June 20, 1939. E. B. WHITE 2,162,872

MONOLITHIC CEMENTITIOUS STRUCTURE

2 Sheets-Sheet 1

Filed June 21, 1937

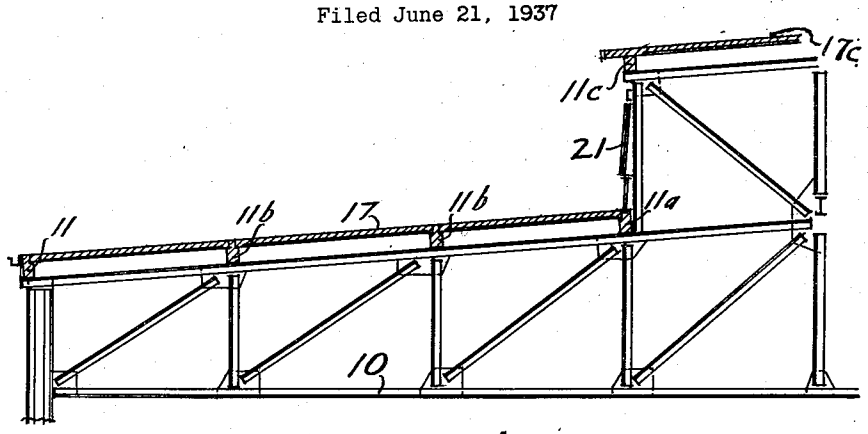


Figure 1

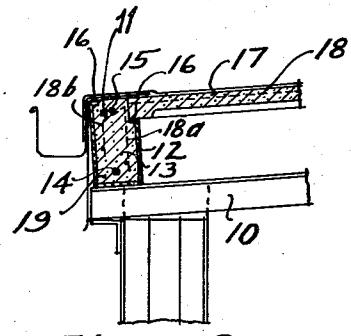


Figure 2

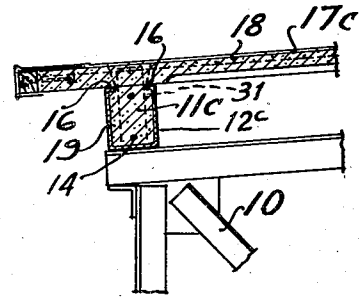


Figure 3

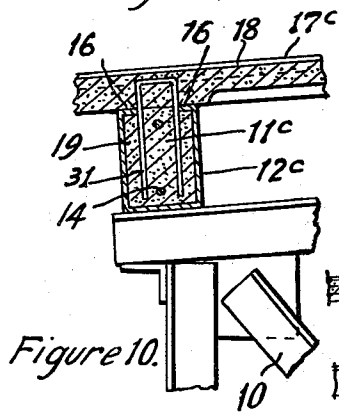


Figure 10.

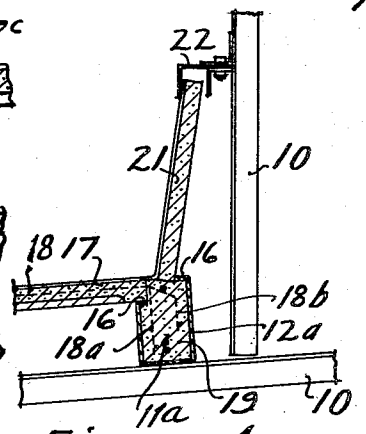


Figure 4

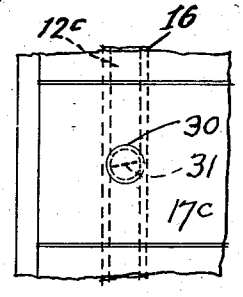


Figure 3a

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MONOLITHIC CEMENTITIOUS STRUCTURE

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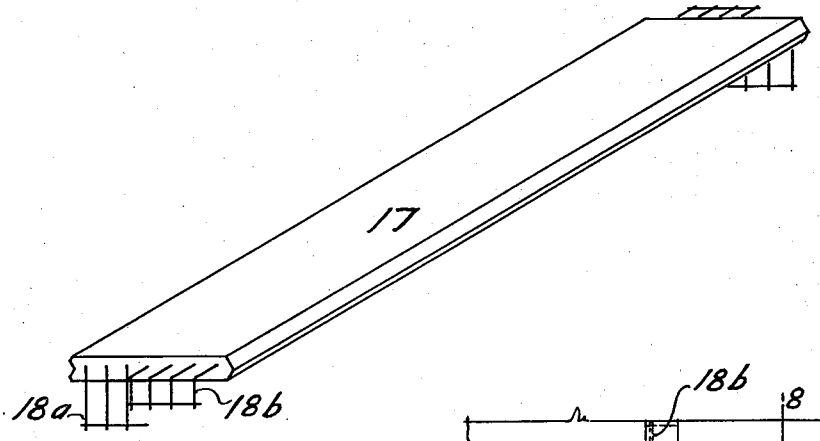


