C. J. HYER.

REINFORCED CONCRETE CONSTRUCTION.

APPLICATION FILED DEC. 19, 1912.

1,090,718.

Patented Mar. 17, 1914.

3 SHEETS—SHEET 1.

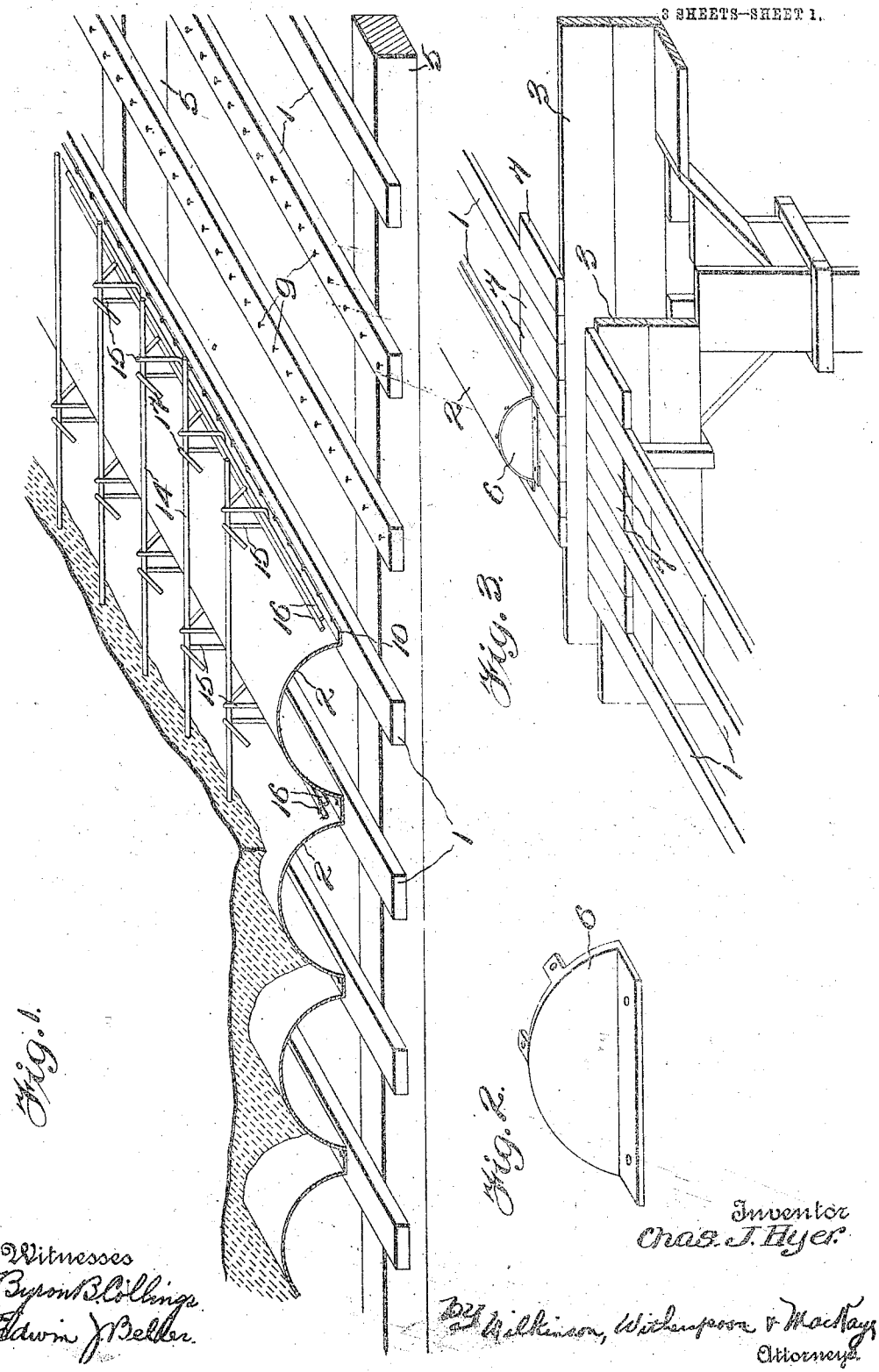


Fig. 1.

