No. 889,223. PATENTED JUNE 2, 1908.

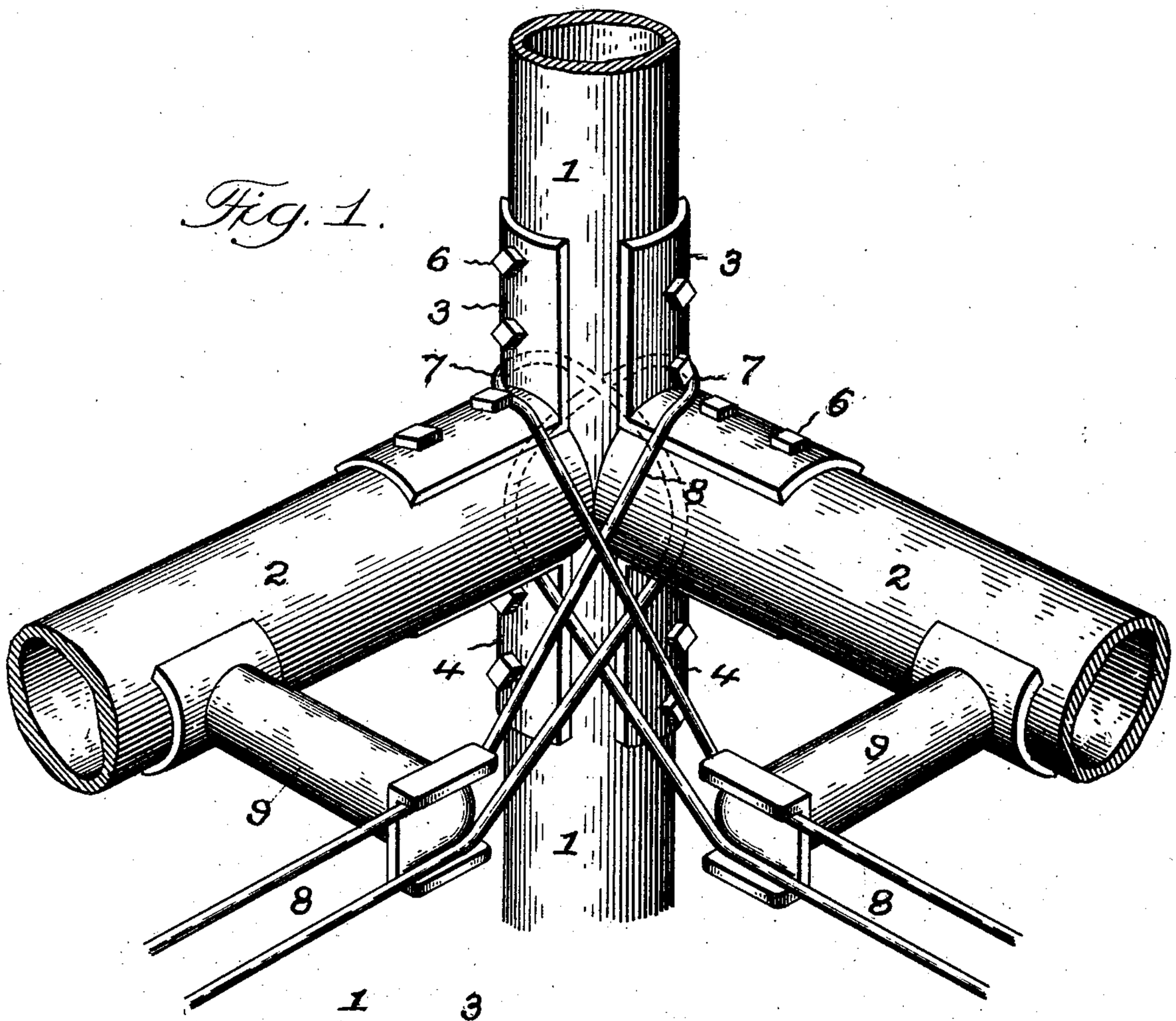
G. M. GRAHAM.

