G. M. GRAHAM, JR.

REINFORCED CONCRETE FLOOR.

APPLICATION FILED APR. 7, 1913.

1,200,484.

Patented Oct. 10, 1916.

Fig. 1.

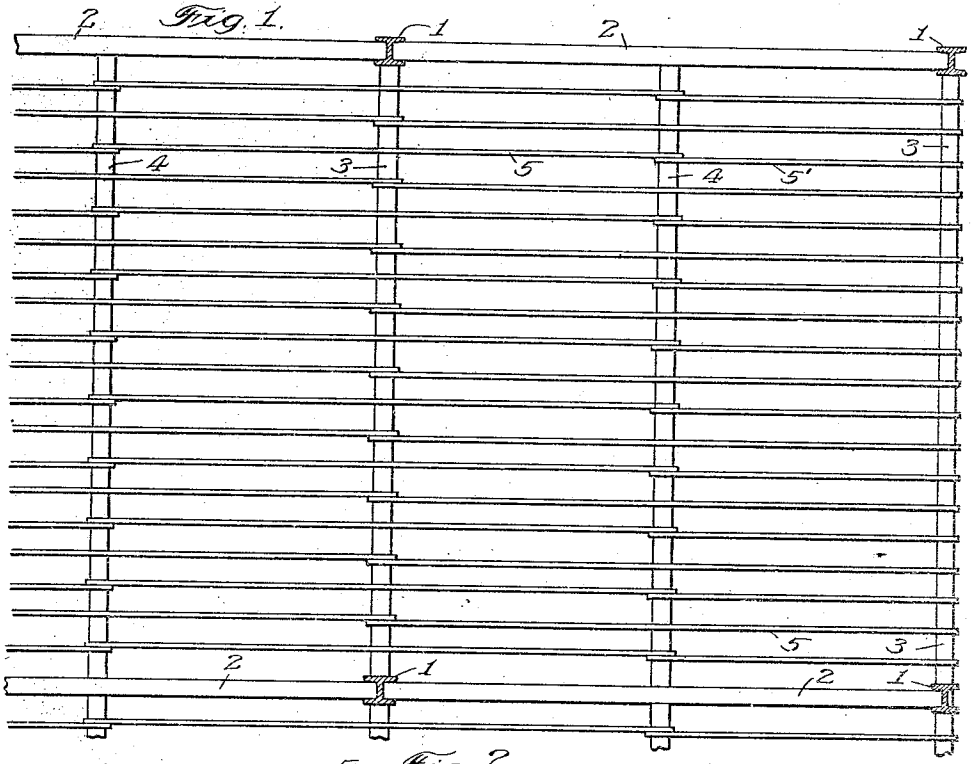


Fig. 2.

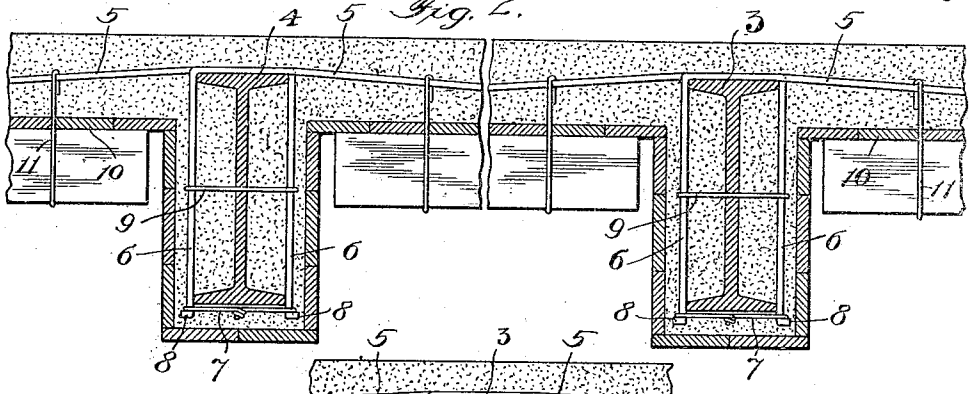
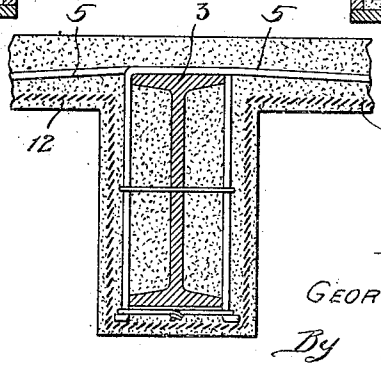


Fig. 3.



Attest:

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

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REINFORCED-CONCRETE FLOOR.

1,200,484. Specification of Letters Patent. Patented Oct. 10, 1916.

Application filed April 7, 1913. Serial No. 759,318.

To all whom it may concern:

Be it known that I, GEORGE M. GRAHAM, Jr., a citizen of the United States of America, and a resident of Fargo, in the county of Cass, State of North Dakota, have invented certain new and useful Improvements in Reinforced-Concrete Floors, of which the following is a specification.

This invention relates to that class of reinforced concrete structures in which a plurality of spaced longitudinal bars or rods are attached to the girders or beams of the skeleton frame of the structure to span the intervening spaces and provide a reinforce for the mass of concrete which constitutes the main body of the floors or other portion of the structure. And the present improvement has for its object to provide a simple and efficient structural formation and combination of parts whereby the reinforcing bars or rods are secured to the girders or beams of the structure in a substantial, ready and economical manner.

