Jan. 28, 1969

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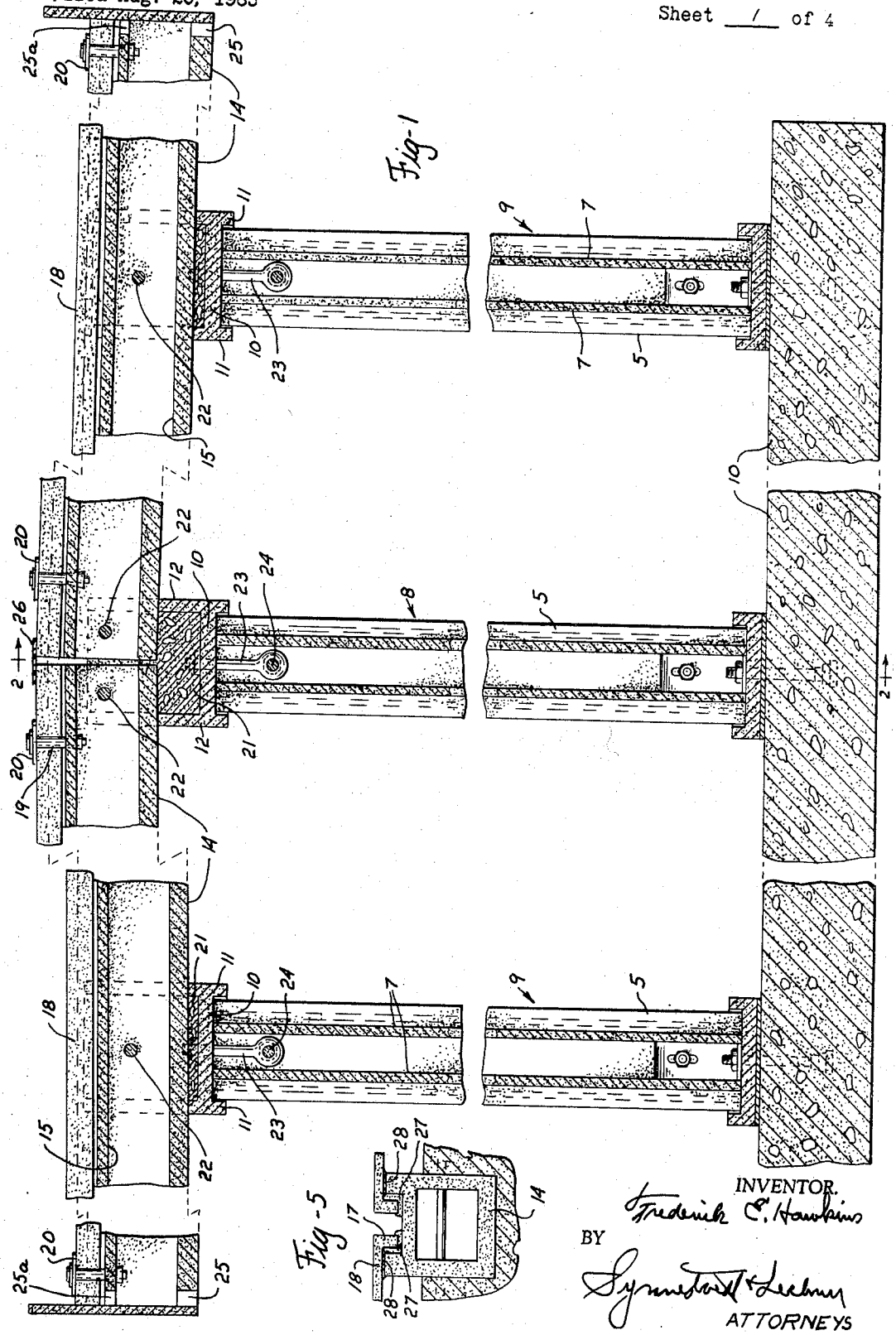
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ROOF STRUCTURE