Fig. 3.

Fig. 2.

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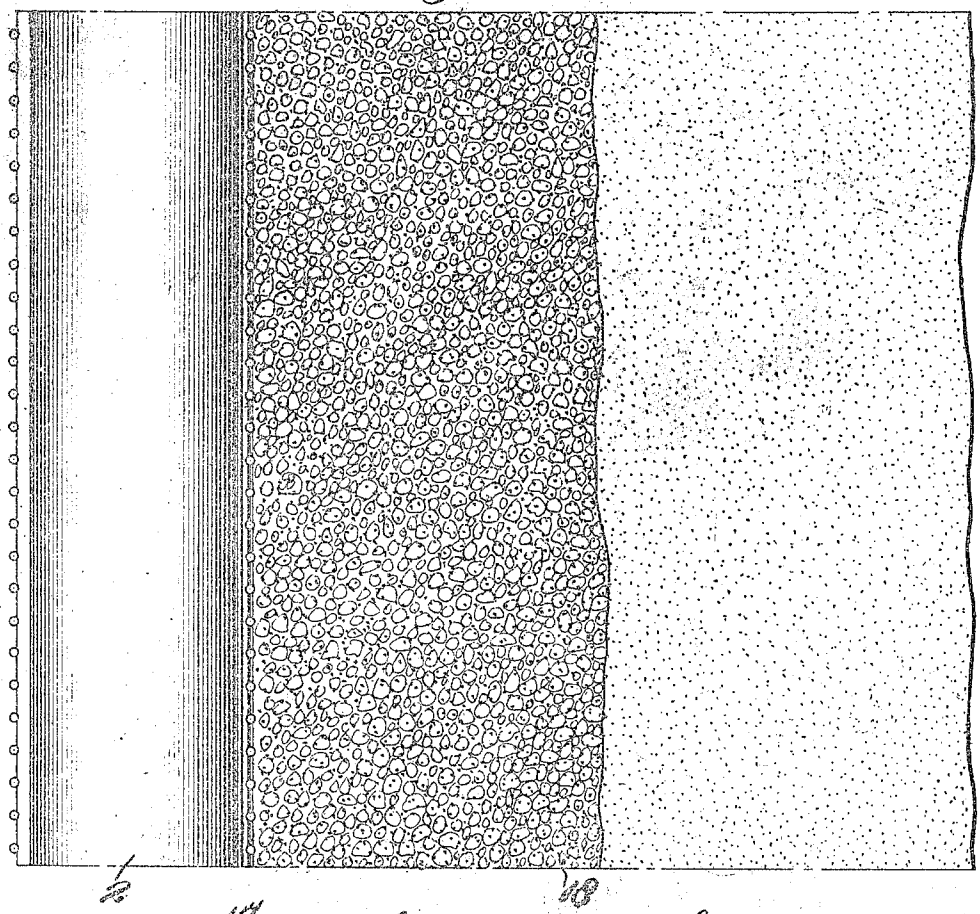
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3 SHEETS—SHEET 2.

Fig. 3.



