United States Patent

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Continuation-in-part of application Ser. No. 679,903, Nov. 1, 1967, now abandoned.

[54] PANEL AND BEAM ROOF ASSEMBLY FOR BUILDING STRUCTURE

2 Claims, 2 Drawing Figs.

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[51] Int. Cl. E04d 3/366
[50] Field of Search 52/465, 468, 469, 466, 467, 501, 464, 463, 461, 495, 470, 471, 472, 498, 273, 459, 460, 58

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ABSTRACT: A horizontal beam of inverted generally T-shpaed vertical cross section supports edge portions of generally horizontal roof panels on transversely oppositely depending base flanges of said beam with a beam central web portion projecting upwardly between said panel edge portions, preferably in the form of transversely spaced vertical webs. Water proof upper layers of shape self-sustaining material are portioned over the panel upper surfaces and have edge portions which project upwardly from the panel edge portions and terminate spaced upwardly from said panel edge portions. An inverted U-shaped cap is positioned over the beam webs and has downwardly projecting leg portions transversely outwardly of the edge portions of the panel upper layers, said leg portions terminating downwardly overlying said panel upper layers. Transversely spaced webs project downwardly from the cap internally thereof and hook engage the beam webs retaining the cap and beam in assembly, with angled guides preferably being formed on the cap for guiding the beam webs into such assembly. Thus, the upwardly projecting edge portions of the panel upper layers provide water barriers internally of the cap for preventing water from flowing transversely into the assembly and downwardly along the inner edges of the panels.

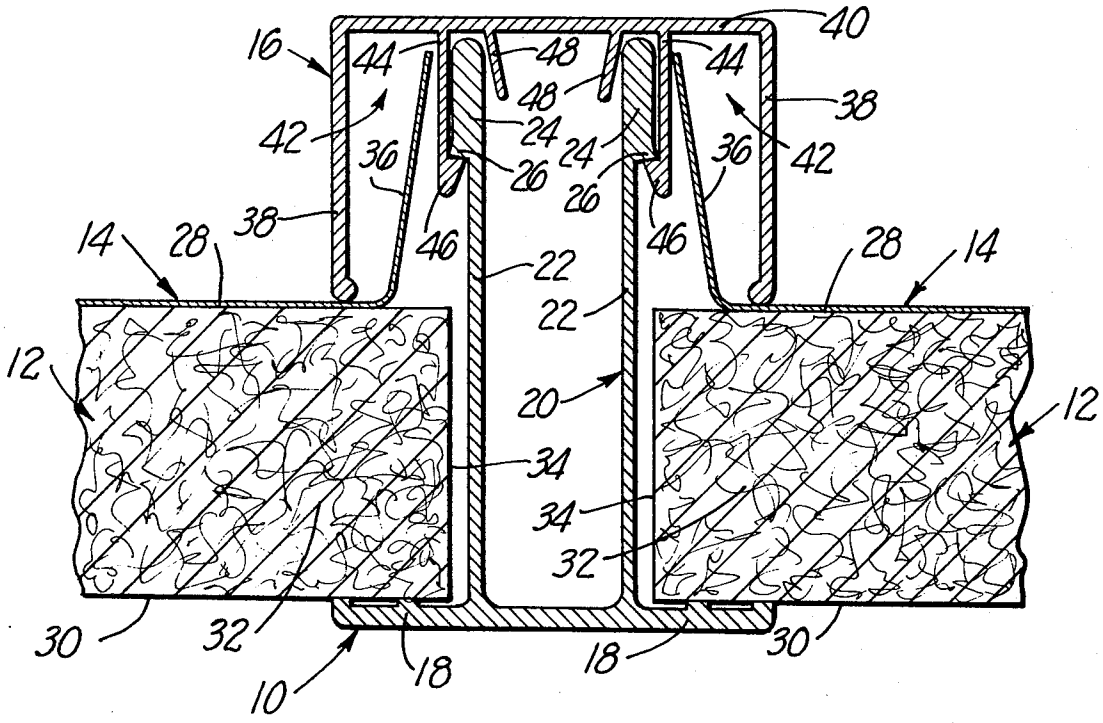


FIG. 1.