Filed Aug. 25, 1965

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Fig-1



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ROOF STRUCTURE

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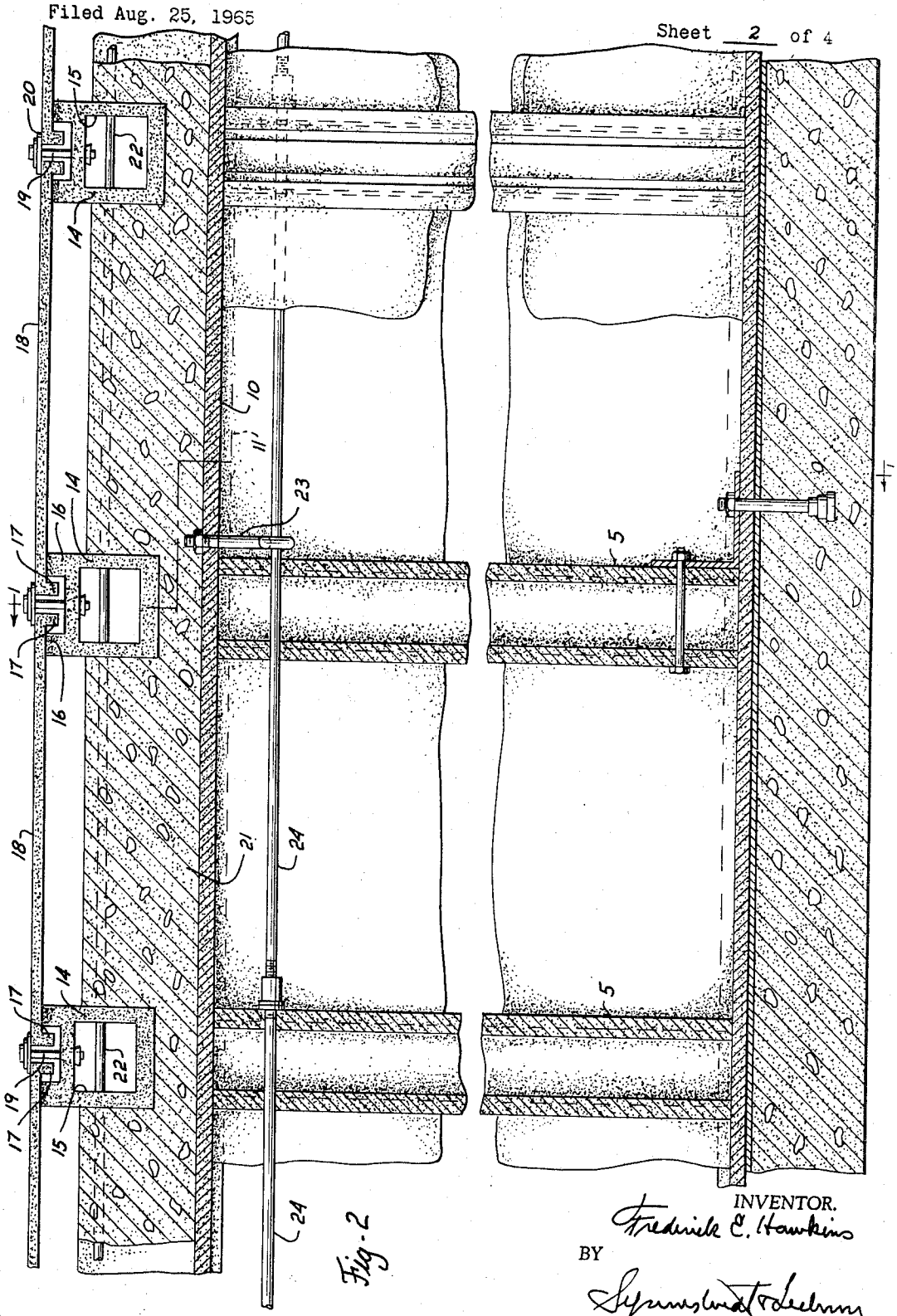


