Nov. 25, 1952 P. ORZEL 2,618,960

REINFORCED PLASTIC STRUCTURAL UNIT

Filed March 23, 1946 2 SHEETS—SHEET 1

Fig 1

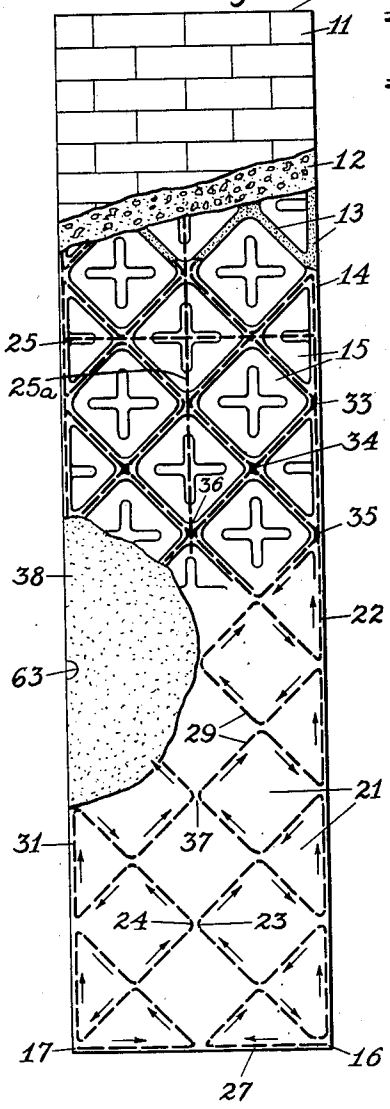


Fig. 2

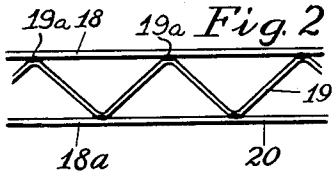


Fig. 3

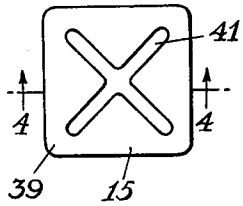


Fig. 4

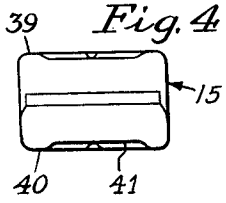


Fig. 5

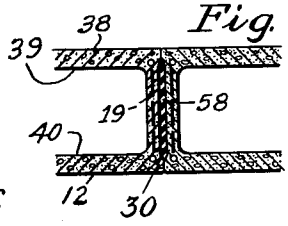


Fig. 6

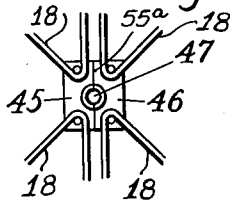


Fig. 7

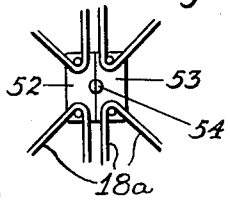


Fig. 8

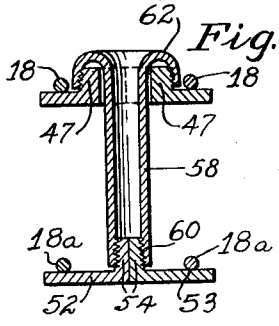
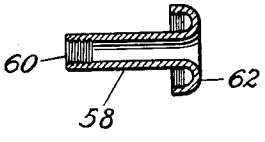


Fig. 9



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REINFORCED PLASTIC STRUCTURAL UNIT

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Fig. 10.