REINFORCING FRAME FOR CONCRETE STRUCTURES.

APPLICATION FILED MAR. 9, 1908.

2 SHEETS—SHEET 1.

Fig. 1.



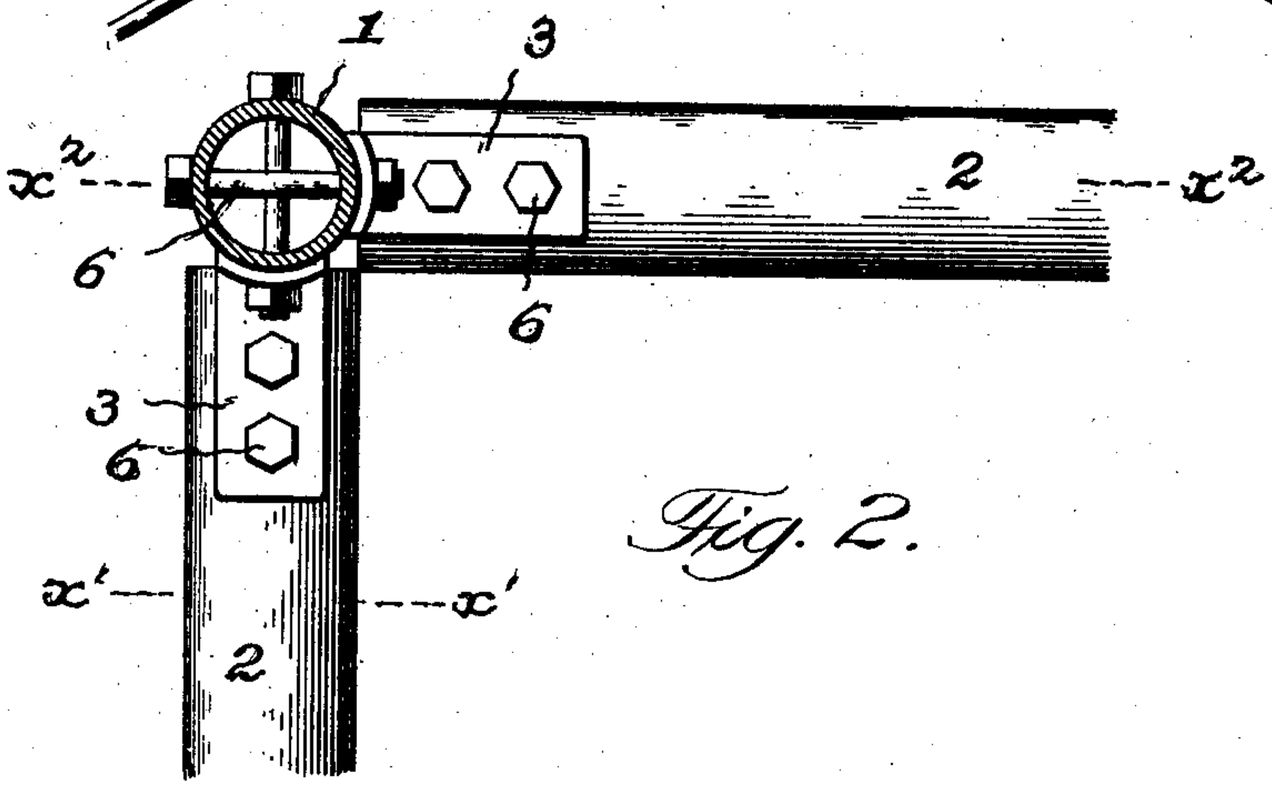


Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

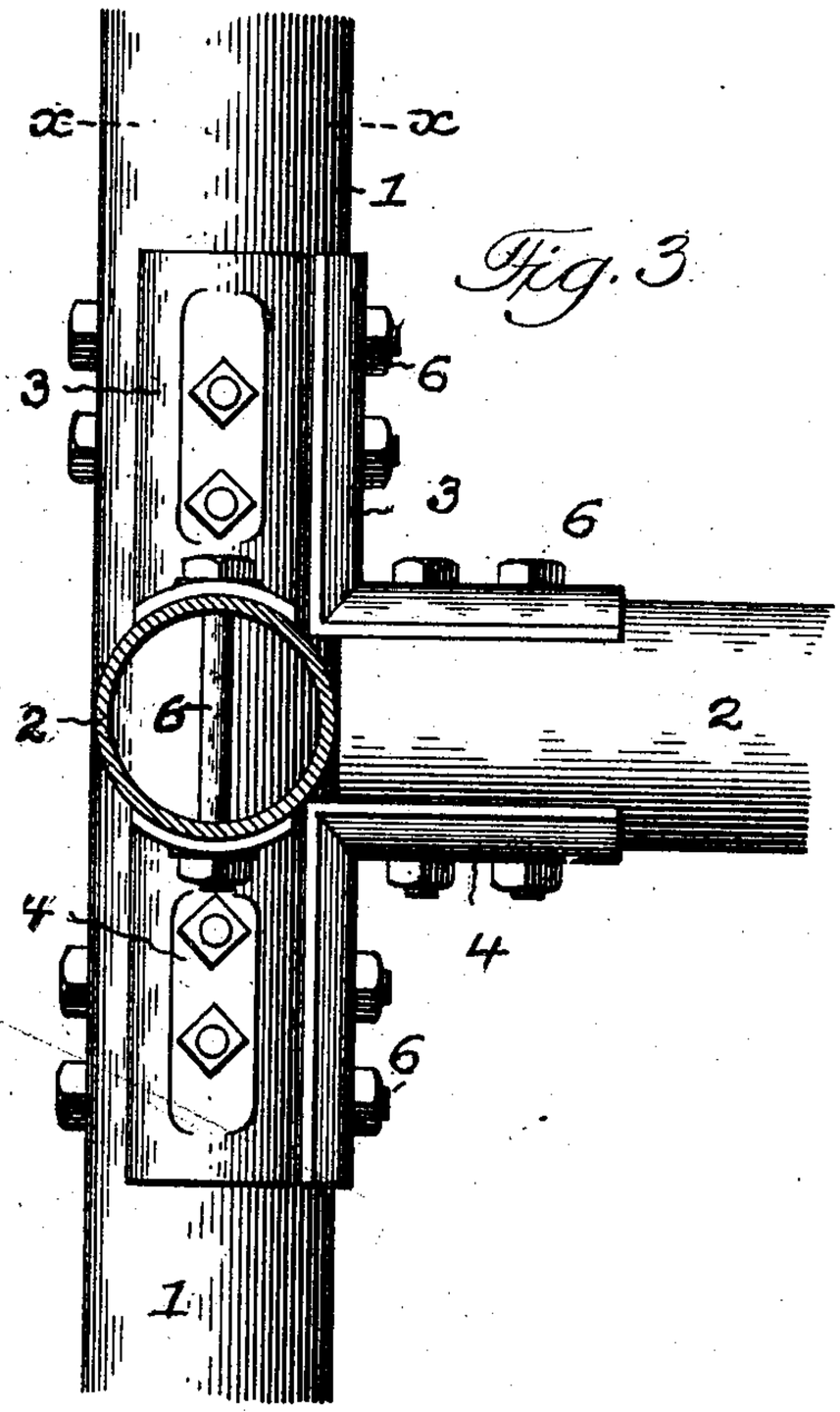


Fig. 4.

