Oct. 24, 1939. J. J. RELIHAN 2,177,264

BUILDING CONSTRUCTION

Filed March 5, 1938 2 Sheets-Sheet 1

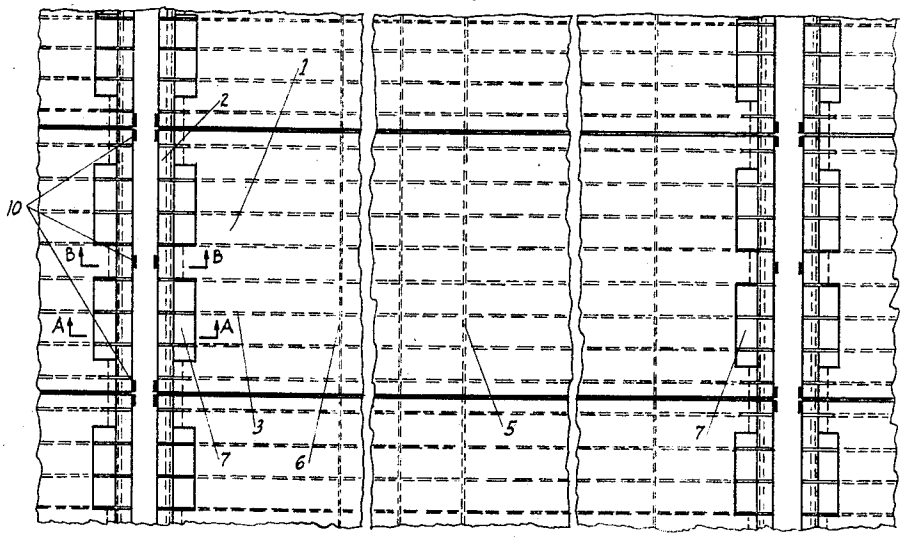


FIG. 1

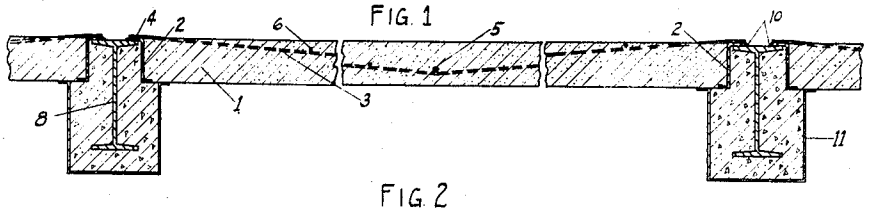


FIG. 2

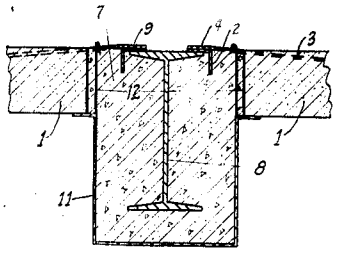


FIG. 3

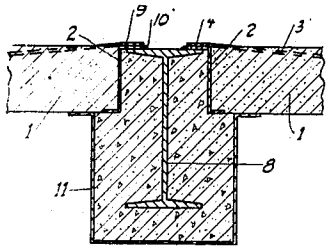


FIG. 4

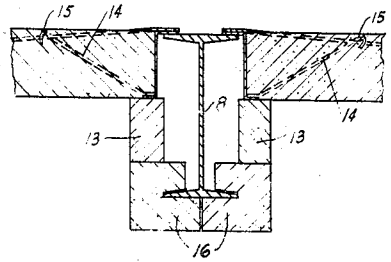


FIG 5

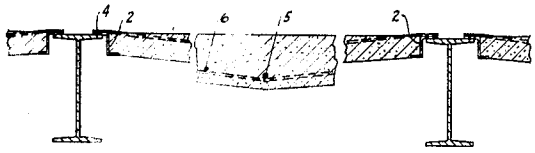


FIG. 6

INVENTOR.
JOHN J. RELIHAN
BY Frank T. Chesnut
ATTORNEYS.

