J. O. MADISON.

TRUSSED BUILDING CONSTRUCTION.

APPLICATION FILED JAN. 6, 1919.

1,344,767. Patented June 29, 1920.

Fig. 1.

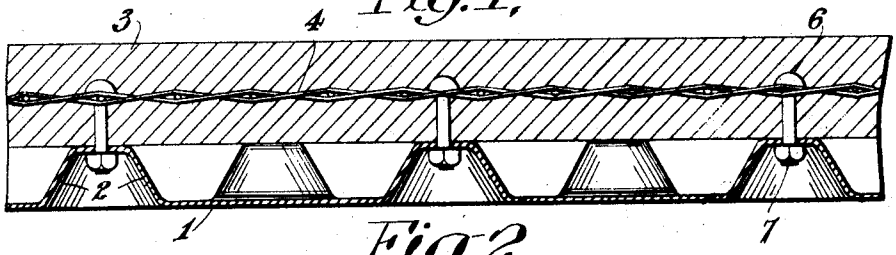


Fig. 2.

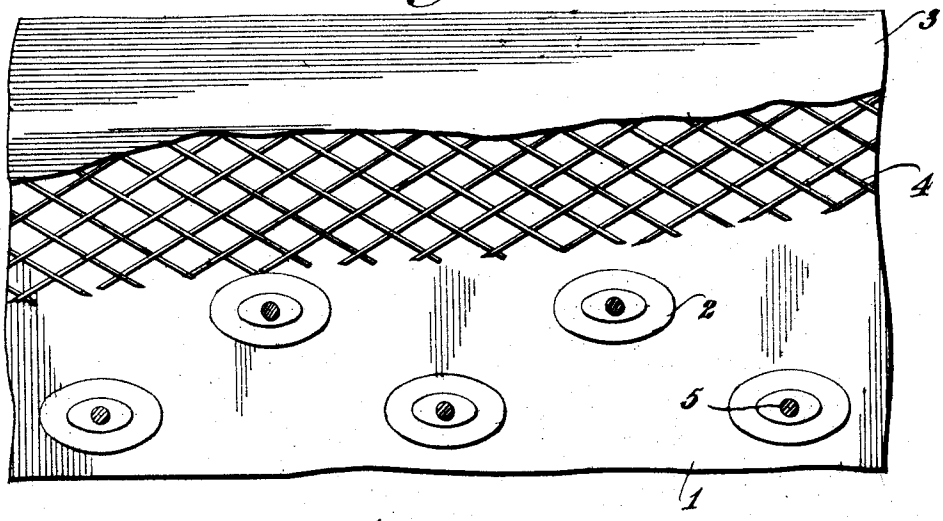


Fig. 3.

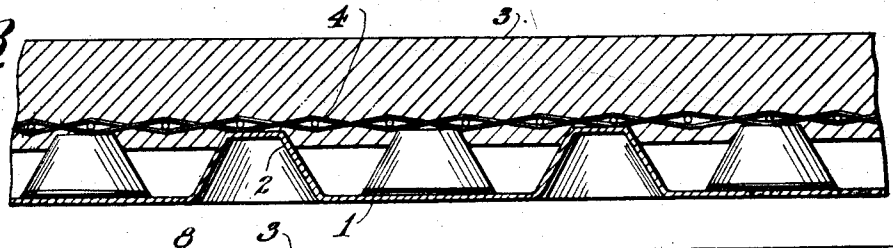


Fig. 4.