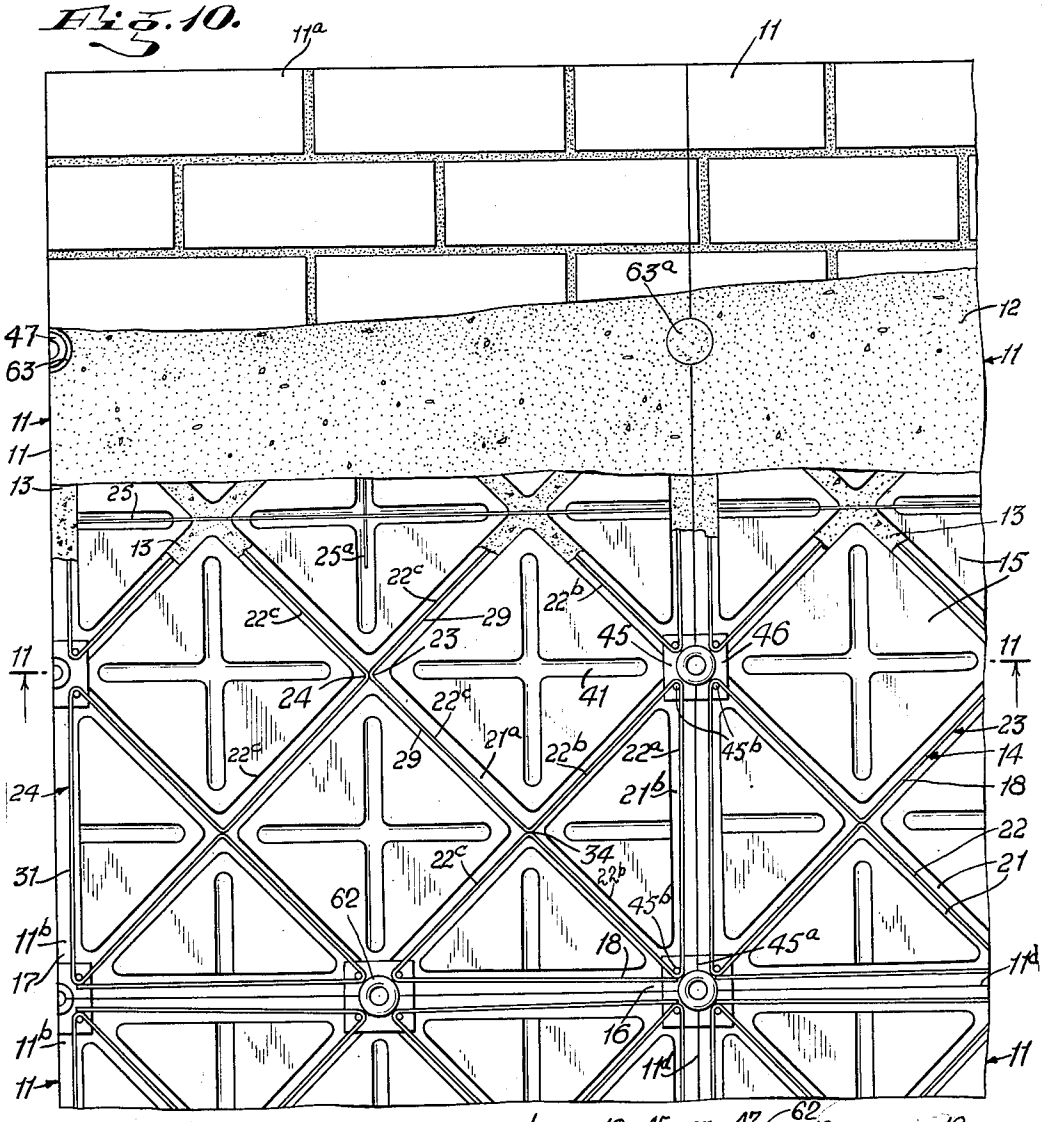
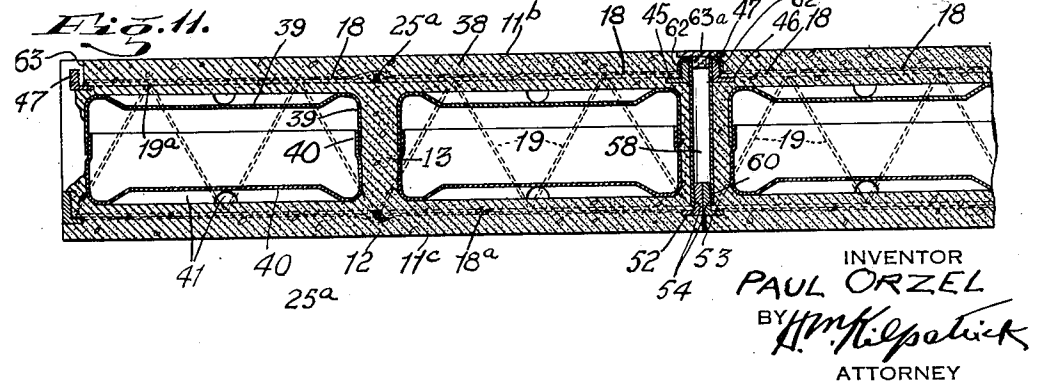


Fig. 11.



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Patented Nov. 25, 1952 2,618,960

UNITED STATES PATENT OFFICE

2,618,960

REINFORCED PLASTIC STRUCTURAL UNIT

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Application March 23, 1946, Serial No. 656,547

17 Claims. (Cl. 72—42)

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This invention relates to a new and improved structural unit having a predetermined outside finish in color if required, and an inside plaster finish for prefabricated houses and the method of making and constructing same.

A principal object of my invention is to provide a type of construction that can be used for dwellings, garages, barns, barracks, tanks, pools, barges, boats or similar structures.

Further objects of my invention are as follows:

To provide such a structure that the manufacture, assembly and erection is entirely new, modern and practical.

To precast such a structure in light weight sections that interlock to form a unit or to form the structure in one complete unit.

To construct such interlocking units so that when they are formed into a completed structure they act structurally as a homogeneous mass.

To so construct such sections that they are internally reinforced and can withstand substantial tension, compression, shear or bending which permits the sections to be used for floors, roofs, or walls.

To so construct such sections or units that a four inch thick precast unit, two feet wide by eight feet long, will support a uniform live load of at least 45 lbs. per square foot and weight only 5 lbs. and 10 ozs. per square foot, so that the unit will float in water 1.1 inches submerged and 2.9 inches free board.

