July 22, 1947. W. S. MILES 2,424,410

DEVICE AND METHOD FOR SECURING CORRUGATED SHEETS

Filed Oct. 31, 1944

Fig. 1.

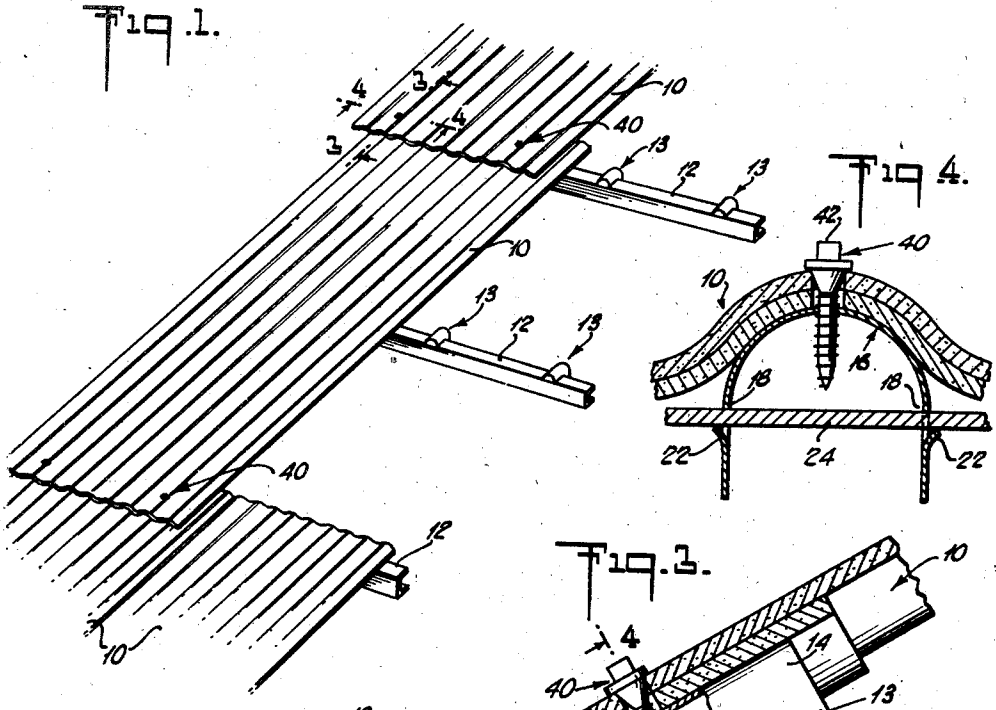


Fig. 4.

Fig. 2.

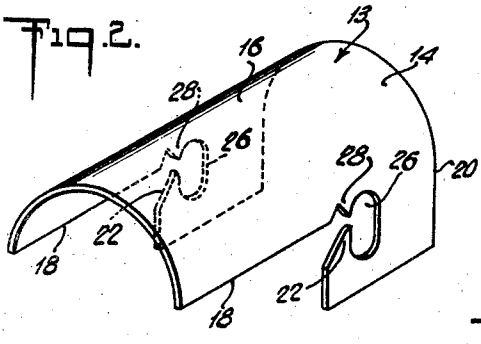


Fig. 3.

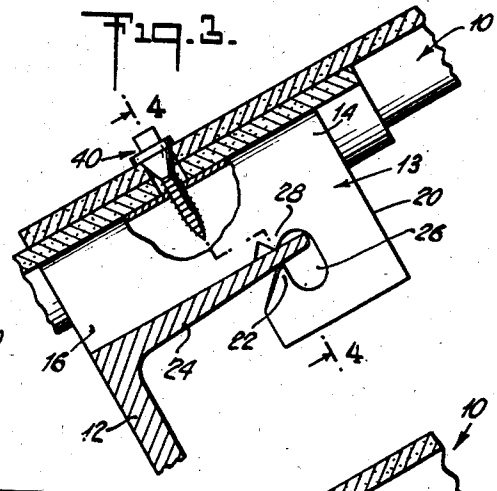


Fig. 6.