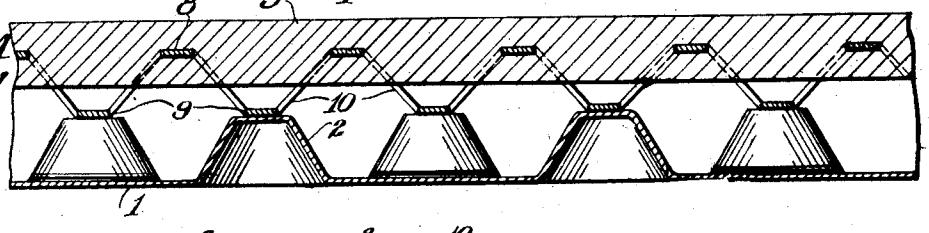
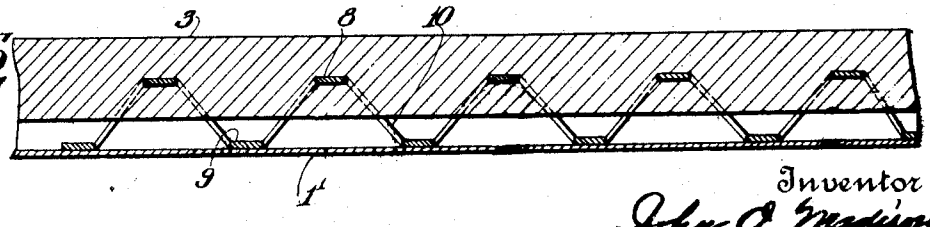


Fig. 5.



Inventor

John O. Madison

By his Attorney

J. Edwards

UNITED STATES PATENT OFFICE.

JOHN O. MADISON, OF BROOKLYN, NEW YORK.

TRUSSED BUILDING CONSTRUCTION.

1,344,767. Specification of Letters Patent. Patented June 29, 1920.

Application filed January 6, 1919 Serial No. 269,749.

To all whom it may concern:

Be it known that I, JOHN O. MADISON, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Trussed Building Construction, of which the following is a specification.

My invention relates to what may be termed building material for walls, floors, ceilings and the like, and has for its object the provision of an improved trussed construction which shall be adapted to carry heavy loads and be durable and at the same time be of light weight, of economical construction and fireproof, etc. My present invention relates to modifications of the general invention disclosed in my Patent No. 1,277,622, dated September 3, 1918, for trussed-sheet building material.

The patent referred to describes a construction embodying a pair of sheets, preferably of steel, which constitute the outer chord members of the trussed construction and which are rigidly connected together at certain intervals by intermediate web members composed of integral projections or depressions formed on one or both sheets and separated from each other laterally and longitudinally, these projections or depressions being of a depth many times the thickness of the sheet, so as to produce a trussing effect.

My present invention relates to a construction in which the lower chord member of the truss is a metal sheet, which in some forms of the invention is provided with the deep integral depressions referred to and in other forms may be plane. The truss construction is formed by securing such a sheet to a metallic member of open construction which is partly or wholly embedded within a layer of plastic material such as concrete. By "metallic member of open construction," I refer to a wire mesh or metal lath or expanded metal or the like. The wire mesh, for example, may extend over and be welded or otherwise secured to the apices or upper ends of the integral depressions formed on the metal sheet which constitutes the opposite chord member of the truss, which may be covered with a plastic material, such as concrete, which extends to a greater or less extent through the interstices of the wire mesh and is thereby anchored to the same without the necessity of providing any special anchoring devices therefor. Or the layer of plastic material may be formed with the metallic member of open construction, such as wire mesh, entirely embedded therein, and securing devices, such as bolts, also embedded in the concrete and extending beyond a surface thereof, these bolts being secured to the wire mesh member. These securing devices will be rigidly secured to the apices of the depressions on the metal sheet which are in alinement with the securing devices. Or an expanded metal member may be embedded in the plastic material with the lower portions thereof extending beyond a surface of the plastic material in position to be welded or otherwise secured to the apices of the depressions on the lower sheet. Or, in case the lower sheet is not provided with depressions or projections, the lower portions of the expanded metal member may be welded or otherwise secured to the flat surface of the lower sheet so as to leave a space between the plastic material and the lower sheet, the trussing effect being obtained in this case by the portions of the expanded metal connecting the upper and lower portions of the same. Constructions such as those indicated will be of very considerable strength and rigidity and also will be quite economical to manufacture since the wire mesh and expanded metal material are comparatively inexpensive.

In order that a clearer understanding of my invention may be had, attention is hereby called to the accompanying drawings forming part of this application and illustrating certain embodiments of my invention.