To form such a unit that it can be finished to imitate any type of masonry, tile or wood in any color.

To provide such a unit that it will have high insulating qualities against sound and temperature; and, so that it will be fireproof, waterproof and verminproof.

To make a unit that will not be subject to unequal contraction and expansion; and, will lend itself very easily to heating and air conditioning in an economical and efficient manner.

To provide a house formed of such units that the house will be permanent, and will not need any attention, paint or repairs to the exterior.

To provide such a construction, manufacture and method of erection of such units to framing where required so as to form a homogeneous structure of integral members that will distribute load and stress in a completed floor or wall, or in combination.

To provide such a house that the footing course and foundation wall construction will distribute its load on a maximum soil area.

To make such a house that the basement floors

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or walls or any part of the structure above grade will be dampproof.

To provide a structural unit capable of carrying a load on the flat or edge side as well as on any side thereof.

To provide a structural unit for a wall, floor partition or roof section that is manufactured as a complete unit for inside or outside architectural finish, that contains all these features together with temperature or sound insulation, and structural rigidity that when interlocked in a completed structure, will transmit stress through the entire structure regardless wherever the load may be applied by virtue of the fact that the structural element (interconnecting trusses prestressed) must transmit this stress throughout its entirety.

Other objects too numerous to mention will become apparent from a reading of the following specification taken in conjunction with the drawings.

All of the foregoing objects are attained by my invention of which a preferred embodiment is shown and illustrated in the drawings, forming a part of the specification, in which—

Fig. 1 is a view in elevation of one of the structural units which, for purposes of illustration, has portions cut away,

Fig. 2 is a detailed side view in elevation of a portion of the trussed frame showing the diagonals,

Fig. 3 is a top plan view of one of the hollow forms or cores used in my structural unit,

Fig. 4 is a sectional view along the line 4—4 of Fig. 3 of the hollow form shown in Fig. 3,

Fig. 5 is a top plan sectional view showing two structural units joined together,

Fig. 6 is a top plan sectional view of a part of the locking or uniting means for locking two or more units together,

Fig. 7 is a detailed view of the other part of the same uniting means,

Fig. 8 is a cross sectional view of the said locking means,

Fig. 9 is a cross-sectional view showing of the screw-threaded member used in uniting the parts shown in Figs. 6 and 7.

Figs. 10 and 11 are respectively front elevation and transverse section of adjacent structural units locked together, parts of Fig. 10 being removed.

Referring now in detail to the various views shown in the drawings—

Like numerals refer to like parts of the structure throughout the several views of the drawings.

In Fig. 1 there is shown a unit 11 having a brick facing 11*a* which can easily be put onto the structural unit. Of course, any other type facing can be used but I merely show a brick facing for purposes of illustration. This view shows the facing broken away and a part of the top concrete slab 12 exposed and the balance of the concrete removed. Immediately below this concrete slab 12 there is shown hollow forms or cores 15 of Figs. 3 and 4 and the concrete partitions 13 enclosing the trussed frame 14. At the lower part of the view the hollow forms 15 and the concrete have been removed. This part shows the trussed frame 14 and the manner in which it is bent. As shown in this Fig. 1 the horizontal bending of the trussed frame starts at the bottom corners 16, 17 and follows the paths indicated by the arrows.

This unit is made by first taking two chords or flange wires 18 and 18*a* (Fig. 2) and laying them in spaced parallel relation to each other. Between these chords 18 and 18*a* there is placed a lacing or diagonal wire 19 in the manner shown in Fig. 2 to form a warren or zig-zag truss. At each place that diagonal wire 19 contacts chords 18 and 18*a* they are welded together or joined in any other similar manner.

All wires, both chord and diagonal, are substantially uniformly prestressed prior to being made part of the structural unit. While a definite distance of spacing between the chords 18 and 18*a* is indicated in the drawings it should be clearly understood that this is for the purpose of illustration only. The distance between the chords is determined by the manufacturer depending upon how thick the final structural unit is to be. If the unit is to be very thick then the space between the chords will be greater. If the unit is to be relatively thin then the cords will be placed closer together.

While I show and describe the chords and diagonals as wires it should also be understood that this also is only for illustration and that any other similar reinforcing material can be used. In manufacturing the structural units I prefer to have the chords 18, 18*a* made of a larger diameter than the diagonal wires 19.

After one of these trusses (as shown in Fig. 2) is thus made of a selected length and width it is then placed on its edge 20 as shown in Fig. 2 and bent horizontally into a series of geometrically shaped areas 21 to form a trussed network 22 as shown at the bottom of the view in Fig. 1. The truss frame 14 is bent to follow the path indicated by the arrows in Fig. 1 so that one continuous truss will form the frame for the right side (23) of the unit. The other side (24) will be formed from another similar trussed frame bent in the same manner. The right trussed frame 23 is so bent that part of it also forms a line half-way across the top 26 and a line 27 half-way across the bottom. The balance of this frame forms oblique lines 29 running halfway across the units. When the left trussed frame 24 is formed the left side thereof will form a line 31 running down the left side of the structure. This left truss will also form lines halfway across the top 26 and bottom 28, respectively. Thus the trusses will form frames for themselves. Due to the manner in which the trusses are bent no such line as heretofore mentioned will be formed on the left side of the right truss or on the right side of the left truss. However, after both a right and a left truss are inserted in the unit I can if so desired, insert a straight trussed frame member between said two trusses to form a center support. Such an added member would, of course, lend added strength to the structural unit.