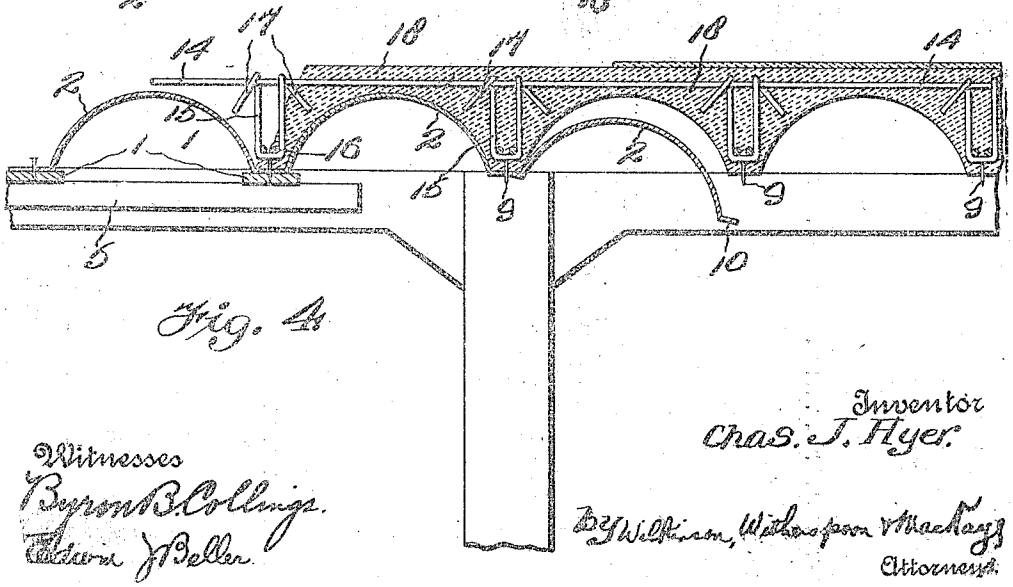


Fig. 4.

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3 SHEETS—SHEET 3.

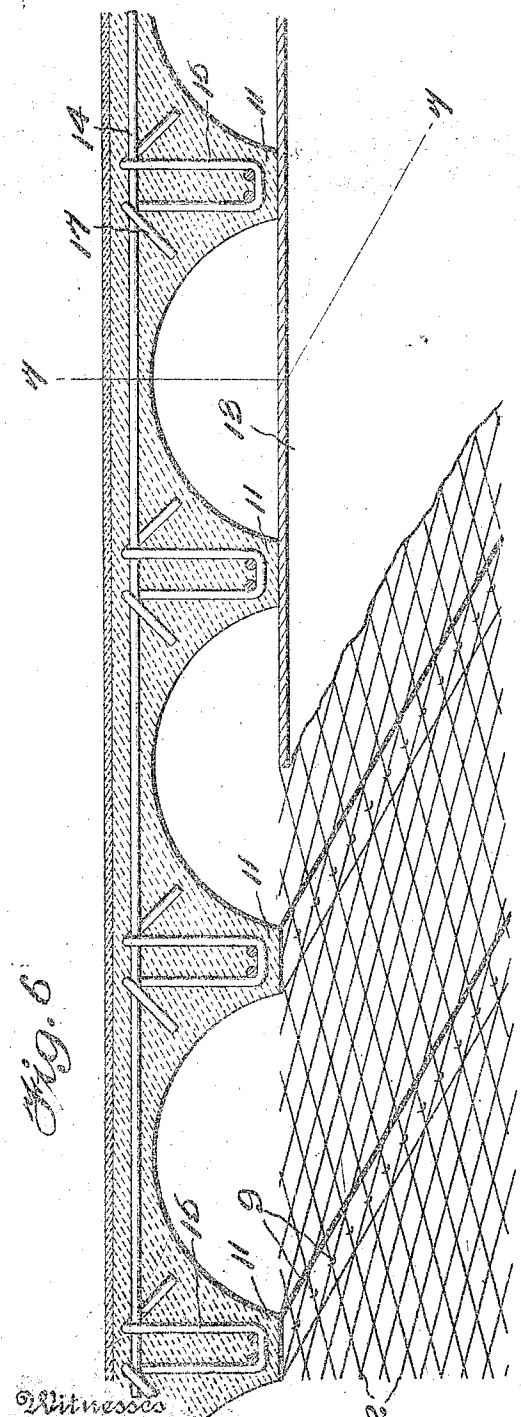


Fig. 6.