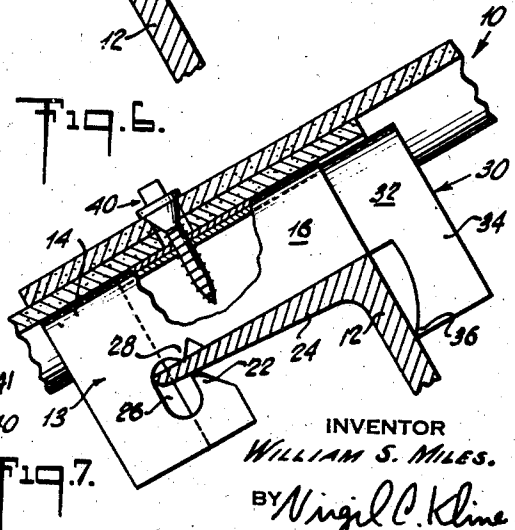


Fig. 5.

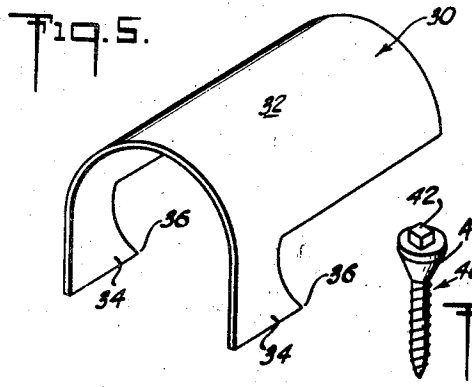


Fig. 7.

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DEVICE AND METHOD FOR SECURING CORRUGATED SHEETS

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12 Claims. (Cl. 108—33)

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The instant invention relates to an assembly of covering sheets on supporting members and, more particularly, to an assembly of this type and to the means and method for making it, in which the construction involves relatively large, heavy rigid sheets, such as those composed of asbestos and cement in a highly compressed and densified state, supported on flanged purlins.

Such covering sheets, widely employed for roofs and walls, are laid on spaced supporting beams or purlins with their corrugations running vertically of the wall or upwardly of the roof at substantially right angles to the purlins. Conventionally the sheets are secured by clips engaging the purlins beneath the purlin flanges, the clips being bolted to the sheets. A primary disadvantage of an erection of this type is the necessity of working from both sides of the structure, this requiring scaffolding or other support for the workmen who must operate beneath the roof or behind the wall to place the clips and draw up the bolts.

A principal object of the invention is the elimination of these disadvantages through the provision of a means and method whereby fastener receiving devices or clips may be placed in predetermined positions and in locking engagement with the purlins prior to the application of the covering sheets, and the covering sheets then laid and secured to the clips, the several operations being performed from one side of the roof or wall in an expeditious and economical manner.

Another object of the invention is the provision of a construction of the above type in which openings are formed for the reception of the fasteners in the sheets and clips after the covering sheets are laid, making exact positioning of the sheets unnecessary.

A further object of the invention is the provision of a securing member or clip for use in the above assembly, the clip being so constructed as to permit of its use on purlins or beams of various sizes and with the purlins supported to have their flanges extending either upwardly or downwardly of the roof or wall.

My invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description thereof which is to follow and to the accompanying drawings in which:

Fig. 1 is a perspective view of a partially assembled roof structure embodying the invention;

Fig. 2 is a perspective view on an enlarged scale of a securing member employed in the construction of Fig. 1;

Fig. 3 is a sectional view on an enlarged scale, with parts shown in elevation for clearness of illustration, taken on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view on an enlarged scale, taken on the line 4—4 of Fig. 1;

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Fig. 5 is a perspective view of an auxiliary member to be employed with the device of Fig. 2 in a modified arrangement of the supporting members shown in Fig. 1;

Fig. 6 is a view similar to Fig. 3, illustrating the modification employing the member of Fig. 5; and

Fig. 7 is a perspective view of a preferred type of fastener to be employed in the invention.

