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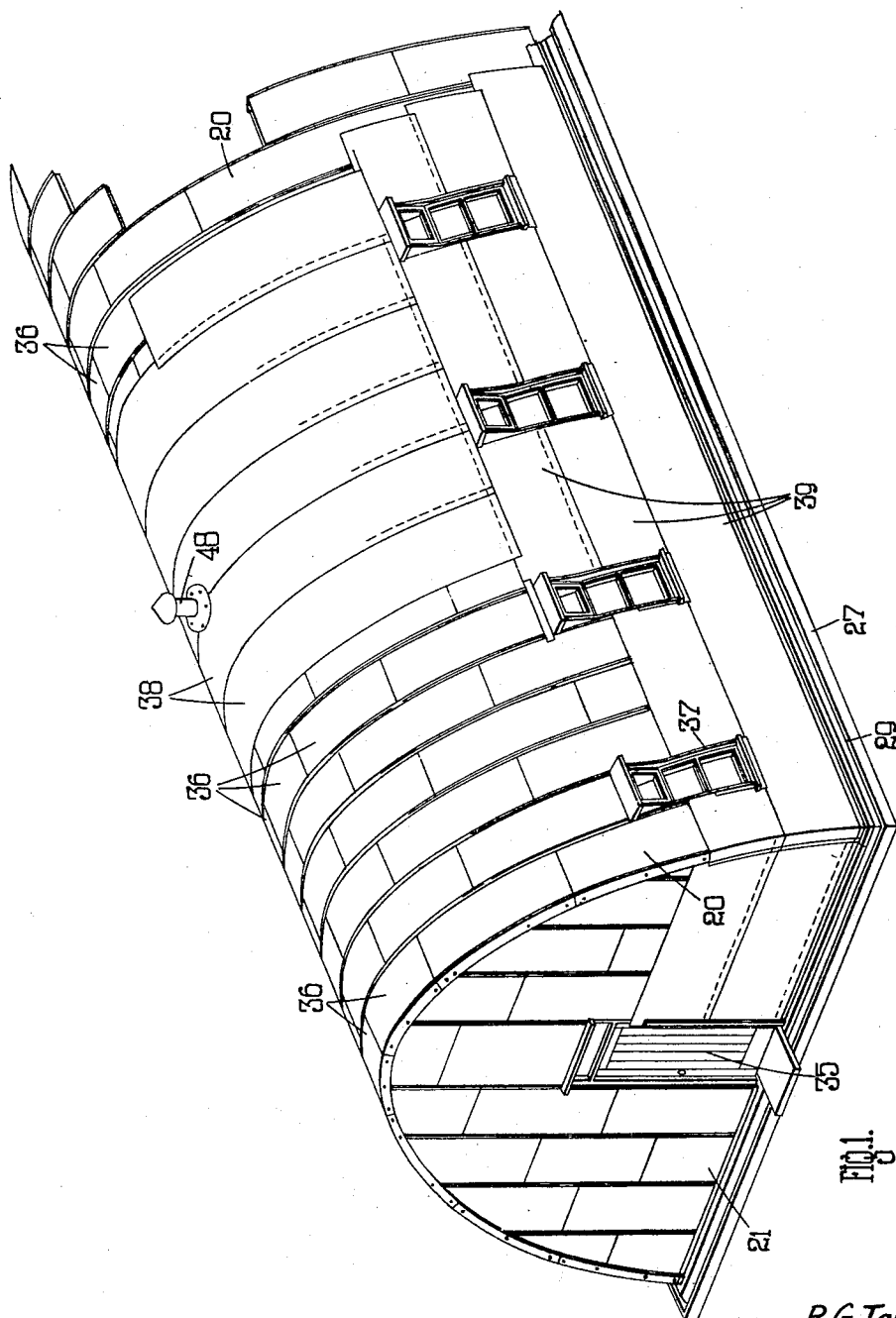
R. G. TARRAN