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BUILDING CONSTRUCTION

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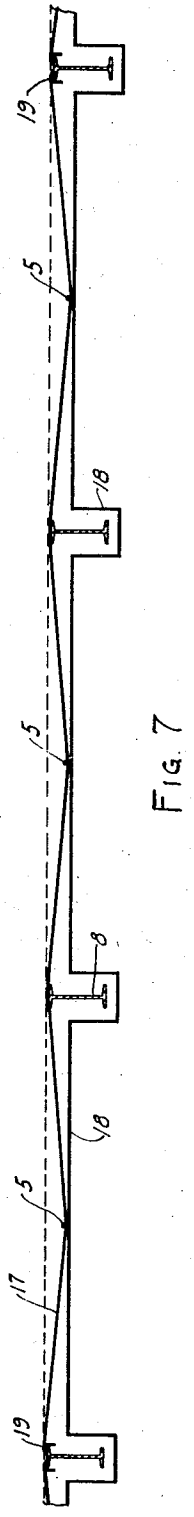


FIG. 7

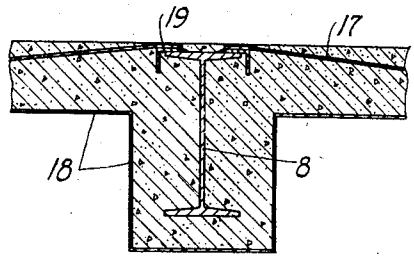


FIG. 8

INVENTOR.
JOHN J. RELIHAN
BY Frank T. Chesnut
ATTORNEYS.

Patented Oct. 24, 1939

2,177,264

UNITED STATES PATENT OFFICE

2,177,264

BUILDING CONSTRUCTION

John Joseph Relihan, Fairfield, Conn.

Application March 5, 1938, Serial No. 194,019

10 Claims. (Cl. 72—71)

This invention relates to building construction and more particularly to roof and floors made of reinforced plastic material, such as gypsum, concrete and the like.

An object of the invention is to provide a roof or floor of gypsum, concrete, or other plastic material, composed of a plurality of individual or pre-formed reinforced slabs having transverse and longitudinal reinforcing members individual to each slab, the longitudinal reinforcing members being shop welded to a structural binding, which may in turn be field welded to the structural frame of a building.

A further object of the invention is to provide longitudinal reinforcing members shop welded to a structural binding to be used in poured-in-place construction.

A further object is to provide a roof or floor construction having a top surface substantially flush with the top flange members of the supporting structure; reducing the weight and bulk of material required, and utilizing the suspension bridge type of design.

A further object is to provide a pre-cast roof or floor slab of novel construction.

A further object is to provide a pre-cast roof or floor slab having core holes or openings whereby material may be poured through said openings to bind the slabs together, to form the fire proofing for the supporting members, and to bind all parts together as a monolithic structure similar to that obtained by pouring in place.

Other objects or purposes of the invention will appear in or be evident from the specification and the claims.

Eight figures have been used to illustrate the invention.

Figures 1 and 2 are plan and sectional elevation views respectively of a portion of roof or floor construction utilizing pre-cast slabs and constructed according to the invention herein described.

Figures 3 and 4 are sections taken from Figure 1 at A—A and B—B respectively, showing the pre-cast slabs adjusted to the supporting members and the methods used for pouring the fire proofing in place around the supporting members.

Figure 5 is a section generally similar to Figures 3 and 4 but showing how the construction might be varied to utilize pre-cast haunch, soffit or shoe pieces.

Figure 6 shows a slab section similar to that of Figure 2 but having a thicker mid section than ends.

Figures 7 and 8 illustrate how shop prepared longitudinal reinforcing members may be utilized in poured-in-place roof or deck construction; Figure 7 being a sectional elevation view across several supporting members, and Figure 8 being a detail view at one terminal support member.

In the drawings similar numerals designate like parts.

In Figures 1 to 4 inclusive applicant shows a type of monolithic roof or floor construction composed of a plurality of individual pre-cast slabs according to the present invention. The pre-cast slabs are preferably made in permanent molds in a central plant, and are stored or shipped to a point of use.

In making the slabs 1, a structural binding 2, here conveniently shown as a Z bar, is cut to length, and longitudinal reinforcing bars or mesh 3, are welded to it as at 4. The welded assembly is then placed in a mold and the reinforcing members 3 are given a desired tension. The reinforcing is preferably deflected by a lateral reinforcing bar 5. Spacing wires 6, may be used if desired to hold the longitudinal reinforcing members in location. When the reinforcing members are adequately placed and tensioned the mold is filled with the plastic floor or roof material. After the material has set the tension in the reinforcing bars is maintained by the welding at the end bindings and by the hardened filler material.

