July 30, 1968 G. H. BURKE, JR., ET AL 3,394,508

ROOF JOINT

Filed Feb. 28, 1966

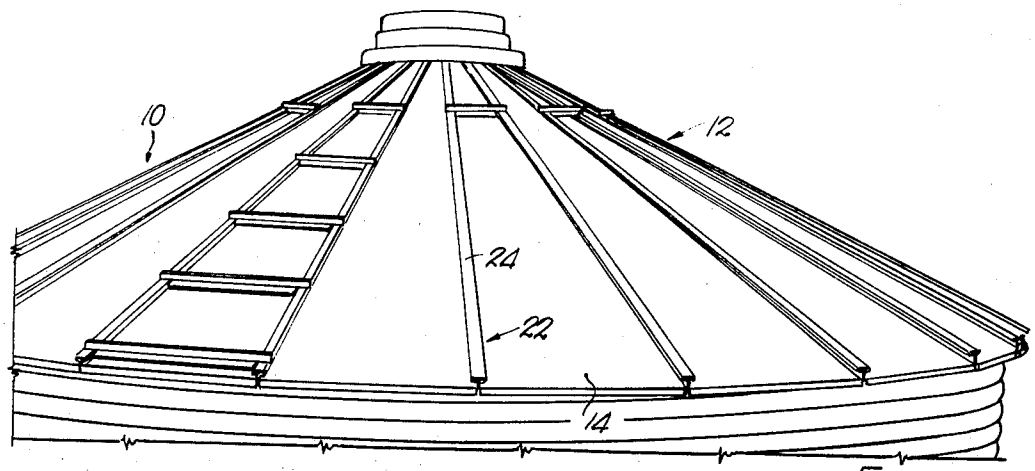


Fig. 1.

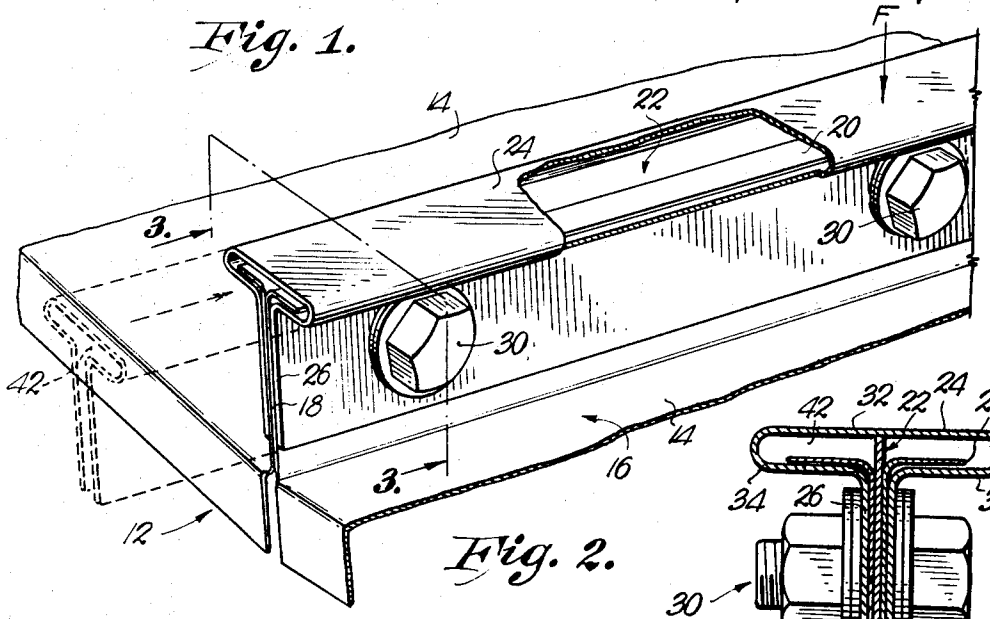


Fig. 2.

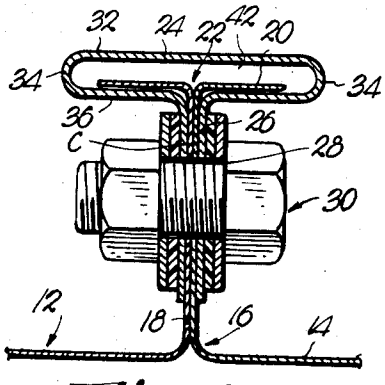


Fig. 3.

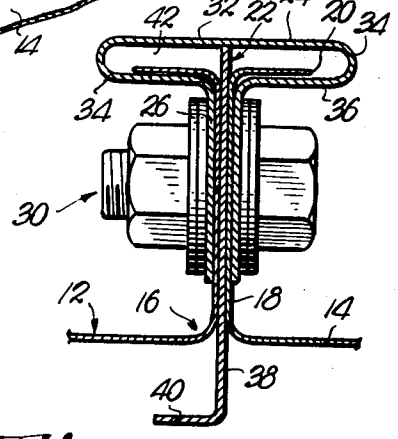


Fig. 4.

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ROOF JOINT

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ABSTRACT OF THE DISCLOSURE

A sheet metal roof joint having high strength characteristics by virtue of shifting the centroid to increase resistance to flexure through use of clamping bolts passing through not only the bights of U-shaped edges of the panels but through flanges that embrace and engage the bights, such flanges being integral with a tubular cap which houses the laterally extending legs of the U-shaped edges.

This invention relates to improved joints for interconnecting a series of panels, such as sheet metal building panels, to form a wall.

Light gauge metal is generally used to reduce the cost of the wall; however, since such material is easily flexed and deformed, it is traditional to utilize short spans of metal with reinforcement provided at the joint between the spans. As often as not, reinforcement is the controlling factor from a cost standpoint and, as a result, it is not economical to provide adequate safety factor to cover all eventualities; for example, reinforcement sufficient to prevent permanent deformation of the roof it a workman were to leap from an adjacent building and land in the center of a sheet metal panel.

