

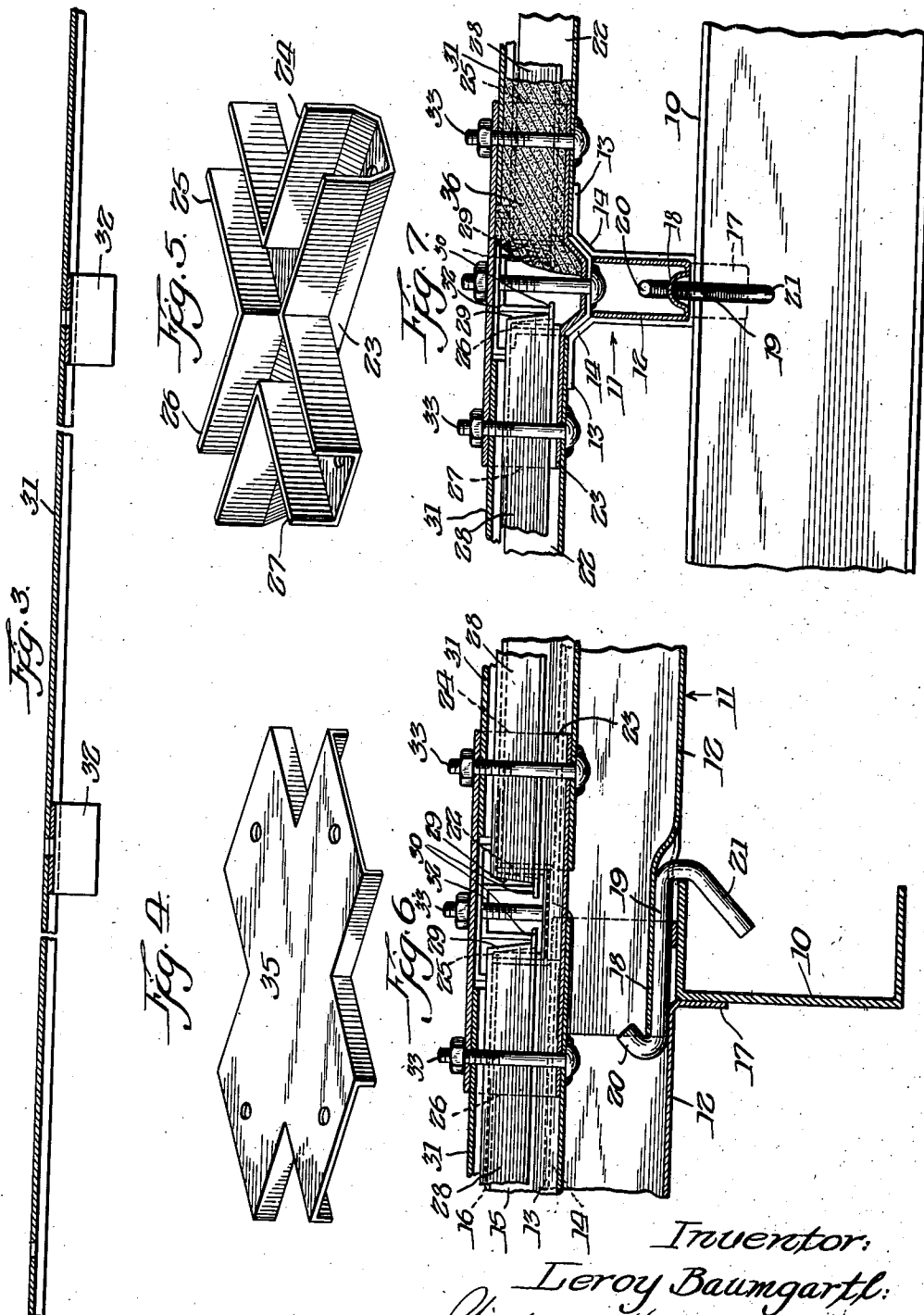
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BUILDING CONSTRUCTION

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BUILDING CONSTRUCTION

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15 Claims. (Cl. 108—13)

My invention relates to building construction, and has particular reference to a roof construction of the flat deck type, although the same construction may be used for walls or sides of buildings, if desired.

The primary object of the invention is the provision of a building structure of substantially pre-fabricated form which can be installed in unit construction to provide a roof or wall construction protecting the building against various elements such as wind, rain, snow and the like, and serving the purpose of the usual enclosure for a building.

Another and further object of my invention is the provision of a building structure which is so constructed that it may expand when becoming heated, as when exposed to the sun's rays, or contract due to cold weather, and yet remain weather- and water-proof under all normal weather conditions.

Another and further object is the provision of a building structure which is flexible within limits and which will yield to a certain extent to the action of the wind or the up-currents of air underneath a roof or to down-currents due to unusual disturbed atmospheric conditions, and yet will retain the necessary strength to perform its functions without weakening to any material degree.

