Sept. 23, 1952 A. B. HAMMITT ET AL 2,611,459

FASTENING MEANS

Filed May 1, 1947 2 SHEETS—SHEET 1

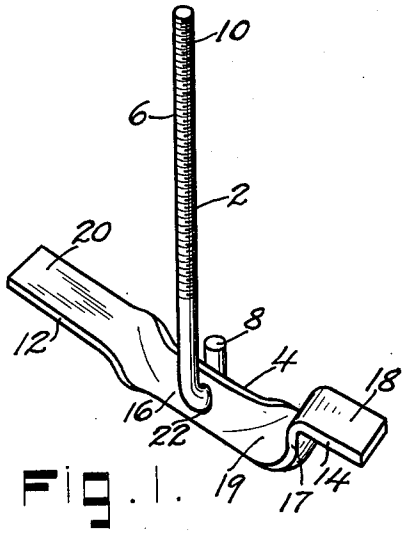


Fig. 1.

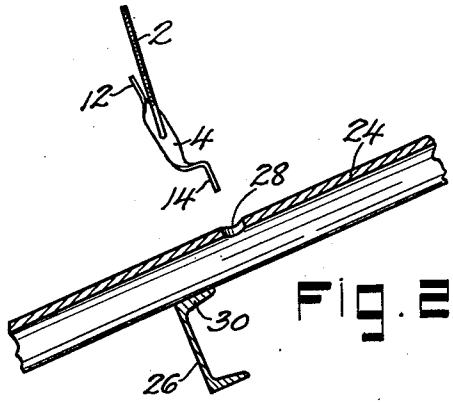


Fig. 2.

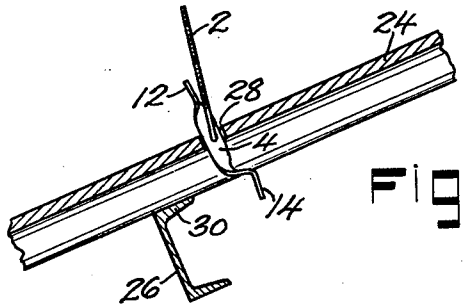


Fig. 3.

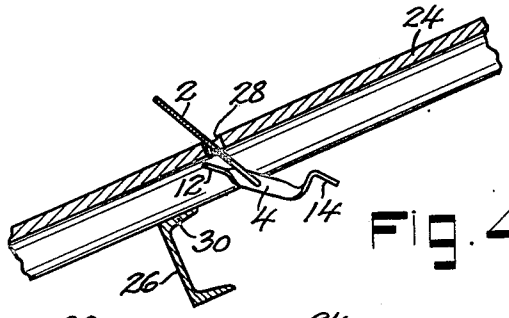


Fig. 4.

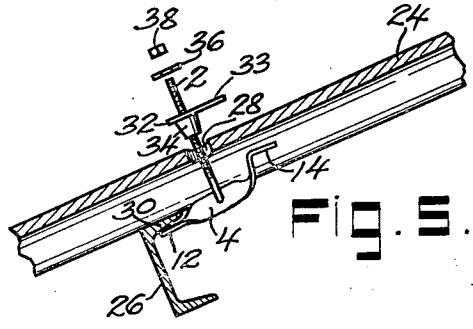


Fig. 5.

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FASTENING MEANS

Filed May 1, 1947 2 SHEETS—SHEET 2

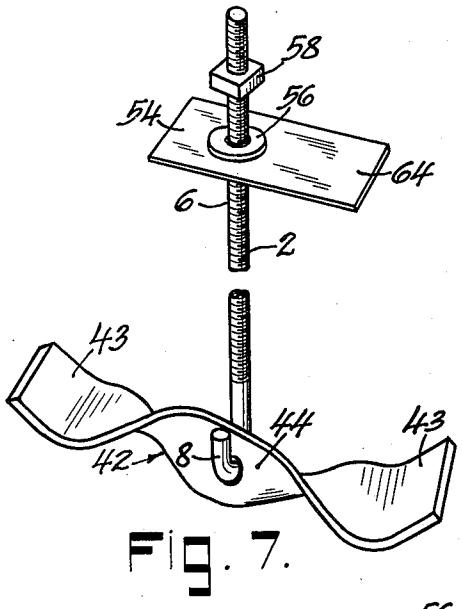


Fig. 7.