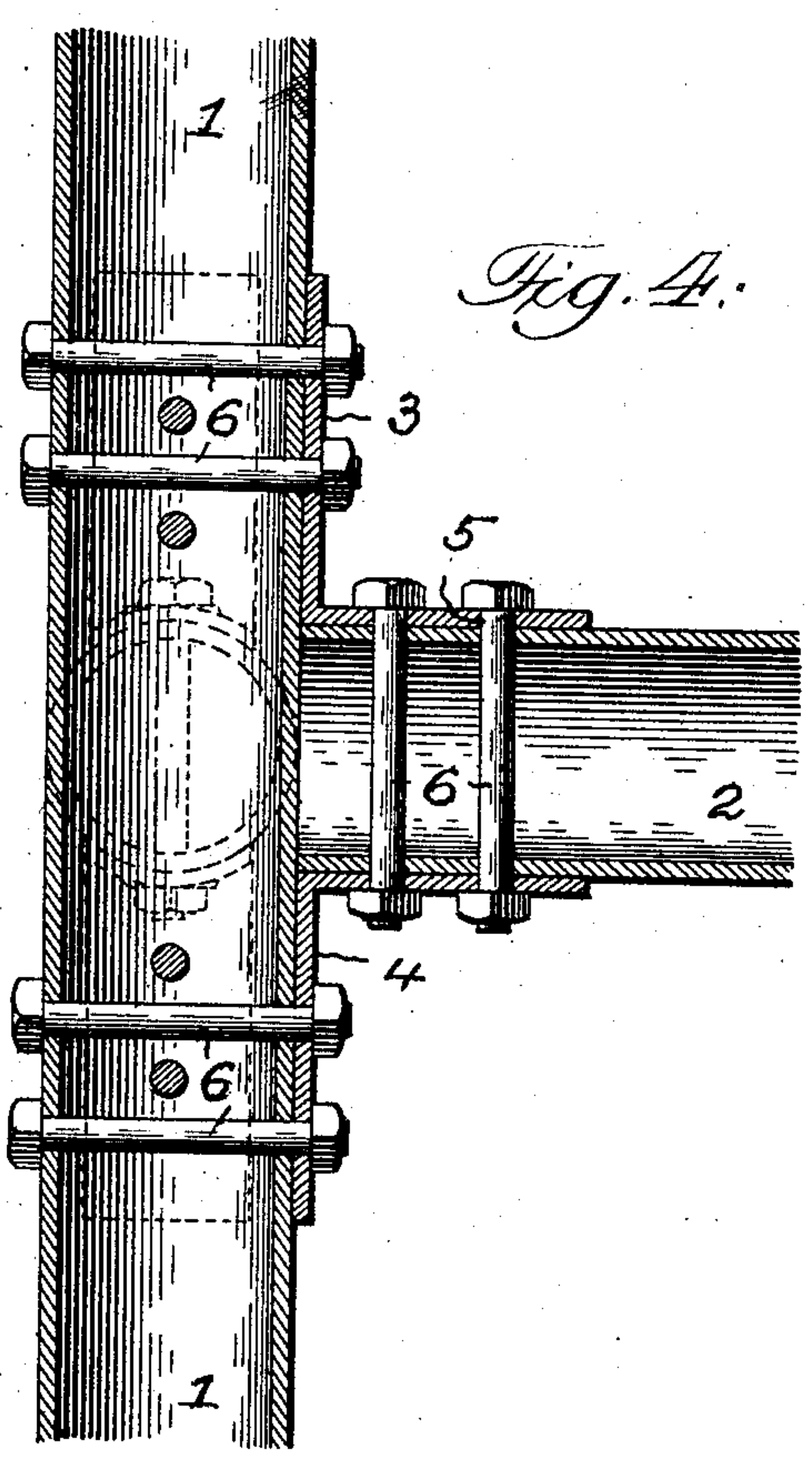
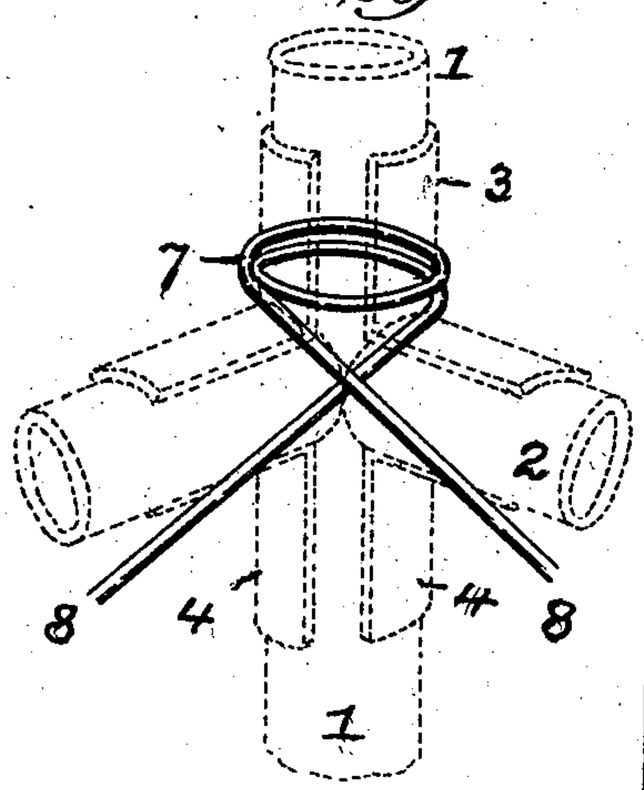