A further object of my invention, particularly when used as a roof structure, is that it is sufficiently strong to withstand ordinary weight such as that of an individual walking upon it, and which in normal use will give long years of service, particularly if the upper surface is kept coated with suitable roofing paint or mastic compound to enable the metal construction to resist rust and the like.

Another and further object is the provision of a roofing structure in which the units may be pre-fabricated and which when placed in service can be easily and quickly put into position by fitting the units together or, if desired for filling out a space, the units can easily and quickly be altered to fit any particular need or purpose.

Another and further object of my invention is the provision of a roofing unit comprising a pan having material, such as fibreboard mastic material or fibrous insulating material in plastic form, or the like, permanently secured or affixed to the under side thereof so the under side of the metal pans is protected from condensation, rust and the like, and an insulating or sound-deadening effect is secured, these units being

prepared so they can easily and quickly be fitted into position during the construction of a roof.

These and other objects of my invention will be more fully and better understood by reference to the accompanying drawings, and in which—

Figure 1 is a plan view of a complete unit embodying my invention, showing the unit in the successive stages of installation;

Figure 2 is a cross-sectional view on line 2—2 of Figure 1;

Figure 3 is a longitudinal view partially in section and partially in elevation of one of the cap members;

Figure 4 is a perspective view of one of the corner cap members used in the structure;

Figure 5 is a channel-shaped star member used for anchoring the support and transverse members together at the corners;

Figure 6 is a vertical sectional view on line 6—6 of Figure 1; and

Figure 7 is a vertical sectional view on line 7—7 of Figure 1.

Referring now specifically to the drawings, and in which like reference characters refer to like parts throughout, the usual purlin 10 is shown, a plurality of which are used in spaced parallel relation with each other, upon which is placed parallel extending spaced support members designated as a whole as 11, 11, these members extending transversely of the purlin 10. These support members 11, 11 are in the preferred form composed of a channel section 12 having flanges 13, 13 extending from each side thereof, with angular disposed webs 14, 14 connecting the flanges and the body of the channel section 12. A U-shaped channel section 15 is provided having its base portions angularly disposed to fit in parallel relation against the webs 14, 14 of the channel section 12, and is spot-welded or otherwise secured to the channel section 12 so that in effect the sections 12 and 15 may be considered as an integral member for practical purposes of construction. The sections 15 have flange portions 16, 16 extending outwardly from the upper edges thereof for purposes which will be hereinafter described.

The support members 11, 11 are placed in telescopic end to end relation with each other, as shown particularly in Figure 6, with a struck-out portion 17 being fashioned out of the bottom wall of the member 12 and bent at right angles thereto, so that it abuts against the purlin 10. The end of the corresponding support member 11, which is slightly reduced in

size to fit into telescopic relation with the end of the adjacent member 11, has the bottom wall 18 of the section 12 bent upwardly a slight distance so that a locking member 19 is provided which is fitted into the upturned portion 18 of one of the sections 12, with one end 20 turned around the bottom wall at the end of the member 12, and the opposite end 21 of the locking member 19 is bent downward around the purlin 10, so that when the longitudinal support members 11 are placed in position they are held against both longitudinal and vertical movement upon the purlin 10.

Transverse U-shaped channel members 22 are provided which are placed in spaced relation with each other and extend at their ends substantially up to the side walls of the members 15, 15. Connecting members 23 are provided which have four-way extensions such as 24, 25, 26 and 27. The extensions 24 and 26 are formed of the same cross-sectional shape as the members 15 and of sufficient size to fit inside these members, while the extensions 25 and 27 are substantially rectangular in cross-sectional form and adapted to fit inside of the transverse extending sections 22, 22. In practice, these members 23 may be integrally formed with the transverse member 22, in which case the one end of the members will be of the contour of either the portions 25 or 27 and formed with projecting portions corresponding to the sections 24 and 26 so that they can be secured to the longitudinal members 11, 11.

Sheet metal pans 28, 28 are provided, each pan being adapted to cover an area enclosed by adjacent pairs of support members 11, 11 and the transverse members 22, 22. The pans 28 have downwardly turned flanges 29 around their entire outer periphery, with horizontally turned edge portions 30, 30 provided so that the edge contour of the pans is substantially of Z-form. In use, the horizontal portion 30 of the edge of the pan may be omitted, as I may find that the cup members hereinafter described will be sufficient without relying upon these edges to form bases upon which the cup members engage as hereinafter described. Extending transversely of the pans 28 on the under side thereof are spaced angles 34, 34 terminating short of the edges of the pans to afford the necessary rigidity to the pans to prevent their bending or cupping in service and to assist the pans 28 in sustaining weight placed upon them, such as may be necessary due to workmen or others walking across the top of the roof during its construction or for purposes of servicing and the like. The pans may have ribs rolled therein to afford sufficient rigidity, if desired, instead of using the angles 34, 34.