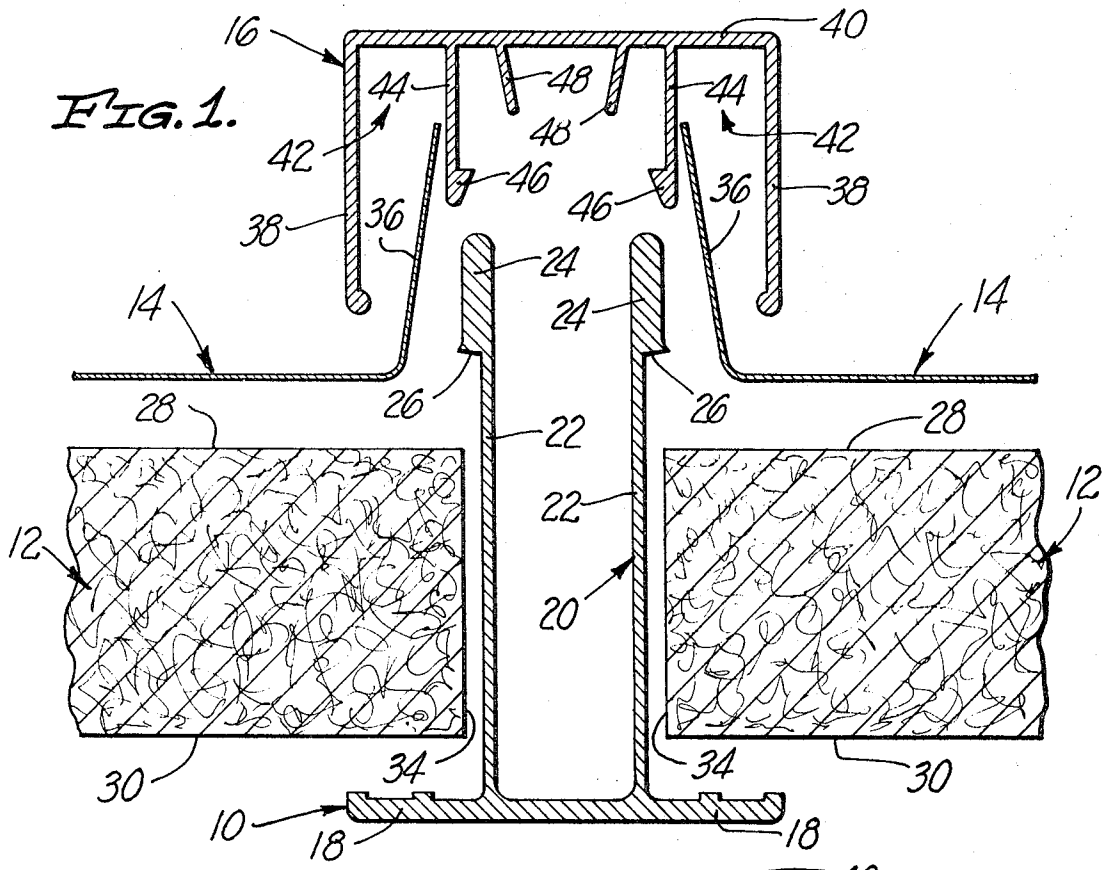
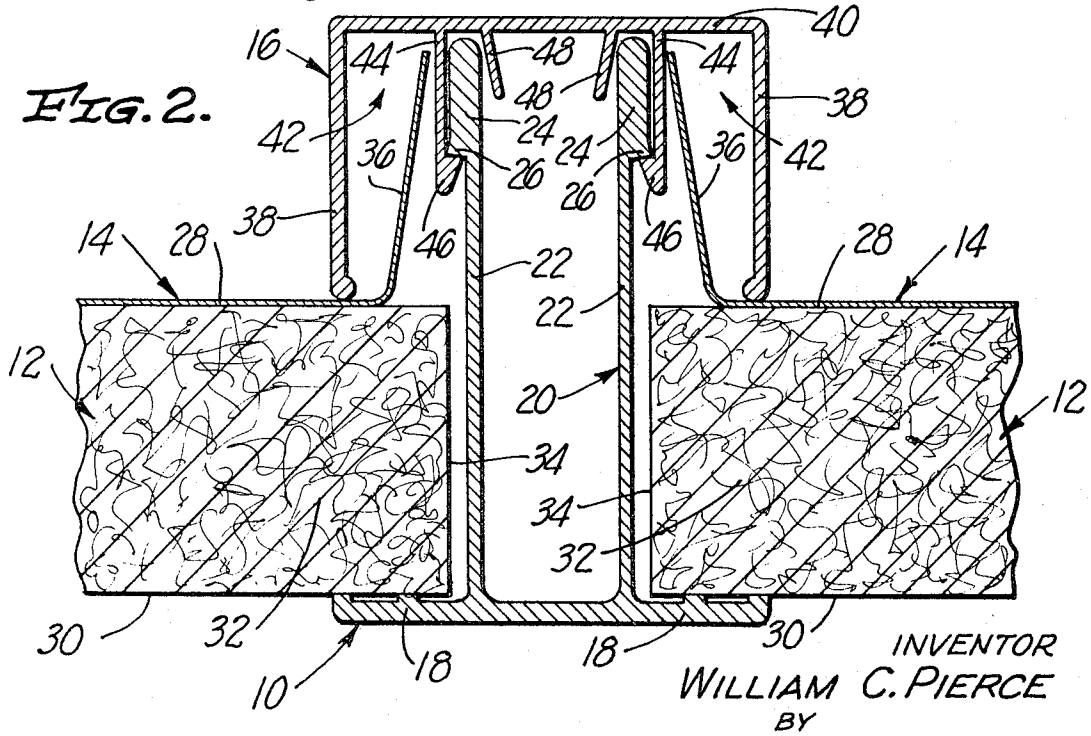