Fig. 2

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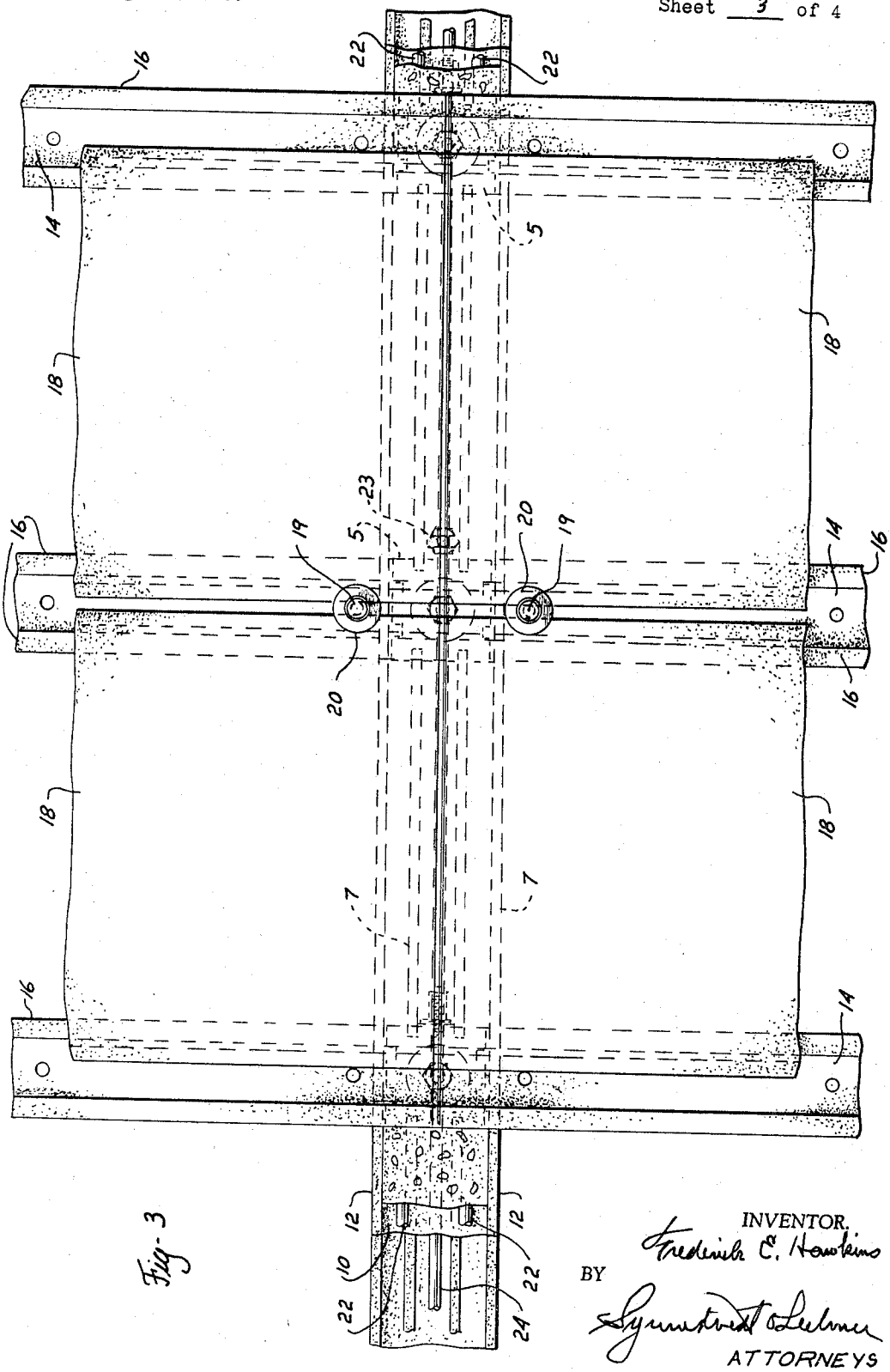