Fibreboards 37, 37 are cemented or otherwise affixed to the under side of the pans 28, being of such length that their ends fit snugly against the flange 29 at each side of the pan, and preferably of sufficient thickness so as to rest on the flanges 13, 13 of the section 11. These boards 37 are of proper width to be fitted between the angles 34, and are attached to the under side of the pans in the shop prior to being placed in position on a roof, so that these boards become a part of the roofing unit ready to be installed when the supporting frame is completed. They provide protection against condensation on the under side of the roof, heat and cold insulation and also possess sound deadening qualities, all of which is desirable in roofs of this character.

Other materials may be used if desired, such as plastic compounds of various kinds, to perform the function described above.

Fitted to the longitudinal sections 15 and the transverse channels 22 and extending over the edges of the pans 28, are cap strips 31, 31, these cap strips having inverted U-shaped members 32, 32 spot-welded to the under sides thereof. Holes extend through these cap strips 31 and through the members 32 in register with each other, so that bolts 33, 33 may be placed in the channel sections 15 and the channel members 22, and extend upwardly therefrom to hold the cap strips 31 in position when the structure is assembled.

A corner cap member 35 is provided having extensions extending in four directions from the center thereof, and which is adapted to overlap the ends of the cap members at the corners and the ends of the support members 11 and transverse members 12 at their ends also. These cap members are held in position by the bolts 33, 33 which pass through the ends of the longitudinal support members 15, 15 and the transverse members 22, and also through the extensions of the corner channel sections 24, through the ends of the cap strips 31 and through openings in the extensions of the members 34. Thus when the members are assembled and the bolts placed in position, the whole structure is held together in a unitary structure by means of these bolts 33, the bolts 33 also holding the cap strips 31 in position at the ends.

In assembling the combination, the longitudinal members 11 are placed in position and secured to the purlins 10 and then the corner sections 24 are placed in position so that at this stage of the assembling the structure is in the condition shown at the upper right-hand corner of Figure 1. The bolts 33 at the corner positions may be inserted and then the open sided longitudinal sections 15 and the transverse sections 22, also the connecting members 23, filled with any prepared roofing mastic 36, these channel sections and connecting members 23 being substantially filled with this mastic. The pans 28 are then placed in position, with the edges of the pans extending into the mastic in the open channels, so that in effect the edges of the pans 28 around their entire periphery are sealed in the mastic, preventing water from flowing into the open sides of the channels and preserving the portions of the metal with which it comes in contact.

The cap strips 31 are then placed in position over the longitudinal members and the transverse channels, with the U-shaped members projecting downward into these channel sections and preferably resting upon the horizontal edges of the pans, so that as the nuts on the bolts 33 are tightened the pans are placed under tension, thus serving to draw the pans taut and hold them firmly in position in service. The cap members 34 are thereupon placed in position as shown at the left end of the figures, so that the ends of these members overlap the ends of the cap strips 31. Nuts are tightened upon the end bolts 33 so that the cap strips are firmly held in position, and then the entire surface is coated with a mastic or roofing paint, as may be desired, so that the surface of the metal is protected from rust and other actions of air and water coming in contact with it.

In following the installation it will be understood that the parts hereinabove described are pre-fabricated and that the initial steps comprise

the laying of the longitudinal support members and putting the transverse members into shape, and that this can be followed by the other steps hereinabove described, so that the installation of a roof can be very easily and quickly accomplished.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form and the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit or scope of my invention.

What is claimed is:

1. Building construction comprising, in combination, parallel open-sided support members, transverse open-sided members in spaced relation with each other secured at their ends to the support members, pans spanning the space between each adjacent pair of support members and each pair of transverse members, cap strips overlying the edges of the pans and the open-sided members, and means whereby the cap strips are secured to the support and transverse members.

2. Building construction comprising, in combination, parallel open-sided support members, transverse open-sided members in spaced relation with each other secured at their ends to the support members, pans having angular disposed side and end edges extending into the channels in the support and transverse members, cap strips overlying the edges of the pans and spanning the open sides of the support members, and means whereby the cap strips are secured to the support and transverse members.

3. Building construction comprising, in combination, parallel open-sided support members, transverse open-sided members in spaced relation with each other secured at their ends to the support members, pans having angular disposed side and end edges extending into the channels in the support and transverse members, and means whereby the pans are clamped to the support and transverse members whereby the pans are free to expand and contract because of varying weather conditions.