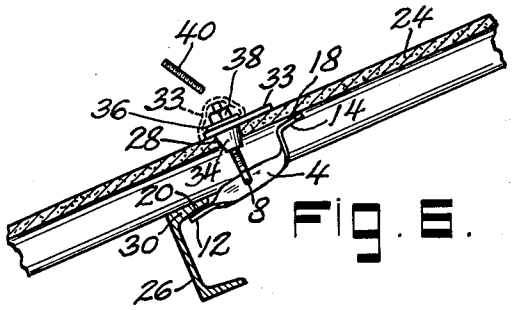


Fig. 6.

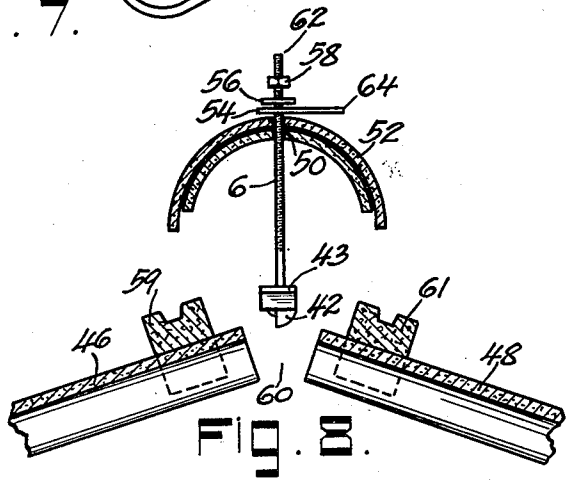


Fig. 8.

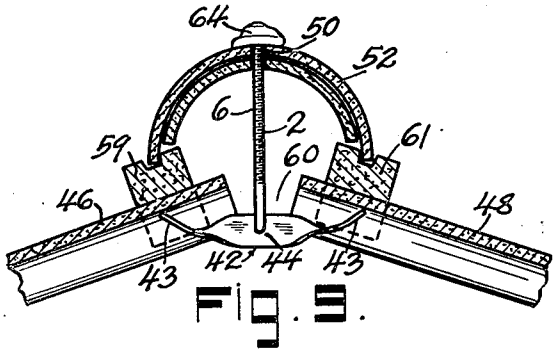


Fig. 9.

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UNITED STATES PATENT OFFICE

2,611,459

FASTENING MEANS

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Trenton, N. J.

Application May 1, 1947, Serial No. 745,142

1 Claim. (Cl. 189—35)

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Our invention relates to fastening devices, and more particularly to fastening devices for securing sheet material to structural framework elements.

Heretofore, sheet material has been secured to structural framework elements by means of conventional bolts and toe clips. The use of such fastening means has necessitated extensive scaffolding both within and without the building structure to which the material is to be applied, and thus has made the application of the sheet material a relatively expensive procedure.

Toggle type fastening means which have been previously designed to effectuate a similar purpose have not been entirely satisfactory. They have either been lacking in the requisite strength for the purpose or have not been formed so that a suitable engagement between the engaging surfaces of the toggle and the structural framework element occurs. Our device, however, is especially designed to accomplish this result.

Briefly, our invention contemplates the use of a toggle type fastening device comprising a bolt member and a new and novel type of toggle pivotally secured on one end of the bolt member. The toggle member is specially formed with surfaces adapted for simultaneously engaging the undersurfaces of a framework element and sheet material. These surfaces coact when the device is tightened up so as to retain the sheet material securely on the structural framework. The pivotal securing of the toggle member to the bottom portion of the bolt allows the toggle member to be positioned so that the fasening device may be easily inserted through openings formed through the sheet material adjacent the purlin or structural element. The toggle then may be maneuvered into a position from which it may be drawn up into a securing position entirely from the outside of the structure. The need for scaffolding and workmen on the interior of the building is thus eliminated altogether.

