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J. S. & W. M. THOMAS.

FRAMEWORK FOR CEMENT STRUCTURES.

APPLICATION FILED OCT. 13, 1904.

Fig. I.

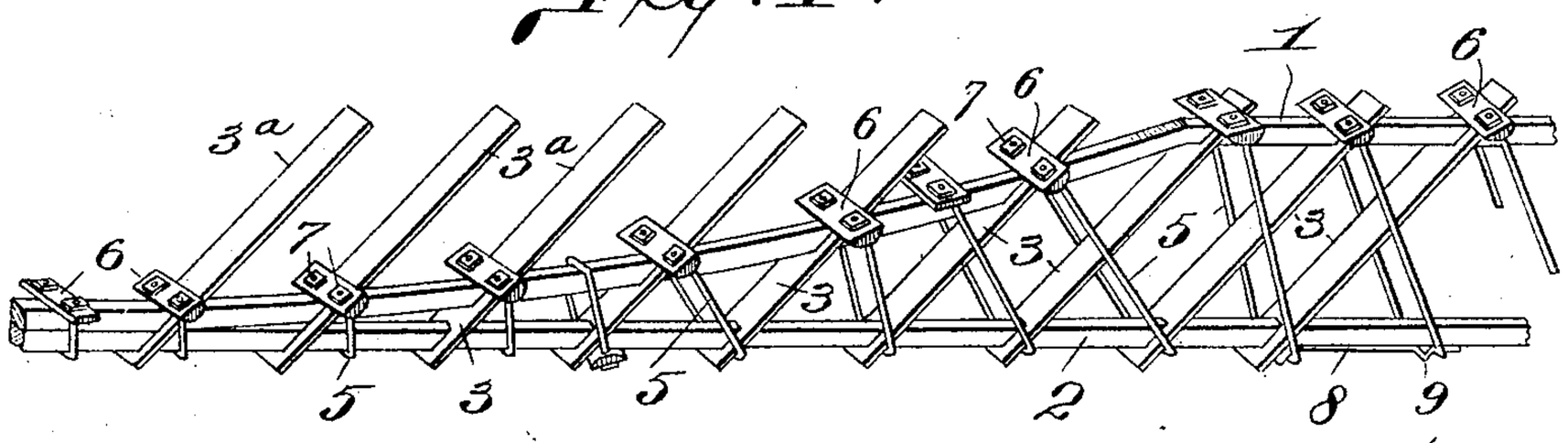


Fig. II.