2,297,175

BUILDING OR STRUCTURE

Filed March 12, 1941

4 Sheets-Sheet 1



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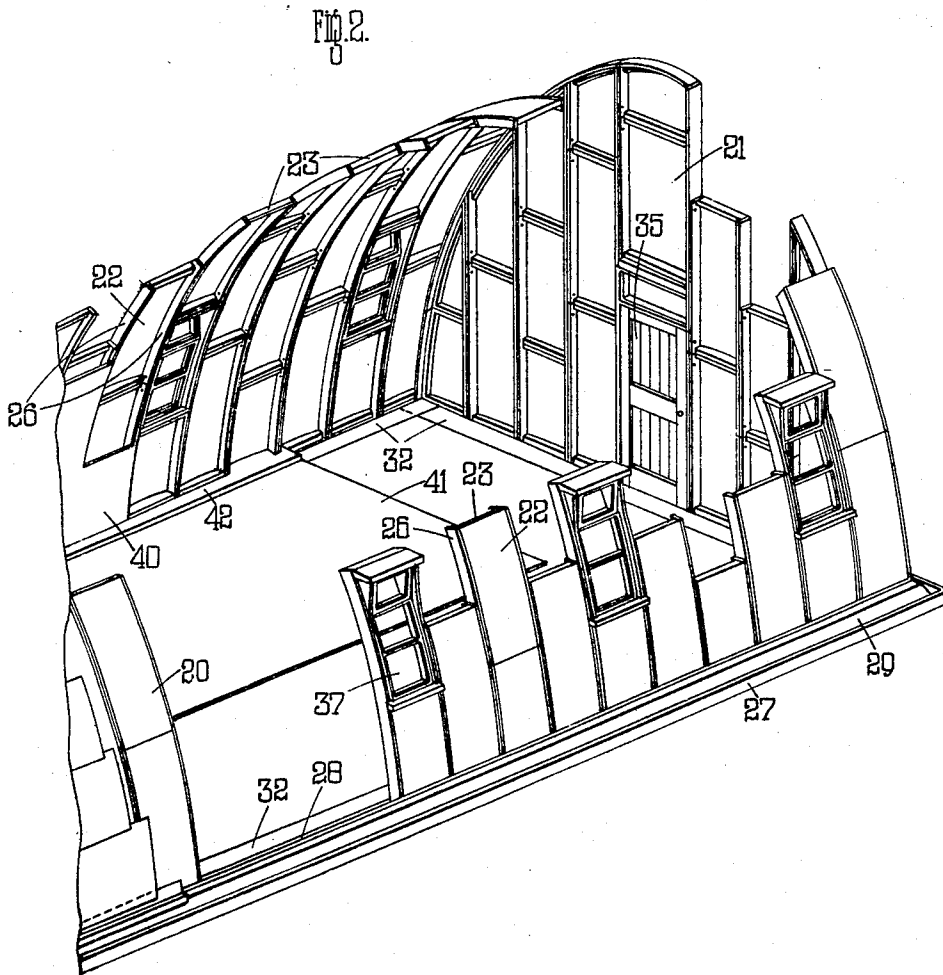