An object of our invention is to provide an improved means for securing sheet material to a structural framework.

A further object of our invention is to provide an improved toggle type fastening means for securing sheet material to a structural framework.

A still further object of our invention is to provide such fastening means which may be applied entirely from one side of a structural framework.

These and other objects and features of our invention may be readily perceived from the following description thereof in which reference is

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made to the figures of the accompanying drawings.

In the drawings:

Fig. 1 is a perspective view of the preferred form of our fastening device;

Figs. 2, 3, 4, 5 and 6 are sectional views through a building construction showing various steps in the application of our fastening device;

Fig. 7 is a perspective of an alternate form of our device; and

Figs. 8 and 9 are sectional views through a building showing various steps which may be employed in applying the alternate form of our fastening device.

Referring to Fig. 1 of the drawing, our device comprises a bolt member 2 and a toggle member 4 pivotally mounted thereon.

The bolt member 2, which may be formed of a metal or any other suitable material having the required strength, is preferably J-shaped in appearance and has a shank 6 with a reversely turned portion 8 integrally formed on one end thereof for receiving and pivotally securing the toggle member 4. Screw threads 10 are formed along substantially the entire length of the shank 6.

In order to provide suitable surfaces for engaging portions of the structural framework and the sheet material simultaneously, the toggle member 4 is formed on its opposite ends so as to provide a portion 12 for engaging the undersurface of a framework member and a portion 14 for engaging the undersurface of the sheet material. These members are preferably formed by twisting or otherwise forming the end portions of the toggle member 4 which lie on opposite sides of the central bolt receiving portion 16 of the toggle member. The engaging surfaces 18 and 20 of the end portions 12 and 14 lie in planes extending substantially at right angles to the plane in which the central bolt receiving portion 16 lies. Since the undersurface of the purlins or structural elements to which the sheet material is applied generally lie in a plane parallel to and spaced below the undersurface of the sheet material itself it is preferable that the upper engaging surface 18 of the sheet material engaging portion 14 of the toggle should lie in a plane above the plane of engaging surface 20 of the framework engaging portion 12. This is preferably accomplished by forming or further bending the sheet material engaging portion 14 so as to provide an off-set portion 17 which positions the sheet material engaging surface 18 slightly above the framework engaging surface 20 of the frame-

work engaging portion 12 when the fastening device is properly positioned. This construction serves to cause the engaging surfaces 18 and 20 to engage the sheet material and structural element throughout substantially the entire area thereof and affords a firm, rigid connection for securing the sheets in place. At the same time the pivotal connection between the toggle and bolt permits adjustment of the toggle so that the engaging surfaces will lie flush against the under surfaces of the sheet material and the structural framework member, even though the opening in the sheet material is displaced or the framework or sheet material is distorted or expand or contract unequally with changes in temperature.

The twisting of the material imparts a sufficiently greater strength to the toggle member 4 so that it may be formed from ordinary strip stock and still be endowed with sufficient strength to withstand the most severe stress and shock. We have also discovered that when the off-set portion 17 of the toggle is located directly adjacent the twisted end 19 of the central portion 16 so that the off-set forms in effect a continuation of the twist, the construction has remarkably greater strength. The twist 19 then reinforces the off-set 17 and prevents it from being straightened out when the fastening device is being drawn up in securing the sheet material in place.

It has also been found preferable to position the bolt member 2 in the bolt receiving portion 16 of the toggle member 4 so that it is nearer the purlin engaging portion 12. This enables the force transmitted through the bolt member 2 when the fastening device is tightened up to effect a firmer engagement between the purlin engaging portion 12 and the flange 30 of the purlin 26.