The mold may be proportioned or dimensioned to meet any particular requirement desired. It may for instance be shaped to have a low point at the center of the slab, giving a slab as shown in Figure 6, having a thicker central section than ends, and allowing thereby for a greater deflection of the reinforcing material, with a consequent lightening of the slab as a whole. The mold will usually be provided with off-set side walls, allowing for slabs having corresponding off-set sides which may be overlapped on installation.

The structural binding may be formed with openings or cut-outs in its lower portion and in the casting process, cores may be inserted in the mold over and around said openings leaving holes 7, in the finished cast slabs.

While the structural binding is shown in the drawings as a Z bar it will be understood that applicant does not wish to limit his invention thereby, as any binding serving a similar purpose will be equally satisfactory. Applicant prefers a binding which when used in conjunction with the finished pre-cast slab will afford a

flange 9, at each end of said slab, substantially flush with the top of the slab.

On installation this flange 9, rests on the top flange of the supporting structural member and is preferably welded to it by welds 10. The number and type of welds will depend on the service the floor or roof is required to render as well as upon the thickness or quality of the reinforcing or structural binding for the pre-cast slabs. In some instances no welding at all is required in the field.

The welding joins the reinforcing of the slabs integrally with the building steel, and when the building steel has been fire proofed as hereinafter explained a rigid monolithic structure results. Applicant's method utilizes the strength of the reinforcing members to a high degree and hence allows for a lighter and less bulky floor or roof construction. The floor or roof surfaces are substantially flush with the tops of the supporting structures and only a very thin surface flooring or decking is necessary for the finished job.

An advantage of applicant's method of deck construction is that the deck may be quickly laid with pre-cast slabs, affording a substantial temporary floor capable of withstanding all usual construction loads conveniently and without danger to workmen, even before the welding of the slab binders or the placing of the filler grout is completed.

When the slabs have been placed on their supporting members and welded as heretofore explained, a light form 11, of either temporary or permanent construction, may be held in place around the support beams 8, by wires 12, while fireproofing material is poured around them through the openings 7 left in the slabs. This fireproofing fills the form 11 establishing the soffit and haunches on the supporting members and integrally binding same with the slabs proper. Additional grout or filler is poured into the lap joints between the slabs, binding these together and forming a complete rigid, monolithic floor such as is obtained by a poured-in-place construction, but with considerably less material and labor cost.

Where it is desirable not to pour the haunches and soffit in place around the supporting beams, pre-cast haunches 13, and shoe tiles 16 may be used as shown in Figure 5. In such instances the pre-cast slabs may be made without the openings 7. It is still desirable to weld the slab flanges to the supporting beam as at 10 in Figures 1 to 4.

Where neither pouring of soffit and haunches in place nor welding in the field is desired applicant has provided a pre-cast slab of slightly different construction. A secondary reinforcing member 14, Figure 5, is fastened to the lower edge of the slab binding, as by welding, and is anchored in the plastic material away from the slab ends as at 15. This member prevents the slab binding from rotating about an axis in its upper edge and insures a rigid floor member. The lap joints between adjacent slabs are filled as usual when the top floor is placed. Secondary reinforcing bars may be of any style other than that described, their function being to prevent the lower ends of the slab binding from spreading in use. Such spreading obviously cannot occur when the binding is welded to the building frame or when the soffit and haunches are poured in place.

In Figures 7 and 8 applicant has shown how a pre-welded frame may be used for poured-in-place roof and floor construction. By this method forms 18 are built around the supporting members 8 as in usual practice. The reinforcing is supplied in rolls from a central plant, each roll comprising end binders 19 shop welded to the reinforcing wires 17. Spacing wires may be used as in Figure 1, or a wire mesh may serve as the reinforcing member. On installation the end binders 19 are field welded or otherwise fastened to the top flanges of the supporting members 8; the longitudinal reinforcing members 17 are put in tension and tied down by cross members 5 to the forms 18, and the floor or roof is poured in place as by usual construction methods.

Having thus described his invention and in what manner it may be carried out applicant requests that United States Letters Patent be granted to him for all that is claimed.

I claim:

1. A pre-cast deck slab comprising structural metallic end binders terminating in outwardly extending flanges substantially flush with the top surface of the slab material providing supports for the slab by engagement in use with the upper flanges of the supporting girders, and longitudinally disposed reinforcing members welded to said end binders and cast in position by a concrete-like filler.