Referring now to the drawings, and particularly to Figs. 1–4 inclusive, my invention is illustrated as embodied in a roof structure. It will be appreciated, however, that it is equally well adapted for vertical walls, or other structures in which large covering sheets are carried by spaced supports. In the construction shown, corrugated sheets 10, preferably composed of a highly compressed and densified asbestos-cement composition, are supported on spaced purlins 12 to form the roof covering. These sheets are usually relatively large, say 42'' wide and 8' to 12' long, and are preferably supported adjacent both ends and at one or more intermediate points, as shown. The sheets are laid with their lower ends overlapping the sheets of the next lower course to provide a shingled effect, and with one longitudinal edge overlapping a previously laid sheet of the same course. Conventionally the covering sheets are secured to the supporting purlins at their ends and at the point where they cross the intermediate purlin.

In accordance with the instant invention, the sheets are supported from the purlins through the intermediary of fastener-receiving clips 13 comprising a member 14 (see Fig. 2) preferably made of relatively light gauge sheet metal, say of 14 or 16 gauge. Member 14 is stamped or otherwise formed to have an upwardly bowed or semi-cylindrical body section 16, adapted to nest within a corrugation of the covering sheet, as shown particularly in Fig. 4, the longitudinal edges 18 of the body section resting on the flange of purlin 12. Member 14 also includes hooked sections 20 projecting from edges 18 and extending downwardly and forwardly to define recesses 26 and prongs 22, the latter being adapted to engage the underside of purlin flange 24 when the member is mounted with the edge of the flange extending within recesses 26, as shown in Fig. 3. The longitudinal edges of body section 16, approximately opposite prongs 22, preferably include one or more teeth 28 adapted to bite into or frictionally engage the upper side of flange 24. Tongues 22 are suitably originally bent outwardly to some extent, as shown in Fig. 2, tongues 22 and teeth 28 defining therebetween a bite of somewhat less width than the thickness of the normal purlin flange at the point where it is engaged by the tongues and teeth. Member 14 is mounted on the purlin flange and shoved or driven home by relatively light taps of a hammer

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or the like until the edge of the flange engages the rear of recess 26, tongues 22 and teeth 28 biting into the surface of the flange sufficiently to prevent disarrangement of the member without the exertion of a substantial force. As the member is driven into position, tongue 22 yields to the extent necessary to accommodate the particular flange thickness. As will be appreciated, this construction permits the clip to be used without modification on flanges of different thicknesses.

In the more usual situation where the purlins are supported with their flanges 24 directed upwardly of the roof or wall, member 14 is used alone, as shown in Figs. 1, 3 and 4. Where, however, the purlins are positioned with their flanges 24 directed downwardly (see Fig. 6), an additional member 30 is employed in cooperation with member 14. Member 30 is stamped or otherwise fabricated of sheet metal or the like of similar character and gauge as member 14, and includes an upwardly bowed or semi-cylindrical body section 32, dimensioned to telescope or fit preferably within body section 16. Hooks 34 project from the lower edges of the body section adjacent one end thereof, the hooks including points 36 adapted to bear against the web of the purlin.

In the construction of Fig. 6, either member 14 or member 32 is first mounted on the purlin, and the other member then positioned with body section 32 within body section 16. The members are then telescoped together until they contact the web and the flange of the purlin respectively as illustrated.