Fig. 3

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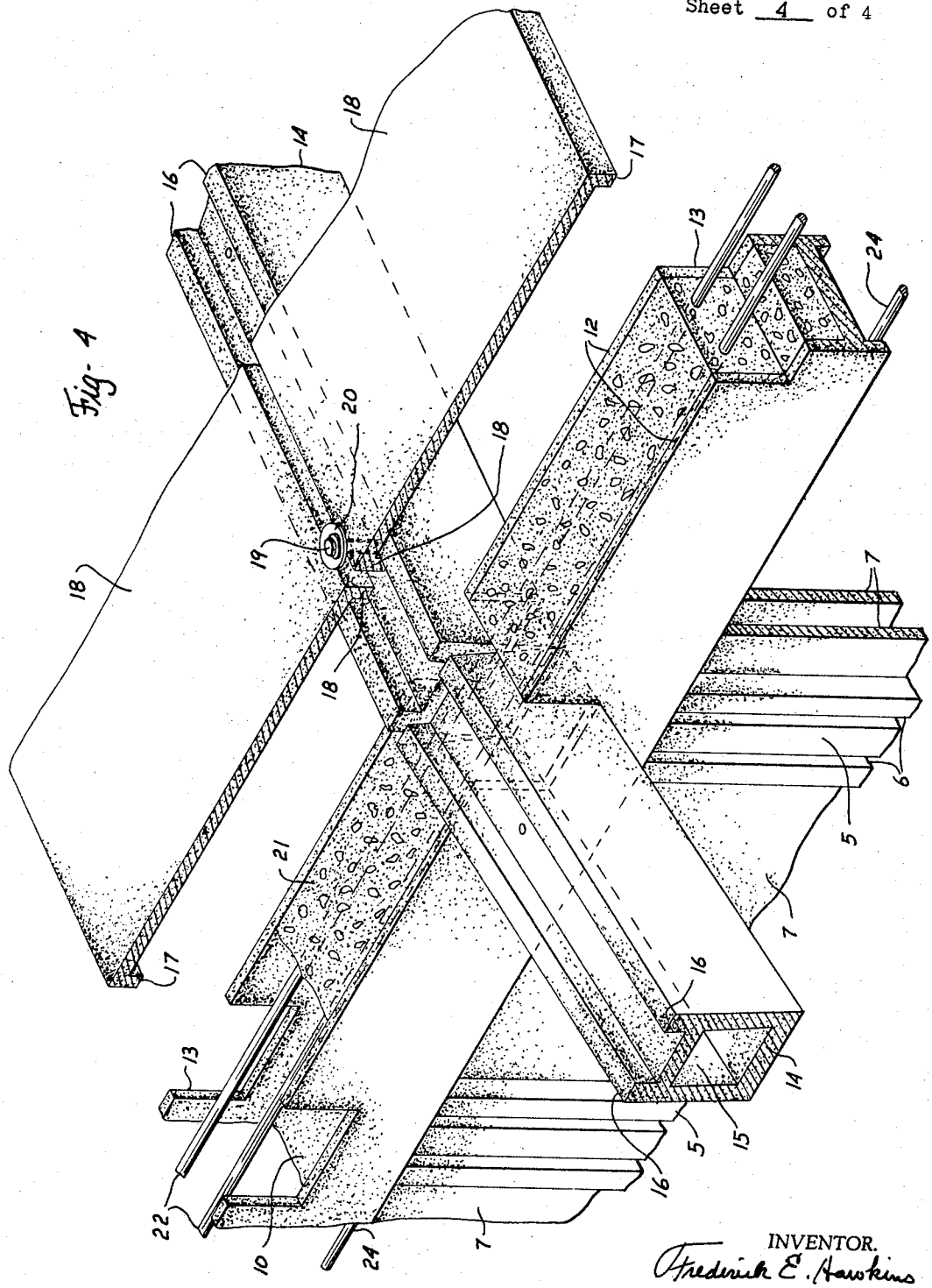
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Fig. 4



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3,423,895

ROOF STRUCTURE

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Filed Aug. 25, 1965, Ser. No. 482,479
U.S. Cl. 52—303 3 Claims
Int. Cl. E04d *13/04;* E04b *7/00, 5/04*

ABSTRACT OF THE DISCLOSURE

Roof construction incorporating rafters each having an internal hollow and an upwardly open channel extended throughout the length of the rafter, and elongated roof panels extended lengthwise of the rafters and having flanges received in the upwardly open rafter channels, and panel fastening means secured to the rafters within their channels.

This invention relates to an improved structure for the roofs of buildings, especially for homes or houses. The invention is particularly concerned with roof structure adapted for use in low cost housing projects.

It is the general object of this invention to provide a roof structure combining low cost with a number of other important characteristics, including simplicity in erection or construction, and also effectiveness in shedding water and preventing leakage.

In achieving various of the objectives referred to above, the invention provides for fabrication of the basic elements or pieces of which the roof is constructed by an extrusion operation, preferably extrusion of asbestos-cement compositions which are highly weather proof, vermin proof and which may also readily be painted according to any desired decorative color scheme.