In forming the fastening device it is preferable to first form the threads 10 on the shank 6 of the bolt member 2 leaving a portion thereof extending below the threaded portion which is subsequently formed into the reversely turned toggle receiving portion 8. The toggle member 4 is then formed by twisting a strip of metal or otherwise shaping rigid material as above described. It is pointed out, however, that the toggle member may be formed by casting or by any other suitable method. An opening 22 of sufficient size to receive the toggle receiving portion 8 of the bolt member 2 is then formed through the bolt receiving portion 16 of the toggle member 4. The toggle receiving portion 8 of the bolt 2 is then passed through the opening 22 and bent upwardly or otherwise deformed so as to retain the toggle member 4 thereon. The toggle member 4 is thereby pivotally mounted on the bolt member 2 and will rotate around the reversely turned toggle receiving portion 8, but cannot twist sideways so as to slip off the portion 8. Although the toggle 4 may be so mounted that it may revolve in a relatively free manner by adjusting the width of the toggle receiving portion 8, we have found it preferable to secure the toggle member 4 to the bolt member 2 so that complete revolution of the same is prevented by contact between the surfaces 18 or 20 with the shank 6 of the bolt 2.

Reference to Figs. 2, 3, 4, 5 and 6 illustrates the manner in which the fastening device may be applied entirely from one side of the building structure. As shown, the sheet of material 24 is positoned on the purln 26. An opening 28 is then drilled through the sheet material adjacent the horizontally extending edge of the upper flange 30 of the purlin 26. The opening 28 should be

of sufficient diameter to permit the passage therethrough of the toggle member 4 and the toggle receiving means 8 of the bolt 2. In order to facilitate the insertion of the fastening device the toggle member 4 is rotated until it assumes a position in which the framework engaging surface 20 of the framework engaging portion 12 abuts against the shank 6 of the bolt member 2 and the sheet engaging portion 14 extends downwardly therefrom at a slight angle to said shank. The fastening device is then passed through the opening 28 as shown in Fig. 3 until it assumes the position shown in Fig. 4, the bolt member 2 is then drawn upward slightly so that the uppermost edge of the purlin engaging portion 12 contacts the under surface of the sheet of material 24 and is rotated or pivoted about the toggle receiving portion 8 into a purlin engaging position. The fastening device is then lowered and maneuvered into a position in which the purlin engaging portion 12 of the toggle member 4 engages the undersurface of the extending flange 30 of the purlin 26.

It may be noted that another advantage to be gained by preventing free rotation of the toggle member 4 on the bolt member 2 is to prevent the displacement of the toggle member 4 after the same has been maneuvered into a purlin engaging position.

A special sealing member 32 such as that described in our copending application Serial No. 676,562 filed June 13, 1946, having a deformable extending tab 33 is then passed over the externally projecting portion of the bolt member 2. The tapered body 34 of the sealing member extends downwardly into the opening 28 of the sheet material 24 to seal the space between the bolt 2 and the sides of the opening 28. A steel or iron washer 36 having a diameter exceeding the diameter of the opening 28 through the sheet material 24 is placed over the sealing member 32 and a retaining member or nut 38 is then threaded downward against the washer by means of the screw threads 10 of the shank 6. The bolt 2 is thus drawn up as the retainng member 38 is screwed downwardly on the shank 6 until the framework engaging surface 20 of the framework engaging means 12 lies flush against and firmly engages the under surface of the extending flange 30 of the purlin 26. The sheet material engaging surface 18 of the sheet engaging means 14 is at the same time forced upward against the under surface of the sheet material 24 while the tapered body 34 of the sealing member 32 is swedged into and completely seals the opening 28 formed through the sheet material 24 and about the shank 6 of the bolt member 2.

When the fastening device is securely tightened the portion 40 of the threaded shank 6 extending above the retaining member 38 is snipped off and the extending tab 33 of the sealing member 32 is folded over and pressed around the exposed end of the bolt, the washer 36 and the retaining member 38 so as to form a weatherproof seal therefor. In this manner complete application of the fastening device may be effected from one side of a structure, and costly scaffolding and labor heretofore located on the interior of the building is eliminated.

