining portions bear against the outer faces of the sheets of adjacent courses. The bolt or securing element acting on the retaining portion applies leverage to the upper retaining portion to urge the upper sheet inward against the lower sheet to secure both sheets in place. This construction in combination with the overlapping of the sheets serves to provide an effective weather-tight construction. Moreover, each sheet is supported directly by the girts adjacent its opposite ends so as to assure the maximum structural strength. At the same time the cost of the scaffolding heretofore required in applying such sheets is eliminated and the time lost in moving the scaffold along the girts and to different elevation can be used in productive work. Furthermore, the construction reduces the number of bolt holes and points of weakness and leakage in the assembly by providing for passage of the securing elements through the sheets only at points adjacent the upper ends thereof. Moreover, the location of the bolt holes and sealing therefor at points adjacent the overhanging lower edges of sheets of an upper course serves to afford further protection against leakage of the assembly.

While we have illustrated and described typical alternative embodiments of our invention, adapted for use in securing sheet material to the structural framework of a building, it will be apparent that other types of sheet material and numerous alternative forms of fastening means may be employed in the practice of our invention. Thus, the securing element may have any of various forms and may be secured to the girts as shown and described in any one or more of our applications referred to above. Similarly, the sealing means applied to the exposed portion of the securing element may be of the type shown and described in our applications Serial Nos. 676,562, filed June 16, 1946, now Patent 2,592,028, and 717,200, filed December 19, 1946. In view thereof, it should be understood that the forms of our invention herein shown and described are intended to be illustrative only and are not intended to limit the scope of our invention.

We claim:

A building structure embodying a plurality of horizontally extending framework elements, sheets of siding material applied to said elements on the exterior thereof and arranged in a plurality of horizontal courses with the lower edges of the sheets of an upper course overlapping the upper edges of the sheets of an adjacent lower course, the portions of said sheets thus overlapped being located adjacent to but above a horizontal framework element and each of said sheets having openings therein located adjacent and below the portions thus overlapped and above said framework element, bolts extending through said openings and across the upper face of said framework elements, framework engaging means on the inner end of each bolt and engaging and em-

bracing said horizontal framework element, and retaining means on the outer end of each bolt bearing against the outer faces of the sheets of adjacent courses, each retaining means having an off-set portion engaged by the lower edge of a sheet of an upper course and having a lower portion in extended parallel engagement with a sheet of a lower course with said bolt extending through an opening in said lower portion, the outer end of said off-set portion having an upwardly and inwardly inclined bearing portion engaging the outer face of a sheet of an upper course and a nut on said bolt drawn up against said framework engaging means and urging said bolt inward against the lower portion of said retaining means and holding the upwardly extending portion of the retaining means under stress so as to continually urge the overlapping portions of said sheets into engagement, the upper extremity of said upwardly extending portion being inclined outwardly to facilitate insertion of a sheet of said

upper course into engagement with said off-set portion of the retaining means.

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