2. A pre-cast deck slab comprising structural metallic end binders terminating in outwardly extending flanges substantially flush with the top surface of the slab material providing supports for the slab by engagement in use with the upper flanges of the supporting girders, and longitudinally disposed reinforcing members welded to the upper portion of said end binders, deflected downwardly toward the lower mid section of the slab, and cast under tension in said position.

3. A pre-cast deck slab comprising structural metallic end binders terminating in outwardly extending flanges substantially flush with the top surface of the slab material providing supports for the slab by engagement in use with the upper flanges of the supporting girders, longitudinally disposed reinforcing members welded to the upper portions of said end binders, deflected downwardly toward the lower mid section of the slab and cast under tension in said position, and other reinforcing members extending from the lower portion of said end binders only a short distance inwardly and upwardly and anchored around said longitudinal reinforcing members.

4. A pre-cast deck slab of concrete-like material comprising structural metallic end binders terminating in outwardly extending flanges substantially flush with the top surface of the slab material providing supports for the slab by engagement in use with the upper flanges of the supporting girders, longitudinally disposed reinforcing members welded to the upper portions of said end binders and embedded in said concrete-like material, and core holes through said slabs near said end binders, said core holes being of ample size and appropriate location for receiving and passing filler material for poured in place soffit and haunch material.

5. A rigid monolithic fireproof deck construction comprising metallic supports having upper flange sections, a pre-cast deck slab, of concrete-like material comprising structural metallic end binders terminating in outwardly extending flanges substantially flush with the top surface of the slab material, having longitudinally disposed reinforcing members welded to the end binders and embedded in the concrete-like ma-

terial and having core holes through it near said end binders, said slab bridging the metallic supports, the flanges of the slab binders being welded to the flanges of the supporting members, and fireproofing for the support members surrounding same and filling the holes in the pre-cast slab.

6. A rigid monolithic fireproof deck construction comprising spaced supporting members having upper surfaces substantially at the finished deck level, a pre-cast deck slab, of concrete-like material comprising structural metallic end binders terminating in outwardly extending flanges substantially flush with the top surface of the slab material, having longitudinally disposed reinforcing members welded to the end binders and embedded in the concrete-like material and having core holes in the slabs near the end binders, said slab bridging the supporting members, the flanges of said pre-cast slabs resting on the upper surfaces of said supporting members, and fireproofing for the supporting members surrounding same and filling the holes in the pre-cast slab.

7. A rigid deck construction comprising spaced structural metallic supports having upper surfaces substantially at the finished deck level, a pre-cast reinforced deck slab of concrete-like material having structural metallic end binders terminating in outwardly extending flanges substantially flush with the top surface of the slab material, said slab bridging the metallic supports, the flanges of the metallic end binders of the pre-cast slab being welded to the upper surfaces of the supporting members.

8. A deck construction comprising spaced supporting members having upper surfaces substantially at the finished deck level, a pre-cast deck slab of concrete-like material having metallic end binders terminating in outwardly extending flanges substantially flush with the top surface of the slab material, longitudinally disposed reinforcing members welded to the upper portions of the end binders and embedded in said slab, other reinforcing members between the lower edges of the end binders and the interior of the slab material, said slab bridging said supporting members, the flanges of the slab resting on the upper surfaces of the supporting members.

9. A rigid fireproof deck construction comprising spaced supporting members having upper surfaces substantially at the finished deck level, a pre-cast deck slab of concrete-like material having metallic end binders terminating in outwardly extending flanges substantially flush with the top surface of the slab material, longitudinally disposed reinforcing members welded to the upper portions of the end binders and embedded in said slab, other reinforcing members between the lower edges of the end binders and the interior of the slab material, said slab bridging, said supporting members, the flanges of the slab resting on the upper surfaces of the supporting members, fireproofing surrounding the supporting members and slab end binders and a finish surface over the slab and support members.

10. A pre-cast deck slab of concrete-like material comprising structural metallic end binders terminating in outwardly extending flanges substantially flush with the top surface of the slab material providing supports for the slab by engagement in use with the upper flanges of the supporting girders, longitudinally disposed reinforcing members welded to the upper portion of said end binders, deflected downwardly near the mid portion of the slab and cast under tension in said position, the thickness of the slab at the mid-section being substantially greater than at the binding ends.

JOHN JOSEPH RELIHAN.