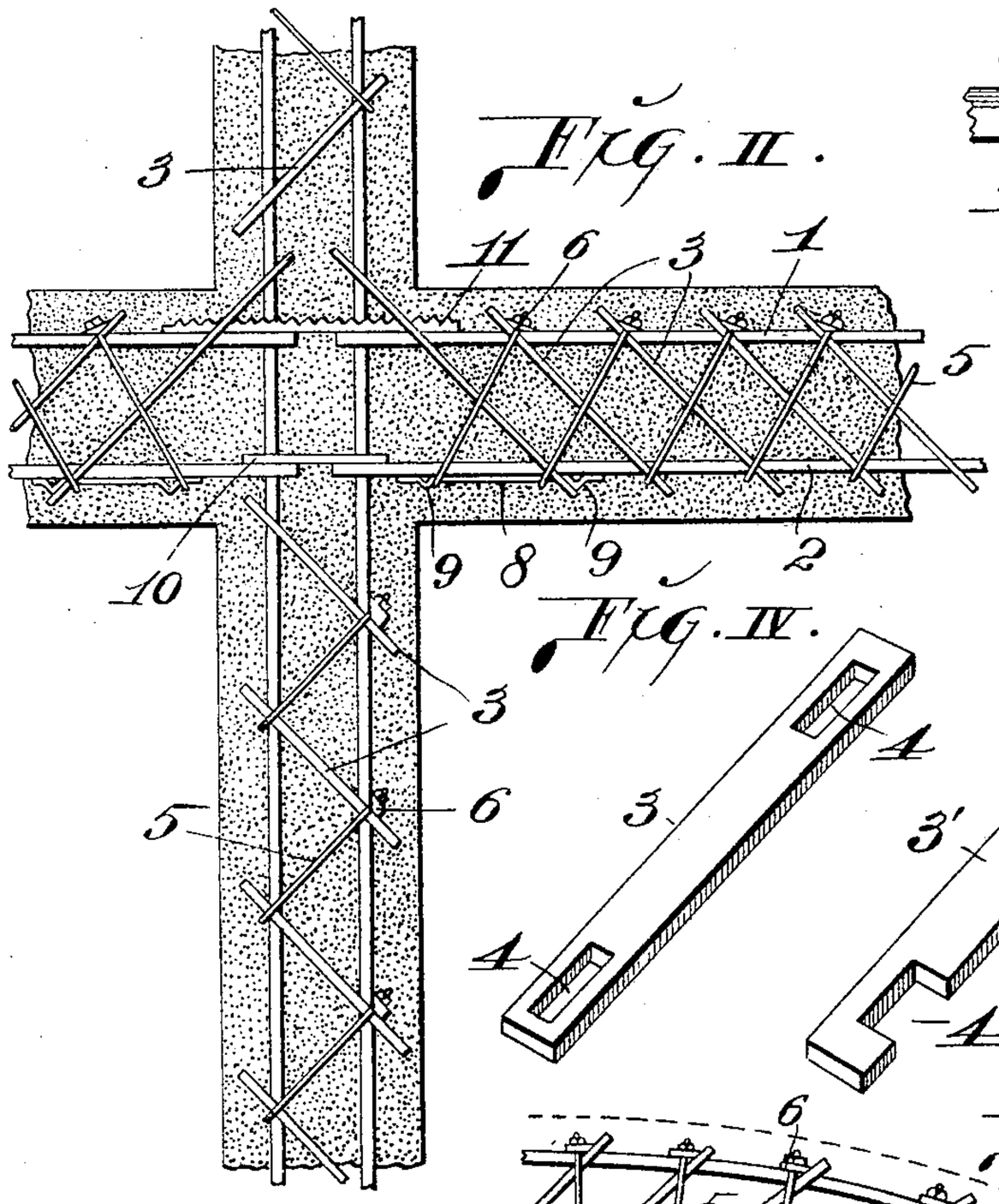


Fig. III.

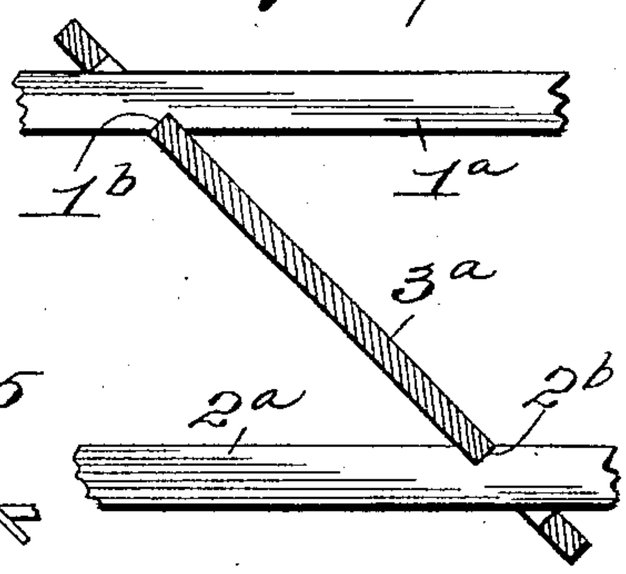


Fig. IV.

Fig. V.

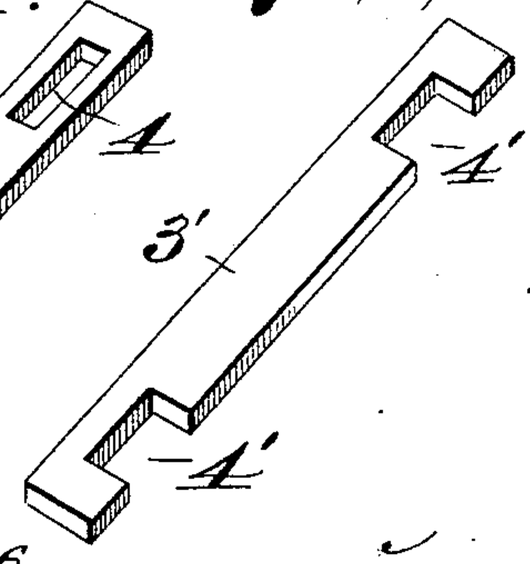


Fig. VI.