It is, therefore, the primary object of this invention to provide an improved joint with a resultant structure having the centroid or center of gravity of a transverse section of the interconnected panels shifted away from the panels so that when the latter are put into tension by longitudinal flexing of the joint, the moment arm through which the tensile strength of the panel acts is increased, thus increasing the resistance to such flexure.

As a corollary to the foregoing object, it is an important aim of this invention to provide such a joint having the edges of proximal panels completely housed by a cap spaced from the panel causing the edges to be weather-proofed and the centroid of a transverse section of the interconnected panels to be shifted away from the panels.

Another important object of this invention is to provide a tubular cap with a pair of flanges thereon presenting a T-shaped channel for housing a pair of U-shaped corresponding edges of proximal building panels to the end that, when the flanges and edges are clamped together, the cap, the flanges, the edges and panels will operate together as a single unit for protection from weather and excess flexure.

Yet another object of this invention is to provide a joint which increases the over-all strength of the structure without additional cost and without loss of simplicity in the design thereof.

In the drawing:

FIGURE 1 is a fragmentary, perspective view of a building having a top wall embodying the improved roof joint of the present invention;

FIG. 2 is an enlarged, fragmentary, perspective view of one joint of the wall shown in FIG. 1;

FIG. 3 is a cross-sectional view taken along line 3—3 of FIG. 2; and

FIG. 4 is a cross-sectional view similar to FIG. 3 with the addition of a stiffener.

A building embodying the principles of the instant invention, broadly designated by the numeral **10**, may be constructed of any suitable material such as sheet metal. A roof or top wall **12** comprises a series of interconnected, elongated panels **14** provided with U-shaped, longitudinal edges **16**. Each edge **16** has a bight **18** and a leg **20** extending laterally from the bight **18**. Bight **18** of each edge **16** is disposed in side-by-side relationship to the bight **18** of a proximal edge **16**, thereby forming a joint **22**.

An elongated, tubular cap **24**, coextensive in length with the edges **16**, is provided at each joint **22** respectively for housing the corresponding legs **20**. Cap **24** has a top **32**, a pair of sides **34**, and a bottom **36** underlying respective legs **20**. A pair of opposed flanges **26** on bottom **36** of cap **24** embrace corresponding bights **18**. Bights **18** and flanges **26** have a series of aligned apertures **28**. Clamping means in the nature of a fastener comprising a bolt and nut assembly **30** is received through aperture **28** for holding the bights **18** and flanges **26** clamped together.

In assembling the joint, a T-shaped slot **42**, formed by the cap **24** and flanges **26**, is aligned with bights **18** and legs **20**. The cap **24** and flanges **26** are then shifted longitudinally as from the dotted-line position to the solid-line position shown in FIG. 2 until corresponding apertures **28** are in alignment.

If desired, as seen in FIG. 4, a stiffener **38** coextensive in length with bights **18** may be used. The stiffener **38** has a lateral extension **40**, and a series of apertures (not shown) aligned with apertures **28**. Stiffener **38** is held clamped between bights **28** by a nut and bolt assembly **30**.

As seen in FIG. 3, the center of gravity or centroid of the section shown, is at a higher elevation than panel **14** as designated by the letter C. Thus, if a force F were applied to cap **24**, as shown in FIG. 2, to thereby flex joint **22** downwardly, panel **14** would be in tension. The tensile strength of panel **14** has a substantial moment arm to act through, and since cap **24**, flanges **26** and edges **16** are clamped together, they act as an integrated unit to resist longitudinal flexing of the joint **22**.

In order for the tensile strength of panel **14** to be used to its greatest advantage, it has been discovered that it is desirable to shift the centroid of the transverse section of the interconnected panels illustrated in FIG. 3 away from panels **14**. Additionally, it has been found that flanges **26** and bights **18** must be clamped tightly together so that panels **14** will be put into tension when a force F is applied to cap **24** to cause a longitudinal, downward flexing of joint **22**. If bights **18** are not clamped tightly between flanges **26**, bights **18** and panels **14** will be free to shift longitudinally with respect to cap **24** and flanges **26** when the latter are flexed longitudinally and panels **14** will then not be put into tension and the joint **22** would be greatly weakened.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a building roof having a series of relatively light weight, sheet metal panels, each provided with a pair of opposed, U-shaped, longitudinal edges, each edge having an outwardly extending bight and a leg extending laterally from the bight, each bight of each edge being in side-by-side engagement with the bight of a proximal edge, forming a joint, and an elongated, tubular cap at each joint respectively, said cap being formed to present a substantially T-shaped space therewithin and being coextensive in length with the edges and housing the corresponding legs within said space, said legs terminating within the cap, with the free ends thereof disposed in spaced relationship from the inner perimeter of said space within the cap for facilitating assembly of the joint,

a pair of flanges on the cap embracing corresponding bights in engagement therewith; and

a plurality of bolt and nut assemblies spaced along each joint respectively, the bolts passing through the bights and the flanges for holding the bights and the flanges clamped together,

said flanges being integral with the cap, interposed between the panel and the leg of each corresponding edge respectively, and terminating in spaced relationship to the panels.

2. The invention of claim 1,

and a stiffener for each joint respectively coextensive in length with the bights and held clamped therebetween by said assemblies, each stiffener having a

lateral extension disposed on the inside of the panels opposite to said edges thereof.

References Cited

UNITED STATES PATENTS

1,145,202	7/1915	McFarland	52—82 XR
1,718,014	6/1929	Westlin	52—584 XR
2,103,407	12/1937	Dean	52—584 XR
2,867,857	1/1959	McCarthy	52—582

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