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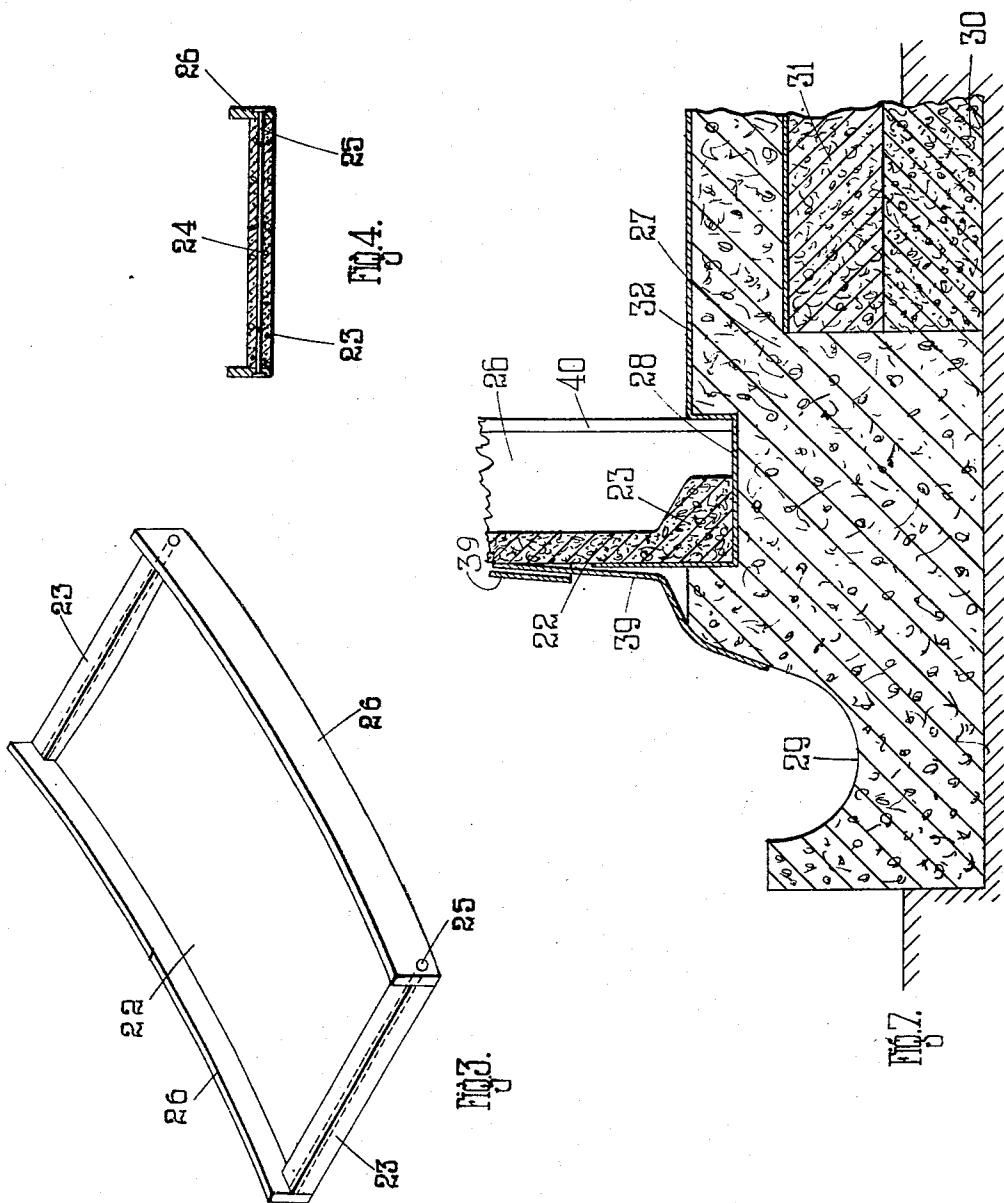
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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