In the drawings, Figure 1 represents a partial cross section through a construction embodying my invention; Fig. 2 is a top plan view of the same with certain parts broken away; and Figs. 3, 4 and 5 are partial cross sections through constructions illustrating modified forms of my invention.

Referring first to Figs. 1 and 2 of the drawings, one of the chord members of the truss, which I will refer to as the bottom chord member, comprises the sheet 1, preferably of pressed steel or of other suitable metal, the web members of the truss being formed by the deep depressions 2 which are integral with the sheet 1. These depressions may be formed by a suitable method such as pressing, rolling or molding the sheet and are of a depth many times the thickness of

the sheet 1, as may readily be accomplished by pressing, drawing or metal rolling operations. The depressions may be of any desired shape but are preferably of a frusto-conical shape, as illustrated. They are spaced apart laterally and longitudinally, preferably in a staggered relation, as shown in Fig. 2.

The layer 3 of hard setting plastic material, such as concrete, is formed with the metallic member of open construction, illustrated as the sheet of wire mesh 4 embedded therein. The securing devices illustrated as bolts 5 are also embedded in the plastic material when the same is formed, these bolts being shown as secured to the wire mesh 4 by the engagement of the heads 6 of the bolts with the wire mesh. These securing devices extend beyond the lower surface of the plastic material and may be equal in number to the depressions 2 on sheet 1 and correspondingly spaced so that the apices of the depressions 2 may be rigidly secured to the metallic securing devices.

When the securing devices 5 take the form of bolts or the like, the trussed construction is assembled by simply passing the lower ends of the bolts through corresponding openings formed in the upper ends or apices of the depressions 2 and tightening the nuts 7 of the bolts, as shown, to draw the apices of the depressions into firm engagement with the lower surface of the plastic layer 3. In this case, the wire mesh member 4, together with the layer of concrete in which the same is embedded, will form one chord member of the truss and the sheet 1 will form the opposite chord member, the depressions 2 constituting the web members of the truss.

A modification of the above is illustrated in Fig. 3 in which the wire mesh member 4 is welded or otherwise rigidly secured directly to the apices of the depressions 2 of the sheet 1. The layer 3 of plastic material may be and preferably is formed *in situ* on the wire mesh member 4 either before or after the wire mesh member is secured in position on the apices of depressions 2. The wire mesh member may have the strands of which it is formed spaced at greater or less distance apart as will be determined by the necessities of particular installations and will be of considerable strength. It may be in the form of a flat sheet as illustrated or of other desired configuration.

The plastic material when positioned on the wire mesh in the construction shown in Fig. 3 will, of course, be of greater or less fluidity, as desired, and will pass through the meshes of member 4 to a greater or less extent in accordance with the way the composition is mixed and in accordance with the size of the meshes in member 4. For some purposes, it may be desirable to permit the space between member 4 and the body portion of sheet 1 to be entirely or largely filled by the plastic material which may thus pass freely through the meshes of member 4 to form a reinforced concrete structure. For other purposes, it may be desired to leave an air space, as is shown in Fig. 3, between member 4 and the body portion of sheet 1, which may readily be accomplished as will be understood, in which case the plastic material will penetrate through the meshes of member 4 only sufficiently to firmly anchor the plastic material to the wire mesh. For other purposes, it may be desirable to have the space between member 4 and sheet 1 wholly or partly filled with sound or heat-insulating material or other filling material.

A modification is shown in Fig. 4 in which the layer of plastic material 3 is reinforced by a metallic member of open construction in the form of an expanded metal member. This member has upper portions 8 embedded in the plastic material and lower portions 9 which extend below the lower surface of the plastic material 3, which lower portions are welded or otherwise secured to the apices of depressions 2 of the lower sheet 1. The expanded metal member is stretched in process of its manufacture so as to form portions 10, which extend at an angle between the upper and lower portions 8 and 9, and connecting the same together to provide a strong trussing effect. In the completed structure, when the portions 9 of the expanded metal have been welded or otherwise secured to the apices of depressions 2, the lower sheet 1 constitutes one chord member of the truss and the plastic material 3 with the portions of the expanded metal embedded therein constitute the other chord member of the truss, the depressions 2 together with the connecting portions of the expanded metal member secured thereto constituting the web members of the truss. The layer of plastic material 3 may be preformed with the expanded metal member embedded therein, or it may be poured onto the expanded metal member after the latter has been secured to the depressions 2 so as to entirely or partially fill the expanded metal member.