The diagonals 19 of the two trusses 23, 24 are so arranged that they run in the same line with each other so that when they are joined together the diagonals of both trusses are united to form larger diagonals for the entire unit. And as the several units are joined together they are joined at the ends of each such larger unit diagonal. In this manner all the diagonals of the several units unite to form still larger diagonals for the structure which they form, as for example, a wall. The method and means for joining these units and diagonals will be described hereinafter.

At each point that the trussed frame contacts itself, such as at points 33, 34 and 35, and all other similar contact points, the trussed frame is welded at both the top and bottom chords of the truss. In addition to this the right truss makes contact at various places in the center of the unit with the left truss. At each point, such as points 36, 37 and all other similar points of contact, these two trusses are welded together at the top and at the bottom chord of the truss. In this manner the two trusses, the right (23) and the left one (24), are formed into a unitary structure 14.

After the unitary structure 14 is thus formed, one of the edges 20 thereof is then embedded into concrete to be formed into a slab for my structural unit. This slab 38 into which the truss 14 is embedded is formed by pouring concrete into the bottom of a forming mold (not shown), which mold is of the same shape as the final structural unit. Enough concrete is poured into the mold to form one slab 38 of my unit. After pouring and before the concrete has set the truss frame edge 20 is embedded therein.

The truss frame is thus welded, and embedded in the concrete. It will be recalled that the horizontal bending of the truss formed geometrical areas 21. Into each of these areas 21 there is placed a hollow form 15, such as is shown in Figs. 3, 4. This form can be made of any cheap, semi-rigid waterproof material such as cardboard. Contained within these hollow members 15 is dehydrated air.

One of these hollow forms 15 is shown in Figs. 3 and 4. Fig. 3 shows a top plan view and Fig. 4 is a cross-sectional view. This hollow form is made of such a size that it will fit into one of the same shaped areas 21 formed by the horizontal bending of the truss frame 14. The top 39 and bottom 40 of the hollow form or core has a bumped-in depression 41 to form reinforcements for the facing. While I have shown the particular depression in the form of an X I, of course, can use other similar depressions or means.

After the hollow forms 15 are inserted in these geometrical areas 21 concrete is then poured onto the trussed frame 14 and the hollow forms 15 therein. The concrete will fill the bumped-in depression 41 and act as a strengthening means for said box. In addition this will aid in keeping the box in position at all times.

However, this only acts in the latter capacity after the concrete has been poured and has set. Before that, in order to hold the forms in position, a metal clip is affixed securely to the box. This metal clip will then be clipped onto the chords of the trussed frame. This clip is of a rigid material so that the box will be spaced

from the chords but at all times will remain stationary.

On top of this hollow core and on a line running across the top from one corner to the opposite corner there will be a wire **25** (shown in Fig. 1). Another wire **25***a* will then be run across this wire **25** at substantially right angles to it. These wires **25** and **25***a* will run across the bumped-in depression **41** following the path of such depression. At each point (see Fig. 1) that wires **25, 25***a* cross each other they are welded together. In like manner, at each point that they cross the chords of trussed frame **14** they are welded thereto. This thus gives added strength to the structural unit at points immediately above said hollow forms or cores and adapts this type of unit with such reenforcing wires **25, 25***a* for particular use as a floor unit.

The forms **15** are made of such a size that a small space is left between the outer sides of the hollow forms and the sides of the bent truss around the areas **21**. Concrete can then be poured between said hollow forms and sides which concrete will cover all parts of structure of the truss frame, including the chords and diagonals, thus forming concrete partitions **13** throughout the unit.

More concrete is then poured into the forming mold and over the entire structure and the hollow forms. The mold in which the unit is placed is of a selected size and shape so that only a small space exists between the outer frame of the truss and the wall of the forming mold so as to allow the poured concrete to enter therein to form walls for the structural unit in its completed form.

This space is determinative of the thickness of the walls of the structural unit. The size of the space will therefore be determined by the builder depending on the thickness of the walls that is desired. The larger the space the thicker the wall and the smaller the space the thinner the wall.

The concrete upon being poured in will not only fill the space between the walls of the vat and the sides of the truss frame but will also fill all empty spaces in the truss. It will thus cover all the diagonals and chords of the truss and all the hollow forms. The concrete pouring is continued until the entire structure is covered and a sufficiently thick wall or slab **12** is obtained on top.