How the foregoing objects and advantages are attained will appear more fully from the following description referring to the accompanying drawings which illustrate the embodiment of the invention and in which:

FIGURE 1 is a vertical sectional view through portions of a building structure incorporating a roof structure constructed in accordance with the invention, this view being taken as indicated by the section line 1—1 on FIGURE 2 and certain portions of the building and roof being broken out;

FIGURE 2 is a vertical sectional view taken at right angles to FIGURE 1 as indicated by the section line 2—2 appearing in FIGURE 1, and also showing certain portions of the building broken out;

FIGURE 3 is a fragmentary plan view of a portion of the roof and of certain of the roof supports shown in FIGURES 1 and 2;

FIGURE 4 is a fragmentary perspective view, with parts broken out, illustrating a portion of the roof supports adjacent to the ridge of the roof; and

FIGURE 5 is a fragmentary view of an alternative arrangement of certain parts.

Although the roof of the present invention is adapted to be mounted upon the walls of a building constructed in any of a variety of ways, the roof is particularly suitable to support by walls constructed in accordance with the disclosure of the copending application of Donald D. Burris, Ser. No. 482,350 filed concurrently herewith and assigned to the assignee of the present application. The roof structure of the present invention is therefore herein illustrated, by way of example, as supported on wall structure of the type disclosed in said copending application. The details of the wall construction need not be considered herein, but it is briefly pointed out that in the embodiment as illustrated, the walls are made up of posts **5**, each post being of square cross section and each side

of each post having a pair of grooves **6** formed therein adapted to cooperate with wall panels **7** in the form of flat vertically extended boards of substantially the same height as the height of the posts **5**. As disclosed more full in said copending application, the partitions and outside walls of the house, such as the partition indicated generally at **8** in FIGURE 1 and the outside walls indicated generally at **9—9** in FIGURE 1, are supported on a base or slab **10**.

At their upper edges, each of the walls **8** and **9** is surmounted by a cap rail **10**, each cap rail having a pair of downwardly presented flanges **11—11** defining a channel of width adapted to fit the upper ends of the square posts **5**.

Each cap rail further has upwardly presented flanges **12** defining an upwardly presented channel which is adapted to be notched out at intervals, as shown especially in FIGURE 4 at **13** in order to receive the roof rafters **14**. The cap rails associated with the outside walls **9—9** as shown in FIGURE 1 are desirably notched relatively deeply, whereas the cap rail associated with the interior wall **8** which comprises the ridge supporting wall is provided with a somewhat shallower notch, in view of which the rafters will be supported at angles to the horizontal, as clearly appears in FIGURE 1, thereby developing a roof pitch for shedding water.

Each of the rafters **14** comprises a piece of generally rectangular cross section having an interior square hollow **15** and having a pair of upwardly presented flanges **16—16** defining an upwardly presented channel for receiving the downwardly presented marginal flanges **17** of the roof panels **18**.

The roof panels are secured to the rafters by means of fastening devices which preferably comprise expansion bolts **19** which extend vertically between the adjacent edges of pairs of roof panels **18**, each bolt having a washer or other suitable means such as indicated at **20** which extends to overlie the adjacent edges of the roof panels, so that each bolt contributes to the fastening of both of the adjoining roof panels.

The rafters **14** are secured or anchored to the cap rails **10** by means of a cementitious bond provided by infilling the upwardly presented channels of the cap rails with cement or concrete as indicated at **21**. Preferably also the rafters are apertured to pass anchor rods **22**, these rods being embedded in the cement **21**.

The cap rails are desirably secured to the posts **5** by means of anchor bolts **23** which extend through the web of each cap rail **10** and the lower ends of which are provided with eyes adapted to receive the tie rods **24** which are extended between and through the posts **5**.

A particular advantage in the roof structure of the present invention is the arrangement of the roof panels with downwardly presented flanges received in the upwardly presented channels formed at the upper sides of the rafters. This arrangement, with the bolts **19** lying between the adjacent edges of the roof panels provides a securing means not requiring penetration of the roof panels. Moreover the interfitting of the flanges **18** of the roof panels with the upwardly presented channel provided by the upwardly presented flanges **16** of the rafters provides a drainage system by means of which water may readily flow lengthwise of the rafters within the upwardly presented channels to the edge of the roof, for discharge beyond the outside walls of the house.