Fig. 6.



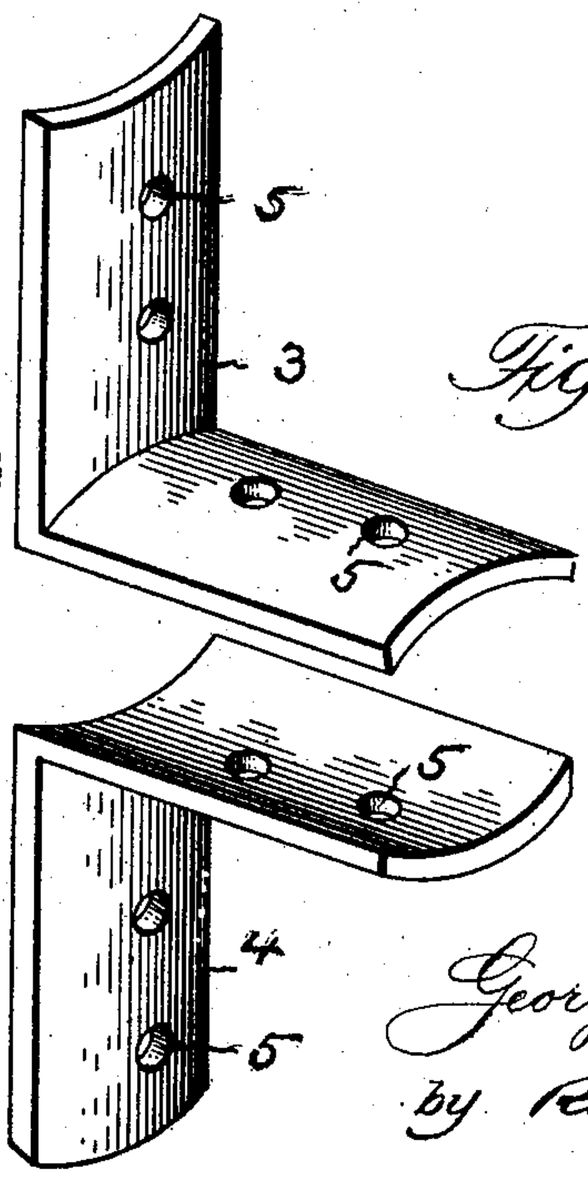


Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE M. GRAHAM, OF CHICAGO, ILLINOIS, ASSIGNOR TO G. A. EDWARD KOHLER, OF CHICAGO, ILLINOIS.

REINFORCING-FRAME FOR CONCRETE STRUCTURES.

No. 889,223. Specification of Letters Patent. Patented June 2, 1908.

Application filed March 9, 1908. Serial No. 419,857.

To all whom it may concern:

Be it known that I, GEORGE M. GRAHAM, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Reinforcing-Frames for Concrete Structures, of which the following is a specification.