Figure 5

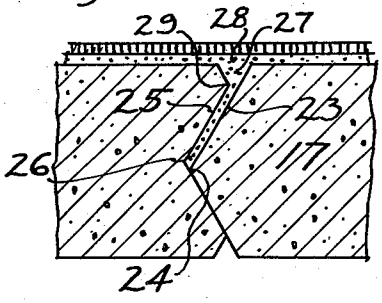


Figure 9

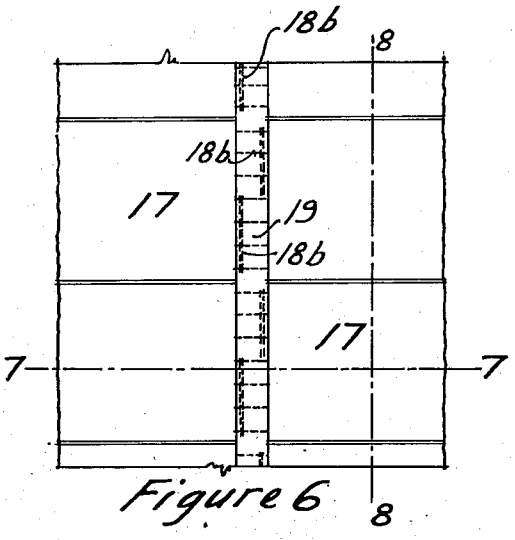


Figure 6

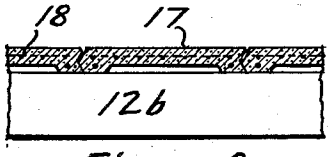


Figure 8

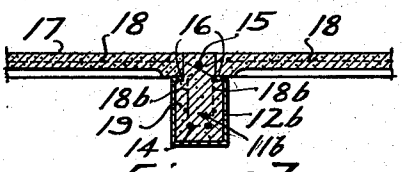


Figure 7

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UNITED STATES PATENT OFFICE

2,162,872

MONOLITHIC CEMENTITIOUS STRUCTURE

Eugene B. White, Oak Park, Ill.

Application June 21, 1937, Serial No. 149,357

4 Claims. (Cl. 72—68)

My invention is concerned with roofs and other monolithic cementitious structures, and is designed to produce a structure of sufficient strength and durability that can be manufactured with less material and less labor than has been heretofore possible for roofing of equal durability.

To this end it consists of a novel combination of supporting beams and a monolithic roof supported thereby that can be constructed thereon without the employment of the forms which have heretofore been deemed essential in such construction.

It also consists in a certain specific novel monolithic structure which will hereinafter be described in detail.

To illustrate my invention I annex hereto two sheets of drawings, in which the same reference characters are used to designate the identical parts in all the figures of which:

Fig. 1 is a side elevation of a roof truss embodying my invention with the roofing proper in vertical section;

Figs. 2, 3 and 4 are portions of the structure shown in Fig. 1 on a greatly enlarged scale;

Fig. 3*a* is a plan view of the structure shown in Fig. 3.

Fig. 5 is a perspective view of one of the slabs used in forming the roof;

Fig. 6 is a top plan view of a portion of the roof showing how the slabs and beams are joined;

Figs. 7 and 8 are vertical sections on the lines 7—7 and 8—8, respectively, of Fig. 6; and

Fig. 9 is a much enlarged view of a portion of Fig. 8.

In Fig. 1 I have shown one of a series of trusses 10 used in forming the roof of any desired structure, such for instance, as a factory.

In Fig. 2 is seen a section of the eaves portion in which the beam 11 consists of a thin metal channel 12 of the slightly irregular design shown filled with concrete 13, reinforced by the rod or rods 14 designed to take the tensile stress of the beam, and rod or rods 15 designed to take the compressive stress of the beam. The beam 11*a*, Fig. 4, is similar to the beam 11, except that it is reversed, as it were. The intermediate beams 11*b* (see Fig. 7) have the channels 12*b* regular in form as shown, and the beam 11*c* is like beam 11*b*, except as hereinafter noted. In all cases, the metal channels have inwardly projecting flanges 16 on their open sides for the purpose described. The channels 12 and 12*a* have their righthand and lefthand sides, respectively, shorter than the other, and the flanges 16 of the short sides of 12 and 12*a* and the flanges of 12*b* form seats or supports for the ends of the slabs 17, one of which is shown in perspective in Fig. 5.