Still another feature of importance in connection with the roof structure is the fact that the roof rafters **14** are provided with an interior hollow, so that any leakage which may occur where the fastening bolts **19** penetrate the upper wall of the rafter will flow through the interior hollow within the rafter laterally to a point outside of the

outside walls of the house, for ultimate discharge, for instance through a notch or port **25** shown toward the right in FIGURE 1. In addition to the notch **25** in the lower wall of the hollow rafter, a notch **25***a* is provided in the upper wall of the rafter in order to facilitate drainage from the channel on top of the rafter.

It is also contemplated that holes be provided in the top wall of the rafter in addition to the holes in which the fastening bolts **19** are secured to deliberately provide for flow of water from the top channel of the rafter into the interior hollow, thereby increasing the total drainage capacity of the rafter.

The construction of the roof from the roof panels **18** and the rafters **14** as above described is also advantageous since both of these basic components of the roof may be formed as extrusions, for instance, extrusions of asbestos-cement compositions.

If desired a waterproofed fabric or plastic cover strip **26** may be adhesively applied over the crack at the ridge of the roof, in order to exclude water.

An alternative joint between the roof panels and the rafters is illustrated in FIGURE 5. Here a bead **27** of a sealing compound is introduced into the corners of the channel at the top of the rafter **14**, for instance by means of a caulking gun, and at the top of the flanges an adhesive **28** is applied, so that upon placing the roof panels upon the rafters, the flanges **17** of the roof panels engage and somewhat deform the beads **27** so as to provide an effective seal, and the inside surface of the roof panel is brought down against the adhesive **28**. In this embodiment, the fastening bolts such as indicated at **19** in the first embodiment need not necessarily be employed, but they can be used in addition to the sealing compound and adhesive if desired. The sealing compound may be one of the plastic materials of the type commonly used for caulking, and the adhesive may be any well known waterproof adhesive such as epoxy resin.

The roof structure of the present invention including especially the combination of roof panels and rafters as above described is readily adapted to mounting on a variety of other supporting structures. Moreover, it provides an inexpensive and easily installed roof.

I claim:

1. A roof structure for a building comprising a series of parallel rafters each having an interior hollow with a closed bottom extended throughout the length thereof and having an upwardly open channel at its upper side also extended throughout the length thereof, a series of elongated roof panels supported on the rafters with the long dimension of the panels extended lengthwise of the rafters, each roof panel being of width sufficient to overlap adjacent rafters and having marginal flanges extended throughout the length of the panel and presented downwardly and received in the upwardly open channels of the rafters in spaced relation to each other and fastening devices for securing the roof panels to the rafters, the fastening devices associated with each rafter being secured thereto in the region above the interior hollow and within the upwardly presented channel thereof.

2. A roof structure for a building comprising a series of parallel rafters each having an interior hollow with a closed bottom extended throughout the length thereof and having an upwardly open channel at its upper side also extended throughout the length thereof, a series of elongated roof panels supported on the rafters, each roof panel being of width sufficient to overlap adjacent rafters, and fastening devices for securing the roof panels to the rafters, the fastening devices associated with each rafter penetrating the rafter in the region above the interior hollow and within the upwardly presented channel thereof, and the rafters being inclined to the horizontal to provide for gravity flow of any water penetrating into the interior hollow in a direction lengthwise of the rafter for discharge from the lower end thereof.

3. A roof structure for a building comprising a series of parallel rafters each having an interior hollow with a closed bottom extended throughout the length thereof and having an upwardly open channel at its upper side also extended throughout the length thereof, and a series of elongated roof panels supported on the rafters with the long dimension of the panels extended lengthwise of the rafters, each roof panel being of width sufficient to overlap adjacent rafters and having marginal flanges extended throughout the length of the panel and presented downwardly and received in the upwardly open channels of the rafters in spaced relation to each other, and the rafters having apertures in the wall between the upwardly open channel and the interior hollow, thereby increasing the drainage capacity of the rafters.

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U.S. Cl. X.R.

52—11, 90, 94, 434, 491, 494