The chords and diagonals are thus embedded in concrete and both lend support to each other. Air is also thus trapped in each of the hollow forms set in the truss frame. This air acts as a strengthening element for the structural unit as any pressure exerted on the unit will be resisted by the trapped air. The same air spaces not only act as supporting elements but also are very poor conductors of sound, heat and cold. They, therefore, give a sound-proofing advantage to this type of structure. Also since they are poor conductors of heat and cold the house of which they are formed will retain the heat therein when it is cold outside. The outside cold will not penetrate very easily. This, therefore, also gives the house good insulation against the weather.

One of the important steps in carrying out my invention is to bend the truss form **14**, of all the structural units that form one wall, uniformly and at such angles that when a plurality of units are placed side by side the chords and diagonals will line-up with each other and they will have the same effect structurally, when joined together, as if full wall length truss frames were extended throughout the entire wall, interlaced and supported by each other.

I have now described one of my structural units and the method of constructing such a unit. I will now describe the method and means for interlocking one such structural unit to another.

Fig. 5 is a top sectional view showing two structural units joined together by the locking means the details of which are shown in Figs. 6, 7, 8, and 9. Into the opening **30** which exists between structural units, due to the shaping of them in the forming mold, there is poured a waterproof concrete mix which after it has set not only joins the concrete of the units together but cause the joint between said units to be waterproof.

In Fig. 6 there is shown a top plan view of the top split plate of the locking device. This plate is a split plate. One part **45** is embedded in one structural unit and the other part **46** is embedded in the unit to be joined. This plate in addition to being embedded in the concrete is also secured, by welding or otherwise, to the top chords **18** of the trussed frames of the units to be joined.

The chords **18** as shown are joined to split plates **45, 46**. In the center there is shown a split tube **47** threaded on the outside and welded to the plate. The left part of tube **47** is welded to the left part **45** of the split plate. The right part of the tube **47** is welded to the right part **46** of the split plate. When these parts of the tube are joined together by positioning one unit next to the other these split parts will form a complete circular tube **47**. This threaded split tube **47** and the split plate **45, 46** to which it is welded are used to join the outside faces of the units shown in Fig. 1.

Another similar split plate is used to join the inner slabs of the structural unit of Fig. 1. This plate which is shown in Fig. 7 is also a split plate having two parts **52** and **53** one of which is embedded in one unit and the other in the unit to be joined thereto. However, this plate instead of having a split tube attached to it has a split bolt stub **54** welded to it. One half of the stub being threaded and welded to one half (**52**) of the split plate. The other threaded half of the stub **54** is welded to plate **53**. When these two half stubs are joined together they form a complete circular threaded stub **54**. This plate **52, 53** is secured to the inside wall of the outside slab **12** and faces in the direction of the inside slab **38**. The stub is on the side of this split plate **52, 53** facing in the same direction. This split plate **52, 53** is so positioned that it is directly opposite the split plate **45, 46** so that the two plates can be joined together by the threaded cylindrical member **58** shown in Figs. 8 and 9. This member is tubular and is threaded on the inside at one end **60**. The opposite end has integrally formed therewith a threaded hood **62**. This hood **62** has the threads on the inside thereof.

By this means both the inner slabs and the outer slabs as well as the trussed frames are securely joined together. A small semi-circular opening **63** is left in each of the inner slabs directly above the split tube **47** so that when the units are side by side access can be had to the locking members. When the units are placed side by side ready for fastening together these semi-circular openings **63** will form a complete circular hole. Into this circular hole the cylin-

drical threaded member 58 of Figs. 8 and 9 is inserted by inserting threaded end 60 into the hole 63 first. This end 60 which is screw threaded on the inside engages the outer threads of stub 54. At the same time the threads on the inside of the hood 62 at the other end engage the threads of split tube 47.

This member (Fig. 9) can thus be screw threaded to both split plates at the same time in one operation. This cylindrical locking member will not only interlock the units together but will at the same time act as a support between the outer slab 12 and the inner slab 38.

By the use of this locking means no hole will appear on the outside of the unit. Holes will only appear on the inside between units. After a wall of such units is thus formed a locking nut can then be screw threaded on top of the cylindrical member and then concrete can be poured over said locking members to protect them and give the inside of the wall a better appearance.

In actual manufacture I leave small semi-circular openings in the inner slab 63 to facilitate the locking heretofore described. These openings are left by the mold in which the unit is finally formed.

Each unit can be so formed at its upper and lower ends and at intermediate points that a recess appears therein opposite each place of the unit where the inner frame is welded as at points 33 and 35 and all such similar places. Such a recess is of a size sufficient to allow the insertion of the cylindrical member 58.

These screw threaded members 47 and 54 are slightly tapered so that when member 58 is threaded thereon it will force the two adjacent units closer together thus giving a very tight and strong joinder. In this manner all truss members are again prestressed insuring that units thus connected must transmit stress one to the other thus producing rigid continuous structure. Also all sides of slab are ground, so butt joints painted with varnish between will produce a water tight joint.

After the structural unit has been constructed it will thus be waterproof. It can thus be used to form a boat, such as a barge for example, as there will be a large displacement of water with little comparative weight due to the large amount of trapped air contained within the individual units.