An alternate form of our invention particularly designed for use in applying ridge rolls to cover the gap between the upper edges of the sheets at the peak of a roof is shown in Figs. 7, 8 and 9 of the drawings. In this form of our invention the bolt member 2 and the reversely turned toggle

receiving portion 8 thereof are the same as described above. The toggle 42, however, is formed so as to present a symmetrical appearance with substantially identical sheet engaging portions 43 extending on opposite sides of the bolt receiving portion 44. As shown, the engaging portions 43 are formed with a slight upward curve so that a firm line engagement is effected with the undersurfaces of the roof sheets 46 and 48 when the fastening device is drawn up and tightened in place. The toggle member 42 is preferably formed by twisting the end portions of a strip of suitable metal in a manner similar to that disclosed in describing that form of our invention illustrated in Figs. 1 to 6 so as to form the engaging portions 43.

In applying this form of our invention, the fastening devices are passed through openings 50 formed in the ridge roll 52 at specified intervals and are positioned so that they are suspended from the center of the ridge roll with the toggle members 42 extending in a direction parallel to the edges of said ridge roll. The lead sealing members 54, the steel or iron washers 56 and the retaining members or nuts 58 are preferably applied before positioning the ridge roll on the roof sheets. The ridge roll with the fastening devices so positioned is then lowered onto filler strips 59 and 61 extending along the upper edges of the sheets 46 and 48 on opposite sides of the slot 60 extending longitudinally of the ridge of the roof between the adjacent edges of the sheets. As the ridge roll is lowered into place with the toggles 42 extending parallel to the slot 60 the toggles pass down below the under surfaces of sheets 46 and 48. The fastening devices are then turned at right angles to slot 60 or are otherwise maneuvered until the toggle portions 42 extend in a transverse direction to the ridge roll 52. The sheet engaging portions 43 of the toggles are then so positioned that they will engage said under surfaces when the fastening devices are tightened up. After making sure that the ridge roll 52 is resting properly on the filler strips 59 and 61, the fastening devices are tightened up so that a firm engagement is effected between the sheet engaging portion 43 of the toggles 42 and the undersurfaces of the roof sheets 46 and 48. The portions 62 of the shanks 6 extending above the retaining means 58 are then snipped off and the tabs 64 of the sealing members 54 are folded over and molded around the exposed end of the shank 6 and a firm, secure weathertight connection results.

The same or similar devices and methods may be used in securing overlapping sheets of sheet material. The engaging surfaces on the toggle member may be preformed so as to specially fit specifically shaped surfaces such as the lower surfaces of corrugated sheet material. These and

other variations which will not depart from the spirit of our invention may be readily foreseen. The forms shown and described herein are therefore intended to be illustrative only and it is not intended that the scope of our invention shall be limited thereby.

We claim:

A fastening device for securing sheet material to a structural framework comprising a bolt having a shank with threads on one end thereof, the opposite end of the shank being reversely turned through substantially 180° and presenting an extremity which is substantially parallel to and adjacent the shank, a toggle member formed of strip stock and having a central portion with an opening therein engaging the reversely turned end of the shank, said portion lying between said shank and parallel extremity and held against lateral tilting thereby so as to be movable in a single plane between the shank and parallel extremity, said toggle member having opposite ends connected to said central portion by a twisted part and presenting engaging surfaces adjacent and supported by said twisted part, said engaging surfaces extending lengthwise of the toggle member and in opposite directions from said central portion and lying in planes at right angles to said central portion in position to engage the inner surface of framework and sheet material when the threaded end of the shank is passed through an opening in the sheet material adjacent the framework, one of said engaging surfaces lying in a plane parallel to the plane of the other engaging surface but offset above the plane of the opposite end.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
450,127	Wrigley	Apr. 7, 1891
564,251	Long	July 21, 1896
736,586	Dougherty	Aug. 18, 1903
780,810	Payne	Jan. 24, 1905
1,168,257	Kennedy	Jan. 11, 1916
1,576,727	Deniston, Jr.	Mar. 16, 1926
1,648,927	Wurdack	Nov. 15, 1927
2,011,390	Bailey	Aug. 13, 1935
2,061,478	Pepin	Nov. 17, 1936
2,130,546	Hovey	Sept. 20, 1938
2,161,259	Lindsay	June 6, 1939
2,386,386	Doke	Oct. 9, 1945

FOREIGN PATENTS

Number	Country	Date
823,539	France	1937