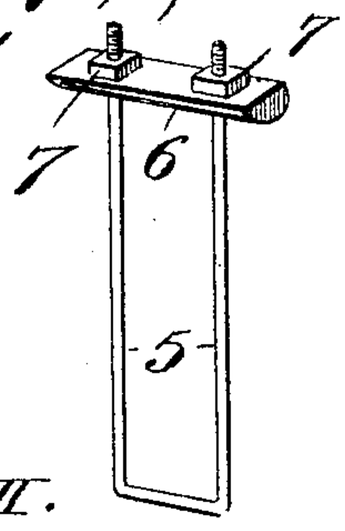
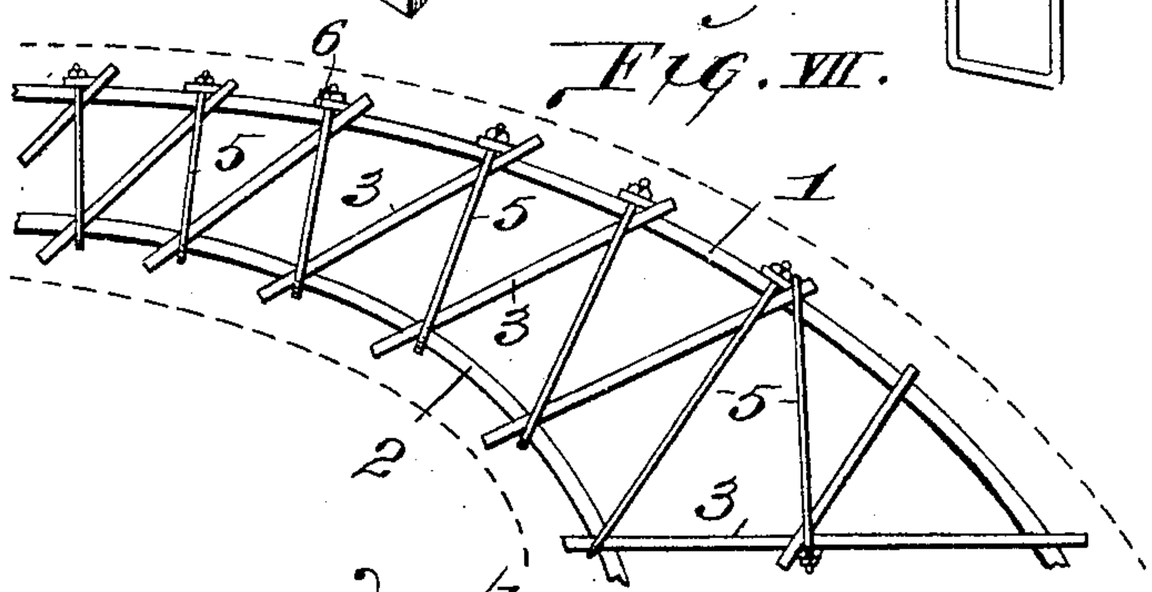


Fig. VII.



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UNITED STATES PATENT OFFICE.

JOHN S. THOMAS AND WILLIAM M. THOMAS, OF ST. LOUIS, MISSOURI.

FRAMEWORK FOR CEMENT STRUCTURES.

No. 805,762. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed October 13, 1904. Serial No. 228,333.

To all whom it may concern:

Be it known that we, JOHN S. THOMAS and WILLIAM M. THOMAS, citizens of the United States, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Frameworks for Cement Structures, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

Our invention relates to a framework for use in building cement structures—such as houses, bridges, or viaducts—and around and into which the cement is molded, the object of the improvement being to produce a framework that will give the greatest stability to structures with a minimum of weight.