A further modification is shown in Fig. 5 in which the trussing effect of the expanded metal members 8, 9, 10, embedded in the plastic material 3 is relied upon without the additional use of the integral depressions 2 of sheet 1, previously described. This construction embodies a sheet 1′ which may be a plane sheet of metal to which the parallel lower portions 9 of the expanded metal member are welded or otherwise secured. The concrete or plastic layer 3 may be preformed with the expanded metal member embedded therein in such a manner that the

portions 9 and preferably the lower parts of the connecting portions 10 will extend beyond the surface of the plastic material. Or the expanded metal member may be secured to the sheet 1′ and the plastic material poured thereon so as to extend through the openings of the expanded metal member and to partially or entirely fill the same and extend above the same. Preferably, a space is left between the plastic material and the sheet 1′, as illustrated, which may be used as an air space or filled with insulating or filling material, if desired. In this case, as well as in that illustrated in Fig. 4, the metal of the expanded member is so stretched that the distance between the upper and lower portions 8 and 9 is equal to many times the thickness of the metal employed, so that a strong trussing effect will be obtained and a strong and rigid structure provided with the use of a metal sheet which may be comparatively thin and light.

What I claim is:

1. In a trussed structure, adapted to withstand heavy loads or stresses, the combination of a layer of plastic material, a metallic member which is wholly open in character and at least partly embedded in said material throughout its area, said member extending throughout the lineal extent of said material, and a metal sheet parallel to said layer and to the general direction of said member and rigidly secured to said member, said sheet and member being so constructed as conjointly to form a truss.

2. In a trussed structure, adapted to withstand heavy loads or stresses, the combination of a layer of plastic material, a metallic member which is wholly open in character and at least partly embedded in said material throughout its area, said member extending throughout the lineal extent of said material, and a metal sheet parallel to said layer and formed with permanent integral depressions of a depth many times the thickness of the sheet, spaced apart laterally and longitudinally, the apices of said depressions being rigidly secured to said metallic member of open construction.

3. In a trussed structure, adapted to withstand heavy loads or stresses, the combination of a layer of plastic material, a metallic member of open construction at least partly embedded in said material, securing devices secured to said metallic member within said layer and extending beyond a surface of said layer, and a metal sheet parallel to said surface and formed with permanent integral depressions of a depth many times the thickness of the sheet, spaced apart laterally and longitudinally, the apices of said depressions being rigidly secured to said securing devices.

4. In a trussed structure, adapted to withstand heavy loads or stresses, the combination of a layer of plastic material, a sheet of expanded metal having upper and lower separated portions, said sheet being at least partly embedded in said material, and the distance between said upper and lower portions being many times the thickness of the metal employed in said sheet, said portions being connected by connecting portions adapted to produce a strong trussing effect, and a second sheet rigidly secured to said expanded metal sheet.

5. In a trussed structure, adapted to withstand heavy loads or stresses, the combination of a layer of plastic material, a sheet of expanded metal having upper and lower separated portions, said sheet being at least partly embedded in said material, and the distance between said upper and lower portions being many times the thickness of the metal employed in said sheet, said portions being connected by connecting portions adapted to produce a strong trussing effect, and a second sheet having permanent depressions of a depth many times the thickness of the sheet, spaced apart laterally and longitudinally, the apices of said depressions being rigidly secured to the lower portions of said sheet of expanded metal.

This specification signed and witnessed this 3d day of January, 1919.

JOHN O. MADISON.

Witnesses:
I. McIntosh,
Anna Oates.