Referring again to Fig. 1, clips 13, comprising either member 14 alone or members 14 and 30 in cooperating telescopic relationship, depending upon whether the purlin flanges extend upwardly or downwardly of the roof, are placed on the purlins at selected points in position to be received within the corrugations of the covering sheet. Suitably a templet or the like may be used to expedite the positioning of the clips. A roof sheet 10 is then laid to overlie the purlins and to overlap a sheet of the next lower course, and preferably the adjacent sheet of the same course. As will be understood, clips are mounted on the lower purlin spanned by the sheet prior to the laying of the sheet of such lower course, whereby these clips will underlie the lapped portion of the sheets. When the sheet is in position, holes of a suitable diameter for the reception of self-tapping screws or fasteners are drilled through the lapping portions and the body portions of the clips on the lower purlin and through the sheet and the body portion of the clips on the intermediate purlin. The openings through the covering sheet or sheets only are then enlarged by a second drilling operation to increase their diameter to such an extent as to loosely receive fasteners of the type referred to. Self-tapping screws of a suitable type, such as illustrated at 40 in Fig. 7, are inserted in the openings and tightened down, the screws cutting their own threads in the sheet metal of member 14, or both members 14 and 30, as the case may be. The enlarged opening in the covering sheets permits the shank of the screw to extend through the sheets without substantial contact. As shown in Fig. 7, screw 40 is preferably of a lead-headed type. That is, it includes a head having a covering 41 of lead or other suitable, relatively malleable material. As the head is drawn against the covering sheet by the turning action, the soft metal is pressed into the irregularities of the covering sheet adjacent the opening, to seal the same against the entry of moisture. Alternatively, conventional screw heads may be employed if desired, and sealed with putty or the like, in the manner previously employed in the art. Screw 40 preferably includes a wrench engaging portion 42 projecting above the lead covering.

The construction described fully meets the several objects of the invention. All operations are performed from the outside of the structure and with a minimum of labor. The clips lend themselves to adjustment for purlins of various types and dimensions, eliminating the need of carrying a stock of different sizes or preparing the clips specially for individual situations. Although in Fig. 3 member 14 is shown as extending the full width of the flange, it will be appreciated that the clips, when made up of member 14 alone or both members 14 and 30, serve equally as well on wider or narrower flanges. Due to the holding action of tongues 22 and teeth 28 the members are adequately locked on the flange against shifting during the application of the covering sheets.

Having thus described my invention in rather full detail, it will be understood that these details need not be strictly adhered to but that various changes and modifications may suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claims.

What I claim is:

1. A clip for fastening a corrugated covering sheet to a flanged support comprising a member including a curved body section with its edges adapted to rest on the flange of the support and its curved portion to project into a corrugation of the covering sheet, and a hooked section adapted to extend around said flange and including upwardly directed prongs to engage beneath said flange, said prongs being adjustable to accommodate flanges of different thicknesses, the member being formed of sheet metal of a character to be drilled for the reception of a self-tapping screw.

2. A clip for fastening a corrugated covering sheet to a flanged support comprising a body member including a semi-cylindrical body section adapted to project into a corrugation of the sheet with its edges resting on the flange of the support, said body section being formed of a sheet metal of a character to be drilled for the reception of a self-tapping screw, a hooked section adapted to extend around said flange and including upwardly directed prongs to engage beneath said flange, and teeth on the edges of said body section substantially opposite to said prongs.

3. A clip for fastening a covering sheet to a flanged support comprising a member including a crowned body section to rest on the flange of the support and a hooked section to extend around said flange and engage the lower side thereof, and a second member for telescopic engagement with said first member and having means for engaging said support on the opposite side from said flange.

4. A clip for fastening a covering sheet to a flanged support comprising a member including a crowned body section to rest on the flange of the support and a hooked section to extend around said flange and engage the lower side thereof, and a second member for telescopic engagement with said first member and having means for engaging said support on the opposite side from said flange, said members being made of sheet metal of a character to receive and hold a self-tapping screw.

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5. A clip for fastening a corrugated covering sheet to a flanged support comprising a member having a section adapted to rest on the flange of the support and project into a corrugation of the covering sheet, and having a hooked section to extend around said flange and including prongs to engage beneath said flange, and a second member for telescopic lapping engagement with said first member and having means for engaging said support on the opposite side from the flange, said members being of sheet metal of a character to receive and hold a self-tapping screw driven through the lapping portions thereof.