FIG. 2.



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PANEL AND BEAM ROOF ASSEMBLY FOR BUILDING STRUCTURE

CROSS-REFERENCES TO RELATED APPLICATIONS

This application is a continuation in part of my copending application Ser. No. 679,903, filed Nov. 1, 1967, now abandoned entitled, "Improved Roof Assembly for Building Structure."

BACKGROUND OF THE INVENTION

This invention relates to a panel and beam roof assembly for a building structure, and more particularly to a roof assembly particularly adaptable to a building structure of the type having the sidewalls thereof formed of a series of wall panels and the roof thereof formed by a series of roof panels. Even more particularly, this invention relates to a panel and beam roof assembly of the foregoing general character wherein a particular formation of beam and cap support the roof panels in a unique manner while providing specifically formed water barriers preventing water from flowing along the roof panels into the beam and cap assembly.

Recent trends in building structures and particularly those for use in the more temperate climates where ice and snow are not a problem have been toward panel construction. In such construction, the structure sidewalls are formed of a series of assembled wall panels, and, in many cases, the roofs thereof are similarly formed of a series of roof panels. Prior to the present invention, however, it has been necessary to make use of conventional roofing materials over the roof panels in order to provide the same with proper water proofing.

Thus, in the construction of these panel building structures, the usual practice has been to first assemble the wall panels to provide the structure walls, mount roof supporting beams on said walls and then assemble the roof panels supported by the beams. Thereafter, common roofing materials are applied over the roof panels to provide the necessary water proofing of the same, with the cost of these added roofing materials constituting a relatively high percentage of the overall structure cost. Furthermore, in order to assure proper application of the roofing materials over the roof panels, it has been necessary to make use of experienced workmen having the appropriate skills and following the usual, relatively time consuming roofing procedures.

OBJECTS AND SUMMARY OF THE INVENTION

It is, therefore, an object of my invention to provide a panel and beam roof assembly for a building structure wherein the roof is formed of a series of assembled roof panels having panel edge portions supported by a unique beam and cap assembly permitting water proofing upper layers to be merely positioned over the roof panels while guarding against water running into the beam and cap assembly which could cause water leakage downwardly through the overall roof assembly. According to the present invention, the water proofing upper layers positioned over the roof panels are formed of a shape self-sustaining material so that edge portions thereof overlying the beam supported panel edge portions may be formed projecting upwardly into the cap of the beam and cap assembly terminating upwardly spaced above the roof panels. Thus, the upwardly projecting edge portions of the water proofing layers within the beam and cap assembly form water barriers preventing water from flowing inwardly within said assembly and downwardly of the roof panel edge portions, thereby effectively water proofing the overall roof assembly without the requirement for usual roofing materials.

It is a further object of my invention to provide a panel and beam roof assembly for a building structure of the foregoing general character wherein the roof may be relatively quickly and easily assembled with a minimum of labor and time required. The supporting beams are inverted T-shaped in cross section with lower flanges thereof receiving and supporting the roof panel edge portions, followed by the water proofing upper layer application as hereinbefore discussed.

The final assembly operation is the mere positioning of the cap over the roof panel and beam subassembly, the cap telescoping over the water barrier forming edge portions of the water proofing upper layers so as to effectively complete a functionally sound and efficiently water proofing overall roof assembly.