This invention relates to that class of reinforced concrete structures in which the skeleton reinforcing frame comprises round tubular border members and a skeleton center formed by windings of wires or rods around and between said members under tension, as set forth in detail in my prior patent No. 865,490 of September 10, 1907. And the present improvement has for its object to provide a simple and efficient structural formation and combination of parts whereby the border frame members are connected together in a simple and rigid manner, and added rigidity imparted to such connection by the tension truss members forming parts of the border frame, all as will hereinafter more fully appear.

In the accompanying drawings:—Figure 1 is a detail perspective view of a corner portion of the reinforcing frame of a concrete structure having the present improvements applied. Fig. 2, is a sectional plan view of same on line x—x Fig. 3. Fig. 3, is a sectional elevation of same, on line x'—x' Fig. 2. Fig. 4, is a similar view on line x^2—x^2 Fig. 2. Fig. 5, is a detail perspective view of the upper and lower angle couplings of the present construction. Fig. 6, is a detail perspective of the wrappings of the tension member of the truss.

Similar numerals of reference indicate like parts in the several views.

Referring to the drawings, 1 represents a portion of a vertical column, and 2 adjacent ends of the round tubular girder members of a skeleton reinforcing frame of a concrete structure as set forth in my aforesaid patent No. 865,490, and the coupling together of which constitutes the subject matter of the present improvement and to such end comprises a formation and combination of parts as follows:—

3 and 4 are angle coupling pieces the members of which are arranged in right angle relation to each other and have a segmental or concavo-convex form in cross section so as to fit and have extended bearing contact with the rounded peripheries of the column and girder members aforesaid. Such coupling members are provided with orifices 5 along their length for the passage of the hereinafter described clamping bolts.

6 are the clamping bolts passing through the orifices 5 of the coupling pieces, and entirely through the columns and girders to which they are applied and clamping firmly the parts together. Such coupling pieces are additionally held in place by one or more wrappings 7 of the wires or rods 8 which form the tension members of the truss by which the lateral rigidity is imparted to the girders, as fully set forth in my companion application for Patent Serial No. 419,856 filed Mar. 9, 1908, and as illustrated in Figs. 1 and 6. In said construction the tension member 8 extends from one girder end or column to an opposite girder end or column and has bearing against lateral struts 9 as shown in Fig. 1.

In the present construction pairs of such coupling pieces arranged on common horizontal planes will be used to attach the abutting ends of the horizontal girders 2 to a vertical column 1, and with a view to prevent an interference between the clamping bolts above referred to, the orifices 5 in the coupling members which are attached to the column 1 will have a staggered or alternated relation to the corresponding orifices of the companion coupling members, and so that the two sets of clamping bolts 6, having a right angle relation, may freely pass through the parts without interfering with each other.

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

1. In a skeleton reinforcing frame for concrete structures, the combination of a vertical column, horizontal girders arranged in right angle relation to each other and abutting against said column, angle coupling pieces the members of which are in right angle relation and have a concavo-convex form, and a series of clamping bolts passing through said members and entirely through the column and girders.

2. In a skeleton reinforcing frame for concrete structures, the combination of a vertical column, horizontal girders arranged in right angle relation to each other and abutting against said column, angle coupling pieces the members of which are in right angle relation and have a concavo-convex form,

and a series of clamping bolts passing through said members and entirely through the column and girders, one set of clamping bolts having a staggered relation to its companion set.

3. In a skeleton reinforcing frame for concrete structures, the combination of a vertical column, horizontal girders arranged in right angle relation to each other and abutting against said column, angle coupling pieces the members of which are in right angle relation and have a concavo-convex form, a series of clamping bolts passing through said members and entirely through the column and girder, and a lateral truss for the girder consisting of intermediate struts and wire or rod tension members extending from column to column, over said struts and wrapped around the column and coupling pieces.

Signed at Chicago, Illinois this 29th day of February, 1908.

GEORGE M. GRAHAM.

Witnesses:

ROBERT BURNS,

HENRY MOE.