As shown in Figs. 10 and 11, my improved building structure may comprise a plurality of right prismatic units 11 disposed edge to edge at sides and ends and having wide exposed front and rear faces 11*b*, 11*c* and adjacent corner portions 16, 17 and narrow contracting and alined edge faces 11*d* in intersecting planes. Each unit comprises a pair of truss frames 23, 24 in the unit each comprising a pair of continuous spaced parallel wire chords 18, 18*a* near and parallel to said wide faces 11*b*, 11*c*. The continuous zig-zag wire 19 between the chords in the planes of the chords comprises diagonal sections having staggered points of contact 19*a* with the chords welded to the chords.

The wires of each frame are bent at some of said points of contact 19*a* to form, within the unit, truss sections 22*a*, 22*b*, 22*c* defining series of right and triangular prismatic enclosures or spaces 21*a*, 21*b*. The triangular spaces 21*b* have chord sections 22*a* secured end-to-end, alined and disposed near and parallel to edge faces 11*d* of the units 11. The right spaces 21*a* have chord sections 22*b* diagonal to said edges 11*d* common

with chord sections of the triangular spaces 21*b* and alined with chord sections 22*c* of the other frame to determine additional right prismatic spaces. The adjacent ends of all adjacent diagonal chord sections 22*b*, 22*c* are welded together. The additional longitudinal and transverse wires 25, 25*a* parallel to said wide faces 11*b*, 11*c* and diagonal to said right spaces 21*a* are connected and welded to the ends of the chord sections 22*c*.

The light weight hollow forms of waterproof cardboard are filled with dehydrated air and comprise telescoping sections 39, 40 and approximately fill said spaces 21*a*, 21*b* and have bumped-in trough shaped depressions 41 disposed diagonally across the front and rear faces of the forms. The filling of plastic material such as concrete encloses said frames and comprises front and back portions 12, 38, and partitions 13 between the forms, enclosing the forms and said wires on all sides, and filling said depressions 41 to form ribs in the filling to strengthen the filling between the truss sections.

The locking means at said adjacent edge faces 11*d* and corner portions 11*b* for locking said units together comprises split plates 45, 46 respectively having sections embedded in said filling near and parallel to said front and back faces 11*b*, 11*c* respectively, the sections having contacting edge faces 45*a* flush with the edge faces 11*d* of the units. The wide outer faces of said sections 45, 46 are welded as at 45*b*, to the ends of adjacent chord sections 22*a*, 22*b* of the triangular spaces of adjacent units 11 at angles of the chords 18. The sections 45, 46 respectively of one split plate having, at the split, arcuate recesses cooperating to form a circular recess, and adjacent to each recess and exteriorly threaded tube or boss part raised in a direction away from the other split plate and cooperating to form an exteriorly threaded tube or boss 47.

The sections of said other plates 52, 53 are respectively provided with longitudinally split stud sections together cooperating to form a threaded split bolt stud 54 axially alined with said boss 47. A cylindrical member 58 passing through said boss 47 has inner threads 60 at one end receiving said stud 54, and at the other end having an interiorly threaded hood 62 receiving the threads of the split boss 47, thereby holding said sections 45, 46, 52, 53 and said units 11 together. The cut-outs 63 through which said hoods 62 move into place on the boss are filled with a plastic plug 63*a* set in said cut-outs and covering said hood.

It will be noted that diagonal chord sections are alined and secured together by welding and locking means and together transmit stresses across the units 11 and across the adjacent faces between adjacent units at the sides and ends of the units.

Having now described a preferred embodiment of my invention and having illustrated same in the drawing, I wish it to be understood that I am not to be limited to the details therein set forth as the structure may be modified and changed in various ways all within the direct intent and meaning of the invention as will be apparent from the scope of the appended claims.

What I claim is:

1. A structural unit comprising a truss frame formed of two main spaced substantially parallel chords, and a tie element secured to said chords at points spaced along said chords, said frame being bent, and welded at spaced points to

define geometrical spaces within said structural unit, hollow forms within said spaces, and a plastic filling covering said truss frame and forms.

2. A structure comprising a plurality of units as defined in claim 1 disposed edge to edge, in which the said chords are joined to run continuously obliquely across said structure from unit to unit and around the inside of the perimeter of said structure.

3. A building structure comprising units having adjacent edge faces; a pair of truss frames in each unit having spaced chords and connecting diagonals, and formed into truss and chord sections surrounding and defining series of triangular and rectangular spaces; and a filling material enclosing said frames and comprising front and back portions; and locking means in said units at said adjacent edge faces and secured to chords of both adjacent frames in said portions locking said units together; the truss sections defining the rectangular spaces associated with each truss frame having chord sections in common and chord sections associated with said triangular spaces and the diagonal chord sections adjacent and alined with chord sections of the other frame to determine additional right prismatic spaces; the adjacent ends of all adjacent chord and diagonal sections being welded together.