It is still a further object of my invention to provide a panel and beam roof assembly for a building structure having the foregoing advantageous features of construction wherein special guides may be formed internally of the cap for aiding in obtaining a proper and secure assembly between the cap and beam. The beam preferably includes spaced webs projecting upwardly between the edge portions of the supported roof panels and into the telescoping cap with said beam webs terminating upwardly in hook portions interengaging with similar hook portions of downwardly extending cap webs. Angular guides are formed projecting downwardly from the cap spaced inwardly of the cap webs functionally operable to guide the beam webs into proper interengagement with these cap webs, thereby insuring proper final beam and cap assembly while maintaining proper positioning with the supported roof panels and the water proofing upper layers thereof.

Other objects and advantages of the invention will be apparent from the following specification and the accompanying drawing which are for the purpose of illustration only.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is an exploded, fragmentary, vertical sectional view of an embodiment of the panel and beam roof assembly of the present invention; and

FIG. **2** is a fragmentary, vertical sectional view of the finally assembly panel and beam roof assembly of FIG. **1**.

DESCRIPTION OF THE BEST EMBODIMENT CONTEMPLATED

Referring to the drawing, the embodiment of the panel and beam roof assembly for a building structure shown in FIGS. **1** and **2** includes a beam, generally indicated at **10**, roof panels, generally indicated at **12**, water proof layers or sheets, generally indicated at **14**, and a cap, generally indicated at **16**. The beam **10** and cap **16** are preferably formed of metal, such as aluminum extrusions, and the roof panels **12** may be formed of any of a multiplicity of usual materials but for economy purposes, are preferably of a composition material, such as comminuted organic materials retained together by a binder. The water proof layers **14** likewise may be formed as sheets of a multiplicity of common water proof materials including metals or plastics, preferably from aluminum sheets for water and corrosion resistance, the important characteristics of the water proof layers being that they will be not only water proofed, but shape self-sustaining so as to retain their shapes as formed for purposes to be hereinafter discussed.

More particularly to the configuration of the beam **10**, the beam extends lengthwise or longitudinally and is normally supported generally horizontally in the usual manner for supporting the overall roof assembly, that is, various portions thereof supported on the headers of intersecting or outside walls or totally supported by the header of an underlying wall, all within the knowledge of those skilled in the art and not illustrated herein. More important to the principles of the present invention, the beam **10** is inverted, generally T-shaped in transverse vertical cross section including oppositely transversely depending, generally horizontal base flanges **18** and a central vertically upwardly projecting web portion, generally indicated at **20**, comprised of transversely spaced, longitudinally and vertically upwardly projecting webs **22**. The webs **22** terminate upwardly in enlarged end portions **24** forming transversely outwardly exposed hook portions **26**, and the cross sections of the webs **22** are sufficiently thin to permit some transverse flexing of the webs during assembly of the beam **10** and the cap **16** as will be hereinafter discussed.

The roof panels **12** are of usual form having generally parallel, upper and lower face surfaces **28** and **30**, said panels being positioned extending generally horizontally depending transversely oppositely from the beam **10** with edge portions **32** supported with the lower face surfaces on the beam base flanges **18**. Also, in such positioning, edge surfaces **34** at the inner termination of the edge portions **32** are generally transversely adjacent the beam web portion **20** or the webs **22**.

The water proof layers **14** are positioned over the upper face surfaces **28** of the roof panels **12**, preferably merely lying thereon, and said water proof layers terminate transversely inwardly in upwardly projecting edge portions **36** which, in turn, terminate upwardly spaced above the edge portions **32** of the roof panels **12**. As hereinbefore described, the roof panels **12** are formed of a shape self-sustaining material so as to retain the upward projection of the edge portions **36** in the final assembly. Thus, as shown in FIG. **2** and as will be hereinafter discussed, the water proof layers **14** with their upwardly projecting edge portions **36** form water barriers preventing the flow of water inwardly along the upper surfaces of the water proof layers **14** and downwardly along the edge surfaces **34** of the roof panels **12**.

The cap **16** extends longitudinally along the beam **10** and is inverted, generally U-shaped in transverse vertical cross section having transversely spaced, downwardly projecting leg portions **38** connected by a longitudinally and transversely extending connecting portion **40**. The cap **16** in assembly as shown in FIG. **2**, is telescoped downwardly over the upper end portions **24** of the beam webs **22** with the leg portions **38** preferably closely overlying and preferably abutting the water proof layers **14** directly over the upper face surfaces **28** of the roof panels **12**. During this telescoping, the upwardly projecting and water barrier forming edge portions **36** of the water proof layers **14** are received in chambers **42** of the cap **16** transversely inwardly adjacent the leg portions **38** thereof as shown.