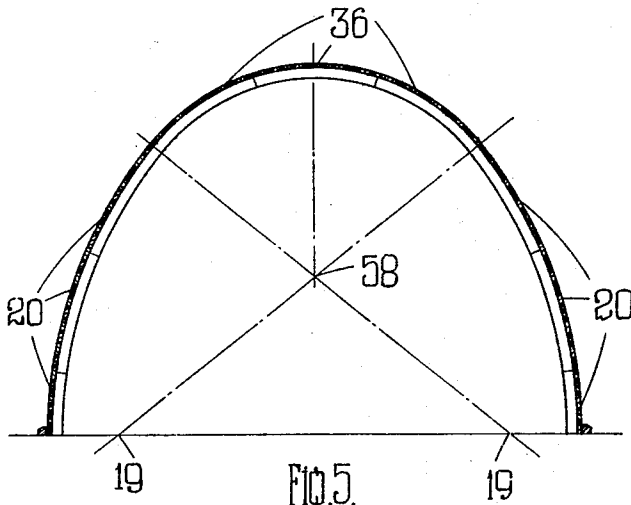


FIG. 5.

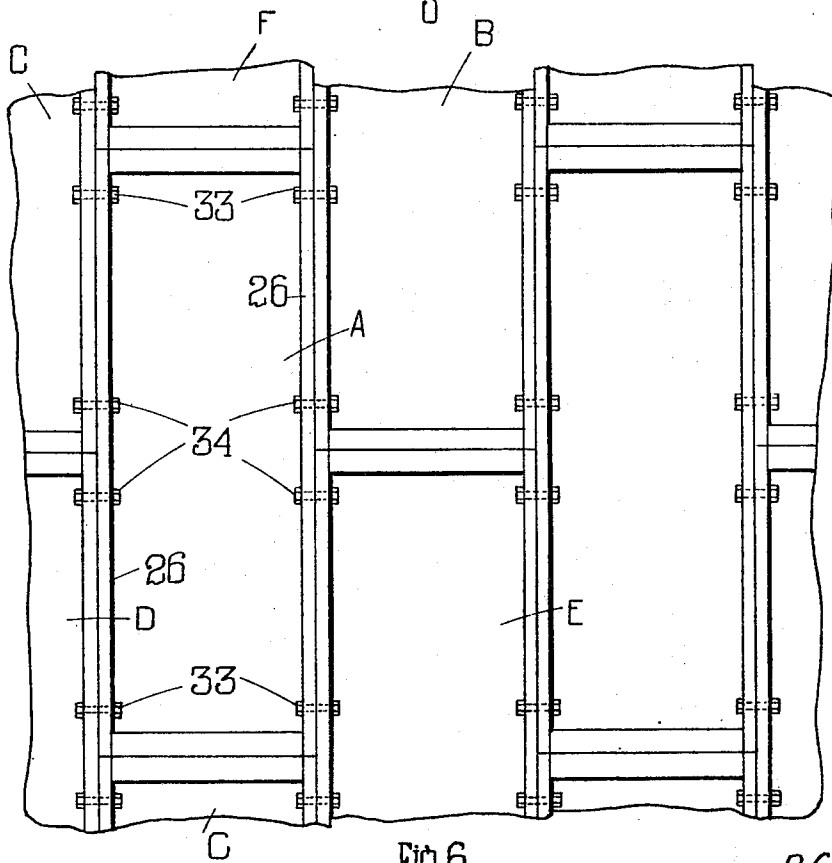


FIG. 6.

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UNITED STATES PATENT OFFICE

2,297,175

BUILDING OR STRUCTURE

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Application March 12, 1941, Serial No. 383,053
In Great Britain March 26, 1940

7 Claims. (Cl. 72-40)

The present invention relates to buildings or structures and to slabs, blocks, bricks or the like units for use in the construction thereof.

The invention is particularly applicable to buildings such as huts, sheds, barns and similar structures and has for its primary object the construction of a building in an economical manner from substantially similar slabs, trays or the like units which building when erected will be possessed of excellent insulating qualities and be of regular character with regard both to its inner and outer surfaces.

According to the present invention a slab or other building or structural unit is provided in which a concrete web part which is curved longitudinally but externally is laterally straight, has integral with it or rigidly connected to it a pair of flanges co-extensive with and extending from the opposite longitudinal side edges of the web in a direction inwardly or outwardly of the curve thereof, said flanges lying normal to the web and constituting the means by which adjacent slabs are interconnected in flanged abutting relationship. Preferably the flanges are made of wood.

From another aspect of the present invention a building or other structure is constructed of a plurality of longitudinally curved slabs or the like units, each having similarly longitudinally curved flanges integral with or otherwise rigidly connected to a concrete web part, said slabs being laid to broken bond by bolting together or otherwise rigidly interconnecting the abutting curved longitudinal flanges of laterally adjacent slabs with the flanges located internally or externally of the structure.

The invention is more particularly described with reference to the accompanying drawings, in which:

Figures 1 and 2 are perspective views of substantially continuous left and right hand end portions of a building according to the present invention, said views showing different sections of the building in different stages of completion for the purpose of demonstrating how the slabs, trays or other units are erected to form the building.

Figure 3 is a perspective view of a curved slab, tray or other unit from which the entire surface other than the end walls of the building is erected.

Figure 4 is a lateral section of the slab of Figure 3 taken through an integral rib adjacent one end thereof.

Figure 5 is a diagrammatic lateral section of the building according to Figures 1 and 2.

Figure 6 is a detail showing one manner of interconnecting adjacent slabs or other units of the end walls, the slabs of the side walls and the roof with which they merge being similarly interconnected.

Figure 7 is a detail showing the relationship in one form of construction between the lowermost slab of a side wall and the base or foundation of the structure.

In the construction according to Figures 1-7 the side walls and roof of the building comprise a plurality of curved units 20, 36 laid to broken bond, that is to say, with their abutting transverse edges in staggered relationship with the units of what can be regarded as each longitudinal first course alternating in height between horizontal lines. Similarly end units 21 are laid to broken bond, said end units being flat as distinct from curved.

Each unit 20 or 36 consists of a longitudinally curved web 22 of concrete, which, for the purpose of this specification means any artificial material wherein the filler is sand, sawdust, or other powdered or granular material and the binder is cement. Thus, wherever concrete is referred to herein such reference includes that material sold under the trade-mark "Lignocrete."

The web being relatively thin is of light structure and at its ends has integral with it a pair of ribs 23 which are reinforced by metallic wires 24 spot welded or otherwise rigidly connected to nails 25 driven through longitudinally curved side wooden ribs or flanges 26, which are co-extensive with the web. Thus, in the formation of a slab, tray or the like unit 20, 36 the flanges 26 are first mounted on a frame with the nails 25 of opposite flanges interconnected by the reinforcements 24, whereupon the concrete web 22 is moulded between the flanges with the ribs 23 surrounding the reinforcements 24.