4. A building structure comprising a plurality of right prismatic concrete units disposed edge to edge at sides and ends and having wide exposed front and rear faces and adjacent corners and narrow contacting and alined edge faces in intersecting planes; each unit comprising a pair of continuous spaced parallel wire chords near and parallel to said wide faces; and a continuous zig-zag wire between the chords in the planes of the chords and comprising diagonal sections and having staggered points of contact with the chords welded thereto; said wires of each frame being bent at some of said points of contact to form, within the unit, truss and chord sections defining series of right and triangular prismatic spaces; the chord sections defining said spaces having chord sections contacted and welded end-to-end, alined and respectively disposed diagonal to and near and parallel to edges of the unit; chord sections of one unit being substantially alined with corresponding chord sections of adjacent units.

5. A truss-frame adapted to be embedded in a plastic building structure unit having wide front and back faces and edge faces; said truss frame comprising a pair of spaced parallel wire chords and a tie wire between the chords having staggered points secured to the chords; said frame being bent at some of said points of contact to form truss and chord sections defining and surrounding series of substantially right and triangular prismatic spaces; certain of the chords of the truss sections contacting and being substantially alined and secured end-to-end, and forming perimeters of the frame and diagonals across the frame.

6. In a combination, a plurality of prefabricated reinforced concrete structural units disposed in edge-to-edge relationship, each unit having spaced wide faces and connecting edge faces, a truss frame embedded within each unit, said truss frames comprising spaced wire chords disposed adjacent said wide faces and a zig-zag wire disposed between said spaced wire chords and connected thereto, the points of connection with one wire chord being staggered with respect to the points of connection with the other chord; said frame being formed into truss sections surrounding and defining series of spaces and forming chord sections joined end-to-end to transmit stress across the unit; and locking means in said units at said adjacent edge faces and secured to both adjacent chords of both adjacent units locking said units together.

7. In combination, a plurality of prefabricated reinforced concrete structural units disposed in edge-to-edge relationship, each unit having spaced wide faces and connecting edge faces, a truss frame embedded within each unit, said truss frames comprising spaced wire chords disposed adjacent said wide faces and a zig-zag wire disposed between said spaced wire chords and connected thereto, the points of connection with one wire chord being staggered with respect to the points of connection with the other chord; said frame being formed into truss sections surrounding and defining series of spaces and forming chord sections joined end-to-end and disposed diagonal to and parallel and near to said edge faces; and locking means in said units at said adjacent edge faces and secured to both adjacent chords of the adjacent units for locking said units together; chord sections of adjacent units at the locking means, and other chord sections secured thereto being alined, to transmit stresses to and across adjacent locking sections.

8. In combination, a plurality of prefabricated reinforced concrete structural units disposed in edge-to-edge relationship, each unit having spaced wide faces and connecting edge faces, a truss frame embedded within each unit, said truss frames comprising spaced wire chords disposed adjacent said wide faces and a zig-zag wire disposed between said spaced wire chords and connected thereto, the points of connection with one wire chord being staggered with respect to the points of connection with the other chord; each frame being bent at some of said points of contact to form, within the unit, truss sections defining series of substantially right and triangular prismatic spaces; certain truss sections contacting and being substantially alined and welded end-to-end, and some disposed near and parallel to edges of the unit.

9. In combination, a plurality of prefabricated reinforced concrete structural units disposed in edge-to-edge relationship, each unit having spaced wide faces and connecting edge faces, a truss frame embedded within each unit, said truss frames comprising spaced wire chords disposed adjacent said wide faces and a zig-zag wire disposed between said spaced wire chords and connected thereto, the points of connection with one wire chord being staggered with respect to the points of connection with the other chord; each frame being formed into truss sections surrounding and defining series of spaces; each unit having a filling material enclosing said frames; and split locking devices in said units respectively at said adjacent edge faces and secured to adjacent chords; and means locking said devices together.

10. In combination, a plurality of prefabricated reinforced concrete structural units disposed in edge-to-edge relationship, each unit having spaced wide front and back faces and connecting edge faces, a truss frame embedded within each unit, said truss frames comprising spaced wire chords disposed adjacent said wide faces and a zig-zag wire disposed between said spaced

wire chords and connected thereto, the points of connection with one wire chord being staggered with respect to the points of connection with the other chord; said frame being bent to form, within the unit, straight truss sections defining series of spaces around which the sections are secured; hollow forms approximately filling said spaces and slightly spaced from the truss sections; and a filling of plastic material enclosing said forms and frames and having front and back portions; locking means at said adjacent edge faces locking said units together and comprising split plates having sections embedded in the filling of adjacent units respectively near said front and back faces; said split sections being secured to the ends of adjacent chord sections at angles of the chords; and a member connected to all of the sections of the split plates of each locking means and holding said split sections and the adjacent portions of the units together.

11. A locking means comprising a pair of split plates having sections having contacting edge faces; the sections of one split plate cooperating to form a circular recess and a surrounding exteriorly threaded boss; the sections of said other split plate being provided with stud sections cooperating to form a threaded bolt stud axially alined with said boss; and a cylindrical member passing through said boss and having threads engaging the stub, and having an interiorly threaded hood receiving the threads of the split boss, thereby holding said split sections together.