Another object is to provide a simple and effective disposal of the plurality of the aforesaid longitudinal reinforcing bars or rods adapted to afford increased strength and rigidity in the skeleton reinforcing members of the structure with economy in the amount of material and labor required, all as will hereinafter more fully appear.

In the accompanying drawings, Figure 1, is a fragmentary top view, with parts in section, of a reinforcing skeleton floor structure embodying the present improvements. Fig. 2, is an enlarged detail section on line *x*—*x*, Fig. 1, illustrating the erection of a concrete floor by the use of removable forms. Fig. 3, is a similar view, illustrating the erection of the floor by the use of perforated metallic lathing and without the use of the aforesaid removable forms.

Similar reference numerals indicate like parts in the several views.

Referring to the drawings, 1 represents a series of metal posts or columns, and 2 and 3, the series of longitudinal and transverse floor beams or girders attached to the aforesaid columns 1, to form part of the usual skeleton frame on which floors, walls and other portions of a fireproof structure are secured and carried.

4 are intermediate transverse beams or girders attached to the longitudinal beams or girders 2, as shown.

5 are a series of longitudinally disposed reinforcing bars or rods, of any usual form in cross-section, and which are attached at their respective ends to the transversely disposed beams or girders 3 and 4, in the usual spaced relation shown in Fig. 1, to constitute the skeleton supporting center of the floor. Said reinforcing bars or rods 5 are attached at their respective ends as aforesaid by the following structural formation and combination of parts:—

6 are right-angle extensions formed on the respective ends of each reinforcing bar or rod 5, and at a distance equal to the distance between the remote edges of the transverse beams or girders to be spanned, and adapted to depend vertically at the remote sides of said beams or girders and constitute the attaching means for each reinforcing bar or rod 5. With the purpose of preventing a movement of said extensions 6 away from the beam or girder under the stress of construction loads, the said extensions 6, are made to project below the bottom of the beams or girders 3, 4, and are connected together in pairs by connections disposed beneath each beam or girder, and preferably by means of wire ties 7 having engagement with the lower ends of said extensions 6, and held from disengagement therewith by out-turned prongs 8 on the extreme ends of said extensions, as illustrated in Figs. 2 and 3.

9 is an intermediate wire tie extending through an orifice in the web of a beam or girder, midway the height of the same, and adapted to tie the middle portions of the aforesaid extensions 6, to form retaining heads for the wire ties 7 aforesaid against an outward bulging under construction load stresses.

A material part of the present improvement consists in the formation of the plurality of spaced reinforcing bars or rods 5, above described, of a length equal to the distance between the main transverse beams or girders 3 of the structure, and the attachment of each alternate bar or rod 5 to said main beams, or girders 3, with the remaining alternating bars or rods attached to the intermediate beams or girders 4, as shown in Fig. 1.

The described arrangement provides a staggered relation of the attachments of bars or rods 5 to the beams or girders 3, 4, aforesaid, and is adapted to provide ample strength in floors of extended areas, such as

warehouses, with economy in the material and labor required. In the described arrangement a series of alternating short bars or rods 5′ will be necessary at each end of the structure to complete the floor center, and such bars or rods will extend between and be attached to the outer transverse beams or girders 3, and the next adjacent intermediate beams or girders 4, as illustrated in Fig. 1.

When the present improved construction is employed in the formation of a reinforced concrete floor, by means of the usual removable board forms 10, as illustrated in Fig. 2, the boards of the said forms 10, will be supported in proper position by ordinary wire hangers 11 extending from the bars or rods 5 and engaging said boards in any usual and ordinary manner.

With a use in connection with orificed metal lathing 12, and with the absence of any forms, as shown in Fig. 3, the said lathing will be connected by wire hangers or connectors to the bars or rods 5 of the present construction. In either case the wire hangers will be left in the concrete mass which forms the flow, and any projecting portions of the hangers will be cut-off even with the face of the flow from which they project.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a reinforced concrete structure of the type described, the combination of a plurality of transverse structural iron beams, a series of spaced bars or rods extending between the same, the ends of said bars or rods having right-angle extensions depending below the beams, said extensions being disposed at the far sides of the beams, and means disposed beneath the beams for holding said extensions against the sides of the beams, substantially as set forth.

2. In a reinforced concrete structure of the type described, the combination of a plurality of transverse structural iron beams, a series of spaced bars or rods extending between the same, the ends of said bars or rods having right-angle extensions depending below the beams, said extensions being disposed at the far sides of the beams, and means disposed beneath the beams for holding said extensions against the sides of the beams, the same comprising wire ties engaging the lower ends of said extensions and held from disengagement by lateral prongs on the ends of said extensions, substantially as set forth.

3. In a reinforced concrete structure of the type described, the combination of a plurality of transverse structural iron beams, a series of spaced bars or rods extending between the same, the ends of said bars or rods having right-angle extensions depending below the beams, said extensions being disposed at the far sides of the beams, means disposed beneath the beams for holding said extensions against the sides of the beams, and intermediate ties arranged at the mid-height of the beams for holding the middle portion of said extensions against outward movement, substantially as set forth.

Signed at Fargo, North Dakota, this 29th day of March, 1913.

GEORGE M. GRAHAM, Jr.

Witnesses:
C. H. Anheier,
A. B. Davis.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."