It will be observed that in the particular form of construction shown in Figures 3 and 4 the lateral end ribs 23 which are integral with the web 22 project inwardly of the curvature of the web to a smaller extent than the inward projection in the direction of the web curvature of the wooden longitudinal ribs or flanges 26, and that when considered externally the outer longitudinal edges of the wooden flanges 26 lie on the same surface as that of the outer face of the curved web. The ribs 23 may however extend inwardly to such an extent as to lie flush with the wooden flanges 26.

Again, as will be seen from Figure 3 the web 22 considered at any lateral section through both opposite flanges 26 has a concave inner surface, whilst externally at any section the outer surface is represented by a straight line including the outer edges of the flanges 26. Thus, the web is plano-concave in lateral section. The end units 21 are similarly formed, the only difference between such units and the units 20, 36 being that they are flat both longitudinally and laterally, whilst if desired the webs may be of constant thickness between the side flanges 26.

Where it is desired to erect a building of the present invention on a concrete foundation 27, this may be provided with inner and outer channels 28 and 29 extending along all four sides of the foundation. The inner channel 28 is of rectangular form and is wide enough to receive a base of each slab or unit constituting the lowermost course and a board or the like connected to the flanges 26 of the slabs. The concrete foundation preferably may have a hard core 30 with a rough layer 31 between it and the upper layer, whilst the foundation adjacent the walls may have a damp course 32.

Preferably in the erection of a building, one end wall is first assembled from pre-formed flat slabs 21 with each unit spliced into, or having dove-tail engagement with, two of the units in the course next below it as shown in Figure 1 or 6. The flanges 26 of laterally adjacent units are interconnected by means such as bolts, nails, screws or clips and as can be seen from Figure 6 which illustrates the bolt method of interconnection, each flange 26 of a unit has four holes formed therein to receive the bolts by which it is interconnected to the flanges of the two units adjacent to it. Thus, the unit A of Figure 6 is interconnected with the units B, C, D, and E by means of bolts 33, adjacent the four corners of the unit A, and also by bolts 34 which pass through holes formed in the centres of the flanges 26 of the unit A and in the corners of the units B, C, D, and E.

It will be seen from examination of Figure 6 that the unit A is not directly connected with the adjacent or abutting units F and G of the same vertical series, but in fact is indirectly connected thereto by virtue of the flange connections with the units E and D on one side and the units B and C on the other.

Where instead of bolts it is preferred to use screws or nails, then such screws or nails are driven home in a direction away from a corner of a unit and towards the centre of a longitudinal flange of the adjacent unit. Thus, of the four nails or screws by which each longitudinal flange 26 is connected to the two half longitudinal flanges of the next adjacent unit, two screws or nails are driven in one direction and the other two in the other direction between the flanges.

Where the structure is to be of a particularly temporary character and the use of bolts or screws is not desired, the flanges may be interconnected by spring clips of U or G shape, i. e. with the relatively flat limb parts engaging with the inner faces of the abutting flanges of the units and the curved part of the clip constituting a resilient yoke for holding the limbs in their clamping position above said flanges.

The space which would otherwise be taken up by the lowermost half unit and the next higher complete unit of the middle series of units in

the end wall, is in fact, taken up by a door 35.

After the end wall has been completed the curved walls and roof are erected, the work proceeding longitudinally of the building, with the first series of curved units having a rabbeted engagement with the edge units of the end wall. The units are interconnected in a manner similar to that already described with regard to the end units and it will be appreciated that in forming the roof and opposite sides of structures of the type shown in the drawings, i. e. with the roof and sides constituting a continuous curve of parabolic appearance made up of circular arcs of different radii, it is only necessary to utilise pre-formed units or part units of two different curvatures. Thus, in erecting a building having the cross section illustrated in Figure 5 the units 20 forming the sides may be of one curvature represented by the radius between the units and their respective centres 19 whilst the units 36 forming the roof may constitute arcs about a centre 58. By virtue of the fact that the centre 58 is located on radii of the uppermost slabs 20 at the left and right hand sides of Figure 5, it will be appreciated that the sides and roof constitute a continuous curve of parabolic appearance of which the first 90° is taken up by two arcs of different radii and the remaining 90° is subtended by a mirror image of said arcs.

In the section according to Figure 5 the lowermost units are constituted by half slabs and the curve of smaller radius representing the roof is taken up by three curved units.