12. In combination a plurality of structural units each having adjacent edge faces and wide front and back faces and a truss in each unit comprising parallel chords and formed into truss sections surrounding and defining series of spaces and providing chord sections having angles adjacent to said edge faces; and locking means in said units at said adjacent edge faces and comprising split plates respectively having sections embedded in said units near and parallel to said front and back faces respectively, the sections having contacting edge faces flush with the edge faces of the units; the faces of said sections being welded to the ends of adjacent chord sections; the sections respectively of one split plate having, at the split, arcuate recesses cooperating to form a circular recess, and adjacent to the recess an exteriorly threaded boss part raised in a direction away from the other split plate and cooperating to form an exteriorly threaded boss; the sections of said other plates being respectively provided with longitudinally split stud sections together cooperating to form a threaded split bolt stud axially alined with said boss; and a cylindrical member passing through said boss and having inner threads at one end receiving and engaging said stud, and at the other end having an interiorly threaded hood receiving and engaging the threads of the split boss, thereby holding said sections and units together.

13. In combination a plurality of prefabricated reinforced concrete structural units disposed in edge-to-edge relationship, each unit having spaced wide front and back faces and connecting edge faces, a truss frame embedded within each unit, said truss frames comprising spaced wire chords disposed adjacent said wide faces and a zig-zag wire disposed between said spaced wire chords and connected thereto, the points of connection with one wire chord being staggered with respect to the points of connection with the other chord; and locking means in said units at said adjacent edge faces and secured to chords of both adjacent frames in said portions for locking said units together; said locking means comprising split plates respectively having sections embedded in said units near and parallel to said front and back faces respectively, the split sections having contacting edge faces flush with the edge faces of the units; said split sections being welded to the ends of adjacent chord sections at angles of the chords; the sections of one split plate cooperating to form a circular recess, and a surrounding exteriorly threaded boss; the sections of said other split plate being provided with sections cooperating to form a threaded bolt stud alined with said boss; and a cylindrical member passing through said boss and having threads engaging the stub, and having an interiorly threaded hood receiving and engaging the threads of the split boss, thereby holding said split sections and units together.

14. A building structure unit saving spaced wide faces and edge faces and adapted to be joined at said edge faces to similar units and a truss frame therein comprising chords forming angles adjacent to said wide and edge faces; a filling material enclosing said frame; and pairs of plate sections secured to said angles and embedded in said filling near and parallel to said wide faces respectively, the sections having edge faces flush with said edge faces; said plate sections being disposable edge-to-edge with similar plate sections in another unit.

15. A unit having spaced wide faces and edge faces adapted to be joined to similar units and comprising a truss frame having spaced chords in said units near said wide faces respectively and ties between the chords; said frame being formed into truss and chord sections joined end-to-end and disposed diagonal to and parallel and near to said edge faces and forming angles near said edge faces; a filling enclosing said frame; and plate sections welded to the chords at said angles and embedded in said filling near and parallel to said wide faces and having edges flush with said edge faces; one plate section being formed to cooperate with a similar plate section in another unit to form an exteriorly threaded boss, the plate section at the other wide face having a stud section adapted to cooperate with a stud section of another unit to form a threaded stud alined with said boss.

16. A structure comprising an assembly of units having wide front and back faces, and adjacent edge faces; a truss frame in each unit comprising spaced wire chords near and parallel to said wide faces respectively; and a zig-zag wire between the chords having staggered points secured and welded to the chords; said frame being bent to form within each unit straight chord and truss sections defining series of prismatic spaces around which the sections are secured and having adjacent chord sections alined and secured together; and a filling of plastic material enclosing said frames; sets of split plates respectively having sections embedded in said filling adjacent to edge faces near said front and back faces respectively; and a locking member connected to all of the sections of the split plates of each set holding said sections of the split plate and the adjacent portions of the units together; adjacent chord sections being secured together and alined to form straight continuous members stretching entirely across the unit from edge face to edge face and radiating from and secured to

said sections of the split plate and alined with similar continuous members of the adjacent unit to transmit stresses through the locking members and split plates to and across the assembly of units to strengthen the assembly as a whole.

17. In combination, units having wide front and back faces, and adjacent end faces; a truss frame in each unit comprising spaced wire cords near and parallel to said wide faces respectively and a zig-zag wire between the chords having staggered points secured and welded to the chords; said frame being bent to form within each unit straight chord and truss sections defining series of prismatic spaces around which the sections are secured and having adjacent chord sections alined and secured together and a filling of plastic material enclosing said frames; split plates respectively having plate sections embedded in said filling near said front and back faces respectively; and a locking member connected to all of the plate sections of the associated split plates holding said plate sections and the adjacent portions of the units together; said adjacent chord sections being secured together and alined to form straight continuous members stretching entirely across the unit from edge face to edge face and radiating from and secured to said plate sections and alined with similar continuous members and adjacent unit to transmit stresses through the locking members and split plates to and across the assembly of units to strengthen the assembly as a whole.

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