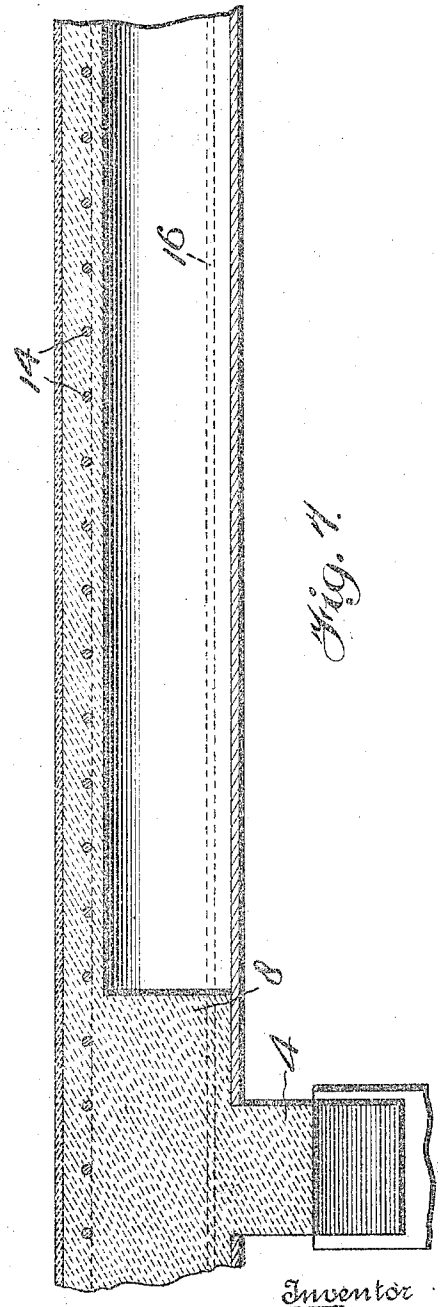


Fig. 7.

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UNITED STATES PATENT OFFICE.

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REINFORCED CONCRETE CONSTRUCTION.

1,090,718. Specification of Letters Patent. Patented Mar. 17, 1914.

Application filed December 19, 1912. Serial No. 737,720.

To all whom it may concern:

Be it known that I, CHARLES J. HYER, a citizen of the United States, residing at Tampa, in the county of Hillsboro and State of Florida, have invented certain new and useful Improvements in Reinforced Concrete Construction; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in reinforced concrete construction, and it consists in the constructions, combinations, and arrangements herein described and claimed.

An object of my invention is to provide an improved concrete construction for combined floors and ceilings, having a maximum strength with a minimum of weight and providing substantially equal resistances to the compression and tensile strains of loading.

A further object of my invention is to provide a reinforced concrete floor slab of large span, which will have a minimum dead weight and a uniform strength and rigidity throughout, and which is constructed to permit ready removal of the forms and false framework.

In the accompanying drawings forming a part of this application, and in which similar reference symbols indicate corresponding parts in the several views:—Figure 1 is a perspective view, showing successively from right to left the temporary framework provided with series of nails for positioning the centers thereof, the centers and reinforcing members in position, and the concrete in place; Fig. 2 is a perspective view of the end closure of an arch center; Fig. 3 is a detail perspective view, showing the temporary form for a concrete beam and the relation of the temporary framework therewith; Fig. 4 is a transverse section, showing successively from left to right the temporary framework and centers in position for receiving the concrete, the concrete in place, the arch centers being removed from the hardened concrete, and finally the complete concrete construction; Fig. 5 is a plan view of the construction shown in Fig. 4; Fig. 6 is a perspective view, partly in section, showing the metal lathe work and ceiling secured in position; and Fig. 7 is a section on the line 7—7 of Fig. 6.

Referring to the drawings, 1 indicates temporary frame members on which are positioned the centers 2; said members 1 having their ends resting on the form 3 for a reinforced concrete beam 4 and being supported intermediately by frame members 5. The centers 2 are provided with closed ends 6 spaced from the form 3, and filling members 7 extend from said form 3 between the frame members 1 to cooperate with said centers and frame members for forming laterally-extending head flanges 8 on the concrete beam 4 integral with the floor slab. The centers 2 are accurately positioned by rows of nails 9, projecting from the frame members 1 above flanges 10 on said centers and adapted to be partially embedded in the lower faces of the concrete joists 11 of the floor slab, to constitute anchors for securing the metal lathe work 12 of a ceiling 13 in position. If a ceiling is not desired, the nails 9 are driven flush with the flanges 10, so that they will not project within the concrete joists 11.