The cap **16** is also formed with transversely spaced, generally vertically downwardly extending webs **44** transversely outwardly adjacent the upper end portions **24** of the beam web **22**, that is, so positioned in the assembly as shown in FIG. **2**. These cap webs **44** project downwardly from the cap connecting portion **40** and include transversely inwardly exposed hook portions **46** which interengage with the outwardly exposed hook portions **26** of the beam webs **22** during the assembly. Again, the cross-sectional thicknesses of the cap webs **44** are sufficiently thin so that some transversely outward flexing can take place during the assembly of the cap **16** and beam **10** so that transverse flexing of either or both of the beam webs **22** and the cap webs **44** will accomplish the secure interengagement for retaining the cap on the beam as shown.

Finally, guide webs or flanges **48** are formed on the cap **16** projecting downwardly from the cap connecting portion **40** spaced transversely inwardly a determined distance from the cap webs **44** and angling transversely inwardly in their downward projection. The guide webs **48** being only a fraction of the downward projection of the cap webs **44** serve as guides during the assembly of the beam **10** and the cap **16** to properly direct the end portions **24** of the beam webs **22** into the described interengagement with the cap webs **44**. At the same time, the guide webs **48** and the proper interengagement between the beam webs **22** and the cap webs **44** insures the proper reception of the upwardly projecting edge portions **36** on the water proof layers **14** within the cap chambers **42**.

According to the present invention, therefore, the cap **16**, which projects totally above the roof panels **12** downwardly telescopes the upper end portions **24** of the beam central webs **22**, which likewise project above the roof panels **12**. During such telescoping of the cap **16**, the cap angled guide webs **48** guide the hook portions **26** of the beam webs **22** into secure interengagement with the cap webs **44**, not only obtaining secure assembled retainment of the cap **16** over the beam **10**, but also insuring proper alignment of the cap relative to the roof panels **12** and the water proof layers **14**. With the cap **16** thusly properly aligned with the beam **10** in the assembly as shown in FIG. **2**, the upwardly projecting edge portions **36** of the water proof layers **14** are properly received in the cap chambers **42** completely hidden in the final assembly from exterior view, but still serving the important water barrier purposes preventing the flow of water inwardly of the cap leg portions **38** and downwardly through the assembly along the roof panel edge portions **32** and edge surfaces **34** thereof.

With the virtually foolproof assembly of the beam **10**, the roof panels **12**, the water proof layers **14** and the cap **16** as described and shown, it is obvious that such assembly may be accomplished by workmen having only very basic skills and the usual skilled workmen well trained in the various trades are not required. Furthermore, the final roof assembly is a secure and, equally important, a water proof assembly, the water proofing being inherent in the unique water barrier formation of the upwardly projecting edge portions **36** on the water proof layers **14**.

I claim:

1. In a panel and beam roof assembly for a building structure, the combination of: a generally horizontal beam inverted generally T-shaped in vertical transverse cross section forming oppositely transversely depending generally horizontal base flanges and a central vertical web portion; generally horizontally extending roof panels depending transversely oppositely from said beam having lower face surfaces supported on said beam base flanges and edge portions terminating in edge surfaces generally transversely adjacent said beam web portion; water proof upper layers over upper surfaces of said panels of shape self-sustaining material having edge portions projecting upwardly from said panel edge portions and terminating upwardly spaced upwardly from said panel edge portions, said upwardly projecting edge portions of said water proof upper layers forming water barriers preventing water from flowing transversely inwardly of said upper layers and downward of said panel edge surfaces; a cap overlying said beam inverted generally U-shaped in vertical transverse cross section projecting upwardly from said panels and upper layers telescoped over said upper layer edge portions, said cap having downwardly projecting leg portions overlying said panel upper layers transversely outwardly of said upper layer edge portions and a connecting portion overlying said upward terminations of said upper layer edge portions; said central vertical web portion of said beam including transversely spaced, vertically elongated webs projecting upwardly into said cap; said cap having transversely spaced, vertically elongated webs extending downwardly from said cap connecting portion transversely inwardly of said upwardly projecting edge portions of said panel upper layers; fastening means retaining said beam and cap in assembly including interengaged hook portions between said beam and cap webs; and said cap including a downwardly projecting, transversely inwardly angled guide web spaced transversely inwardly from each of said cap webs positioned engageable by said beam webs during assembly of said beam and cap guiding said beam webs into said beam and cap guiding said beam webs into said interengagement with said cap webs.

2. A panel and beam roof assembly as defined in claim **1** in which said panels are formed of composition material; and in which said water proof upper layers are formed of metal sheets.