In longitudinally adjacent lateral sections where the lowermost units of the side walls are constituted by complete slabs as distinct from half slabs, the roof part is made up of two curved slabs 36 the ends of which abut at the mid-vertical plane longitudinally of the structure. This can be seen from examination of the left hand end of Figure 1. In addition, in such adjacent lateral sections each of the units abutting against one of the two uppermost units has two curvatures, the upper half being curved similarly to the roof units 36 and the lower half similarly to the side wall units 20.

As will be seen from Figure 1, in the formation of the side walls of a structure the units representing the second course commencing at the second series of units and continuing in every subsequent fourth unit longitudinally of the structure, are eliminated and their places taken by window frames 37.

It will be appreciated that with the exception of the window frames and a flue 48 or ventilator, the outer curved surface of the structure is free from projections and accordingly it is a relatively simple matter to apply sheets of weatherproof material 38 over the units and particularly across the joints between abutting series of units with the sheets laid in overlapping relationship. As shown in Figures 1 and 7 the base of the side walls may be covered by horizontally laid overlapping sheets 39 of weatherproof material, the lowermost sheet extending into the channel 29. If desired however the surface of the monolithic or composite units 20, 21, 36 may be covered by a bituminous or the like substance, such as for example that sold under the registered trademark "Bitumastic," in which may be embedded a number of strips for covering the joints between adjacent units.

Internally of the structure, wall-boards 40 may be secured in any desired manner to the inner-

most edges of the flanges or ribs 26 of the units, the lowermost boards extending with the flanges 26 into the channels 28. The foundation may be covered by linoleum 41 and a surround 42 provided to constitute bed stops, i. e. for preventing beds or other furniture being pushed against the walls.

I declare that what I claim is:

1. As a structural unit, a slab comprising a longitudinally curved concrete web and similarly longitudinally curved wooden flanges rigidly connected to said web and projecting from opposite longitudinal edges thereof in a direction inwardly of the web curvature, said wooden flanges serving as means by which laterally adjacent pre-cast units are interconnected during assembly of the units to form a structure.

2. As a structural unit, a slab comprising a concrete web which is longitudinally curved but at any lateral section is straight, and similarly curved wooden flanges co-extensive with and rigidly connected to said web and projecting from opposite longitudinal edges thereof in a direction inwardly of the web curvature, said wooden flanges serving as means by which laterally adjacent pre-cast units are interconnected during assembly of the units to form a structure.

3. As a structural unit, a slab comprising a concrete web which is curved longitudinally but at any lateral section is plano-concave considered externally and internally respectively, and similarly longitudinally curved wooden flanges co-extensive with and rigidly connected to said web and projecting from opposite longitudinal edges thereof in a direction inwardly of the web curvature, said wooden flanges serving as means by which laterally adjacent pre-cast units are interconnected during assembly of the units to form a structure.

4. As a structural unit, a slab comprising a longitudinally curved concrete web having laterally extending ribs integral with the web and located at the ends thereof and curved wooden flanges co-extensive with and rigidly connected to said web and projecting from opposite longitudinal edges thereof in a direction inwardly of

the web curvature and radially beyond the limits of the lateral ribs, said wooden flanges serving as means by which laterally adjacent pre-cast units are interconnected during assembly of the units to form a structure.

5. As a structural unit, a slab comprising a longitudinally curved concrete web having reinforced lateral ribs projecting from the inner face of said web and integral therewith and longitudinally curved wooden flanges co-extensive with and rigidly connected to said web and projecting from opposite longitudinal edges of the web in a direction inwardly of the web curvature to a greater extent than the inward projection of said ribs, said wooden flanges serving as means by which laterally adjacent pre-cast units are interconnected during assembly of the units to form a structure.

6. As a structural unit, a slab comprising a longitudinally curved concrete web having lateral metallic reinforcements, similarly curved wooden flanges co-extensive with and projecting from opposite longitudinal edges of the web in a direction inwardly of its curvature and metallic means incorporating said reinforcements for rigidly connecting said wooden flanges to said web, said wooden flanges serving as means by which the laterally adjacent pre-cast units are interconnected during assembly of the units to form a structure.

7. As a structural unit, a slab comprising a longitudinally curved concrete web which in lateral section is straight externally and concave internally and has lateral ribs containing metallic reinforcements, co-extensive and similarly longitudinally curved wooden flanges projecting from opposite longitudinal edges of said web in a direction inwardly of the web curvature and to a greater extent than said ribs, and nails passing through said flanges and welded to said metallic reinforcements for rigidly securing said wooden flanges to said web, said wooden flanges serving as means by which laterally adjacent pre-cast units are interconnected during assembly of the units to form a structure.

ROBERT GREENWOOD TARRAN.