A plurality of independent reinforcing rods 14 extend from the usual supporting walls or beams transversely above the arch centers 2, and carry a series of reinforcing stirrups 15 for supporting reinforcing tension rods 16 longitudinally between the lower portions of said several centers 2; said stirrups having their upper portions hooked over the tension rods 14 and bent to diverge at 17 toward the respective adjacent centers 2. These tension rods 16 are preferably in sets or pairs. When the parts are thus assembled, the concrete is filled in in the usual manner to form a reinforced concrete floor slab comprising a series of joists 11 and connecting arches 18 formed integral with the laterally-extending head flanges 8 of a reinforced beam 4, and having a plurality of reinforcing temperature rods 14 extending through the upper portion of said slab transversely to said joist, and a series of longitudinal reinforcing tension rods 16 in the lower portions of the joists 11 connected to said rods 14 by stirrups 15; the stirrups 15 having diverging upper portions 17 bent over the rods 14 and extending into the adjacent concrete arches for rigidly anchoring said stirrups to resist lateral deflection of said joists. After the concrete is hardened, the centers and other temporary work can be readily removed, leading the floor slab with a smooth lower surface which is adapted to constitute a finished ceiling in

factories, ware-houses, and similar buildings, without the expense of being smoothed down or coated with plaster, as required in previous constructions.

If a flat ceiling 13 is required, the positioning nails 9 are left projecting sufficiently from the frame members 1 to be firmly embedded in the concrete joists 11, and suitable metal lathe work 12 can be secured in position by the projecting portions of said nails, and then plastered or given any other desired finish. If desired, the spaces between the flat metal lathe work 12 and the arches 18 can be filled with suitable insulating material; thereby providing an advantageous construction in cold storage buildings, etc.

I claim:—

1. A reinforced concrete construction comprising a longitudinally-extending series of integral concrete joists and connecting arches forming a floor slab, a series of parallel supporting rods extending transversely through said slab for attachment to supporting walls or beams, a series of longitudinal rods in sets spaced below said supporting rods and extending perpendicular thereto through said joists, a series of independent stirrups supporting said longitudinal rods said stirrups having their upper ends bent into oppositely directed, downwardly extending hooks, and being engaged with said several transverse supporting rods and diverging into the adjacent concrete arches for firmly supporting and anchoring said stirrups against swing on said transverse supporting rods.

2. A reinforced concrete construction comprising a longitudinally-extending series of integral concrete joists and connecting arches forming a floor slab, a series of parallel supporting rods extending transversely through said slab above said connecting arches for attachment to supporting walls or beams, a series of parallel tension rods in pairs extending longitudinally through the lower portions of said joists perpendicular to said series of supporting rods, a series of independent stirrups supporting said longitudinal rods said stirrups having their upper ends bent into oppositely directed downwardly extending obliquely divergent hooks, and being supported upon said several transverse supporting rods and diverging into the adjacent concrete arches for firmly supporting and anchoring said stirrups against swing on said transverse supporting rods, metal anchors partially embedded in the lower faces of said joists, a ceiling provided with metal lathe work secured in position by said anchors, and a filling of insulating material confined in said arches by said metal lathe work.

3. A reinforced concrete construction comprising a longitudinally-extending series of integral concrete joists and connecting arches forming a floor slab, a series of parallel supporting rods extending transversely through said slabs for attachment to supporting walls or beams, a series of longitudinal rods in sets spaced parallel to said supporting rods and extending at an angle thereto through said joists, a series of independent stirrups supporting said longitudinal rods and each of said stirrups having its upper ends bent into oppositely directed, downwardly extending hooks, each hook engaging one of said transverse supporting rods and diverging into the adjacent concrete arches for firmly supporting and anchoring said stirrups against swing on said transverse supporting rods.

In testimony whereof, I affix my signature, in presence of two witnesses.

CHARLES J. HYER.

Witnesses:
W. C. Heck,
J. P. Henderson.