The slabs 17 as seen in Figs. 5 to 8 are precast and consist of reinforced concrete or an equivalent, in which the reinforcement 18 preferably consists of welded steel wire mesh. This extends throughout the length of the slab and projects from the ends thereof, as seen in Fig. 5, with a portion 18*a* thereof bent downwardly immediately at said end, while the rest of it, 18*b*, is bent downwardly at a distance therefrom for the purpose hereinafter described. With the elements heretofore described the roof is constructed as follows:

The channels 12, 12*a*, 12*b* and 12*c* are laid transversely on the trusses 10 or equivalent girders, as indicated, spaced apart according to the length of the slabs, and are secured thereon in any desired manner. While they are preferably of a thin 16 gauge sheet steel, they are of a size and shape in cross section proportioned to the distance between the trusses so that they alone are of sufficient strength to support workmen together with the slabs 17 as the latter are put in place, as seen in Figs. 6, 7 and 8 for instance. As seen in Figs. 2, 4 and 7, the ends of the slabs rest on the flanges 16 of the short sides of 12 and 12*a*, and on both flanges of 12*b*, and their projecting reinforcing material 18*a* and 18*b* extends downwardly near the rear and farther sides, respectively, of the channels on which said ends rest. The reinforcing rods 14 and 15 are preferably secured in place in the channels in the shop and are all suitably supported in their respective positions therein by the saddles (not shown).

After the channels 12, 12*a* and 12*b* are assembled with the slabs 17 in place, cementitious material 19 is poured into the channels filling them, until it is flush with the upper surfaces of the slabs 17, and when it is hardened, it will be obvious that a monolithic structure results, for the reason that the material 19 in the channels 12, 12*a* and 12*b* is reinforced by and firmly connected to slabs 17 by the projecting portions 18*a* and 18*b* of the reinforcing material 18. Over the channels 12 may be placed any desired material, and as shown any desired thin sheet metal or other means to support the eaves trough 20 may be employed, and in the open top of the channels 12*a* may be placed the slanting flashing 21, the upper end of which is held in place by the strips 22 supported from the truss work 10, as seen in Fig. 4. As seen in Figs. 6, 8, and 9, the slabs 17, if but a single style is used, have one edge 23 formed with an obtuse angle 24, with its upper

side longer as shown. The other edge 25 is formed with the complementary reentrant angle 26, the sides of which, however, are of equal length so that when the slabs are brought together in assembling them on the roof a space 27 is left between them to be filled with a mastic cement 28, which allows for the contraction and expansion of the roof, whereas if plain cement were used it would crumble and disintegrate. The amount of this mastic cement may be increased when desired by forming an obtuse angle 29 on the edge of the upper side of the reentrant angle 26, which gives more space for the mastic cement, as will be obvious. It will also be obvious that the lower side of the reentrant angle edge 25 serves to support the obtuse angle edge 23 without the formation of any tongues extending at right angles, which would tend to shear off.

In Figs. 3 and 3*a* I have shown the specific construction employed at overhanging eaves where the channel 12*c* is the same as channel 12*b*, but the slab 17*c* is modified as follows: It is lengthened so as to extend over and beyond channel 12*c* and the reinforcement is extended to the lower end but does not project therefrom. As the slab 17*c*, entirely covering the channel 12*c*, would not permit the cementitious material being poured therein, as is done in the channels 12*a* and 12*b*, I form in the slabs 17*c* the dowel holes 30, which register with the center of the channel 12*c* and I place in said dowel holes the stirrups 31 extending down to the rods 14 and engaging the reinforcing material 18. The cementitious material is then poured in the dowel holes 30 and spreads through the channel 12*c* until it is entirely filled and the material stands level with the top surfaces of the slabs 17*c*. When it is set, the slabs 17*c* are locked on the channel 12*c* and a monolithic T beam construction is formed thereby.

While I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

While I have herein shown and described a reinforced slab locked to a reinforced beam upon which it is supported and held in place by plastic material extending through a dowel hole in the slab and into the body of the beam to form a monolithic structure, I do not herein claim the same broadly, as it is so claimed in my application Serial No. 171,728, filed October 29, 1937, for a Monolithic structure and method of making same.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a monolithic cementitious structure, the combination with supporting members, of joists extending transversely thereof, and reenforced cementitious slabs connecting the joists and having their ends resting on the edges thereof, said slabs having on one edge an obtuse angle and on the other a reentrant angle, so that the angle of one edge fits into the complementary angle of the adjacent slab, to leave a space between the upper portions of the edges filled with a mastic preparation to allow for expansion and contraction, the faces of the upper sides of both angles being at an angle to the vertical to resist upward movement of the mastic.

2. In a monolithic cementitious structure, the combination with thin metallic channels having flanges on their open sides, of a reenforcing rod extending along the bottom of each of said channels, reenforced cementitious slabs having their ends resting on said flanges with their reenforcing material projecting from their ends and extending into the channels, and the upper portions of their abutting edges separated so as to allow for expansion and contraction, cementitious material placed in said channels and surrounding said reenforcing material and rods, and a mastic preparation filling the space between the separated portions.

3. A structure as defined in claim 2, in which the abutting edges of the slabs are formed with the equivalent of an obtuse angle cooperating with the equivalent of a reentrant angle, with the upper portions of said edges separated to form the space filled with the mastic preparation.

4. A structure as defined in claim 2, in which the slabs have on one edge an obtuse angle and on the other a reentrant angle, so that the obtuse angle of one edge fits into the adjacent reentrant angle of the adjacent slab to leave the space between the upper portions of the edges to be filled with the mastic preparation.

EUGENE B. WHITE.