4. Building construction comprising, in combination, parallel open-sided support members, transverse open-sided members in spaced relation with each other secured at their ends to the support members, pans spanning the space between each adjacent pair of support members and each pair of transverse members, means whereby the pans are frictionally secured to the support and transverse members, and means whereby said support members are secured to the purlins of a building.

5. A roof construction comprising, in combination, parallel extending channel support members, transverse spaced parallel extending channel members secured to said support members, pans having angular disposed edges extending into the channels in said support members and said transverse members, and cap strips secured to said support members and said transverse members overlapping the edges of each adjacent pair of pans.

6. A roof structure comprising, in combination, a plurality of spaced support members composed of channel sections placed in end to end relation with each other, spaced transverse channel members, channel star sections extending into the ends of each adjacent channel sec-

tion and into the ends of each adjacent transverse member, pans having angularly disposed side and end edges mounted upon said channel sections and said transverse channel members, cap strips secured to the said support and transverse sections, and mastic filling in the said channel support members and the transverse members.

7. A roof structure comprising, in combination, a plurality of spaced support members composed of channel sections placed in end to end relation with each other, spaced transverse channel members, channel star sections extending into the ends of each adjacent channel section and into the ends of each adjacent transverse member, pans having angularly disposed side and end edges mounted upon said channel sections and said transverse channel members, cap strips secured to the said support and transverse sections overlapping the edges of the said pans, mastic filling in the said channel support members and the transverse members, and corner star cap members overlapping the ends of each adjacent pair of cap strips.

8. A roof structure comprising, in combination, a plurality of spaced parallel extending support members composed of channel sections in telescopic end to end relation with each other, spaced transverse channel members, star channel sections joining the transverse channel members and the support members, pans having angular disposed edges supported by said support and transverse members having their edges extending into the channels in said members, cap strips secured to said support and transverse members overlapping the peripheral edge of the said pans, corner cap members overlying the star channel sections and the ends of the cap strips, and a mastic filling for the support members and the transverse members.

9. A roof structure comprising, in combination, a plurality of spaced parallel extending support members composed of channel sections in telescopic end to end relation with each other, spaced transverse channel members, star channel sections joining the transverse channel members and the support members, pans having angular disposed edges supported by said support and transverse members having their edges extending into the channels in said members, cap strips secured to said support and transverse members overlapping the peripheral edge of the said pans, corner cap members overlying the star channel sections and the ends of the cap strips, a mastic filling for the support members and the transverse members, and means whereby the said support members are secured to the purlins of a building.

10. A unit roof structure comprising parallel extending spaced channel support members, transverse channel members secured to said support members, pans having angular disposed edges on said support members and said transverse members, each pan spanning the area defined by adjacent pairs of support members and transverse members, a mastic filling for said support and transverse channel sections into which the edges of the pans extend, cap strips overlapping the edges of the said pans secured to the said support and transverse members, and corner cap sections overlying the adjacent ends of the cap strips.

11. A roof structure comprising parallel extending spaced channel support members, transverse channel members secured to said support

members at their ends, a mastic in the channels of said support and transverse members, pans having angularly disposed side and end edges adapted to rest upon said support and transverse members, the said pans having a layer of material on the underside thereof, and means whereby the said pans are held in engagement with the said support and transverse members.

12. A roof structure comprising parallel extending spaced channel support members, transverse channel members secured to said support members at their ends, a mastic in the channels of said support and transverse members, pans having angularly disposed side and end edges adapted to rest upon said support and transverse members, the said pans having a layer of material cemented to and covering substantially the entire under surface thereof, and means whereby the said pans are held in engagement with the said support and transverse members.

13. A roof structure comprising, in combination a plurality of parallel extending spaced channel sections, transverse spaced channel sections secured at their ends to the first mentioned channel sections, pans spanning the space between each adjacent channel section having downturned edges extending into said channels, cap members overlapping the edges of each adjacent pan, and bolts carried by said channel members extending through said cap members whereby the said cap members are held in clamped position over the edges of the said pans.

14. A roof structure comprising, in combination a plurality of parallel extending spaced channel sections, transverse spaced channel sections secured at their ends to the first mentioned channel sections, pans spanning the space between each adjacent channel section having downturned edges extending into said channels, cap members overlapping the edges of each adjacent pan, bolts carried by said channel members extending through said cap members whereby the said cap members are held in clamped position over the edges of the said pans, and a mastic composition in said channel sections substantially filling said channel sections.

15. A roof structure comprising, in combination a plurality of parallel extending spaced channel sections, transverse spaced channel sections secured at their ends to the first mentioned channel sections, pans spanning the space between each adjacent channel section having downturned edges extending into said channels, cap members overlapping the edges of each adjacent pan, bolts carried by said channel members extending through said cap members whereby the said cap members are held in clamped position over the edges of the said pans, and a mastic composition in said channel sections substantially filling said channel sections and into which the downturned edges of the pans project.

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