6. A clip for fastening a corrugated covering sheet to a flanged support comprising a member including a semi-cylindrical body section adapted to project into a corrugation of the covering sheet with its edges resting on the flange of said support, and a hooked section to extend around said flange and including prongs to engage beneath said flange, said edges of said body section having teeth for engagement with said flange, and a second member for telescopic lapping engagement with said first member and having means for engaging said support on the opposite side from said flange, said members being made of sheet metal of a character to receive and hold a self-tapping screw driven through the lapping portions thereof.

7. In a building construction including a flanged supporting purlin, a corrugated covering sheet resting thereon and a clip fastening said covering sheet to said purlin, said clip comprising a member including a body section resting on the flange of the purlin and projecting into a corrugation of the covering sheet, and a hooked section extending around said flange and having upwardly directed prongs engaging beneath said flange, and a screw member extending through said covering sheet and in threaded engagement with said body section at a point where it overlies said flange.

8. In a building construction including a flanged supporting purlin, a corrugated covering sheet resting thereon and a clip for fastening said covering sheet to said purlin, said clip comprising a member including a semi-cylindrical body section projecting into a corrugation of the covering sheet with its edges resting on said flange, and having a hooked section extending around said flange with prongs engaging beneath said flange, teeth on the edges of said body section substantially opposite to said prongs in biting engagement with said flange, and screw means extending through said covering sheet and in threaded engagement with said body section.

9. In a building construction including a flanged supporting purlin, a corrugated covering sheet resting thereon and a clip for fastening said covering sheet to said purlin, said clip comprising a member including a crowned body section projecting into a corrugation of said covering sheet with its edges resting on the flange of said purlin, and a hooked section extending around said flange and in engagement with the under side thereof, and a second crowned member in lapping engagement with said first member and having means for engaging said purlin on the side thereof opposite from said flange, and screw means projecting through said covering sheet and in threaded engagement with said members in the lapping portions thereof.

10. In a building construction including a supporting purlin, a corrugated covering sheet resting thereon and a clip for fastening said covering sheet to said purlin, said clip comprising a member having a semi-cylindrical section projecting into a corrugation of said covering sheet with its edges resting on said flange, and having a hooked section extending around said flange and having prongs engaging beneath said flange, teeth on the edges of said body section opposite said prongs in biting engagement with said flange, and a second member in telescopic lapping engagement with said first member, said second member having means for engaging said purlin on the opposite side from said flange, said members being made of sheet metal, and a screw means extending through a perforation in said covering sheet and in threaded engagement with said members in the overlapping portions thereof.

11. In a method of securing a corrugated covering sheet to a flanged support, the steps comprising locating a clip comprising a member having a semi-cylindrical body section resting on the flange of said support and having a hooked section including upwardly directed prongs engaging beneath said flange on said support, in a pre-determined position, laying a corrugated covering sheet to overlie said clip with said body section received within a corrugation of said sheet, perforating said sheet and body section inwardly from the outer surface of the sheet and in a continuous operation to define aligned apertures of relatively larger and smaller diameter, respectively, and driving a self-tapping screw through said aligned apertures into threaded engagement with said body section.

12. In a method of securing a corrugated covering sheet to a flanged support, the steps comprising locating a clip comprising a member having an upwardly bowed body section resting on said flange and a hooked section extending around and beneath said flange and engaging the under side thereof, on said support in a predetermined position, locating a second member of said securing device, comprising an upwardly bowed section of a dimension to telescope in said first member and a hooked section adapted to engage said support on the side thereof opposite from said flange, with its bowed section in lapping engagement with the bowed section of said first member, laying a corrugated covering sheet to overlie said securing device with said lapped bowed sections received within a corrugation of said sheet, perforating said covering sheet and bowed sections inwardly from the outer surface of the sheet and in a continuous operation to define aligned apertures of respectively larger and smaller diameter, and driving a self-tapping screw through said aligned apertures for threaded engagement with said bowed sections.

WILLIAM S. MILES.

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The following references are of record in the file of this patent:

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