Briefly stated, the construction of the framework embodies series of horizontal, vertical, inclined, or curved beams tied together by struts slipped loosely onto the beams and binding thereagainst in positions oblique to the beams. The connected beams and struts are stayed by ties uniting the beams and disposed in directions the reverse of the position of the struts.

Figure I is a perspective view of a section of our framework. Fig. II is a section of a cement structure with our framework embedded therein. Fig. III is a view, partly in elevation and partly in section, illustrating a modification. Fig. IV is a perspective view of one of the struts. Fig. V is a perspective view of a modification of the struts. Fig. VI is a perspective view of one of the tie-stirrups. Fig. VII is a side elevation of a section of framework suitable for use in bridges or viaduct structures.

1 and 2 designate beams that may be of any desirable shape in cross-section—such as square, rectangular, or round—and which are disposed in pairs in alinement with each other. These beams may, in order to secure the greatest degree of strength in the structure, be either parallel, as seen in Fig. II, or partially parallel and partially inclined or curved, as seen in Fig. I, or curved, as seen in Fig. VII.

3 designates struts that are provided near their ends with elongated openings 4, extending longitudinally of the struts, as seen in Fig. IV. These struts are slipped onto the beams 1 and 2 in succession and of a number sufficient to give the requisite stability to the framework. When the struts are brought successively to the proper positions on the beams, they occupy positions obliquely to the beams and the portions of the struts at the inner facing sides of the beams and within the openings in the struts bite into the beams, whereby the struts are maintained from displacement and serve to resist any strain that may be imposed upon the framework. We prefer to make the openings 4 in the struts entirely within them; but there are certain instances in which it is infeasible to slip the struts onto the beams from their ends, and to provide for the application of the struts in such instances we make struts 3′, as seen in Fig. V, that are provided with openings 4′ in the form of notches cut into the sides of the struts, so that they may be slipped onto the beams that receive them from the sides thereof.

As seen in Fig. I, the framework is made with the beams 1 and 2 arranged in trussing shape, and when they are so arranged we prefer to make the struts located at the narrowest portions of the confined beams considerably longer than the width of said beams in order that they will constitute extensions 3^a, which become embedded in the cement and afford greater stability and better embedding of the framework in the cement.

While we prefer to make the beams of the framework of plain form and rely upon the biting of the struts 3 thereinto in their oblique positions, as the connections of the parts are ordinarily of sufficient stability in so doing, we may provide the beams indicated by the numerals 1^a and 2^a in Fig. III with notches 1^b and 2^b, into which the struts 3^a may seat to avoid all possibility of their becoming dislocated.

5 designates ties or stays that unite the beams of the framework and bear against the struts 3, these ties being intended by their application to afford additional rigidity in the framework by bracing it in a direction opposite to the direction in which the struts extend. The ties or stays 5 are preferably of stirrup form, as seen most clearly in Figs. I, VI, and VII, but may be of any other suitable shape. At the ends of the tie-arms where they are made of stirrup form are cross-pieces 6, that are held to the arms of the stirrups by nuts 7, the said cross-pieces being adapted to bear against one of the framework-beams and against the portions of the struts adjacent to said beam, while the other or looped ends of the ties or stays bear against the other beam and the portions of the struts fitted thereto.

For the purpose of preventing slippage of

the ties or stays where they do not bear directly against the struts, as seen in Figs. I and II, we provide brace-strips 8, that are provided with projections 9 and are held to the beams within the struts in order that the ties or stays may seat thereagainst and slippage of them along the beams be avoided.

Where the beams of our framework are united to crossing framework-beams, as seen in Fig. II, the two sets of beams are united by tie-bars 10 and 11, that are threaded onto the beams and the latter of which is preferably toothed to receive the struts that are fitted thereto and which unite the crossing-beams and act in connection with the ties 10 and 11 to hold the parts assembled.

We claim as our invention—

1. In a framework of the character described, the combination of a pair of beams, apertured struts threaded thereonto and disposed in positions oblique to the beams, and ties connecting said beams and struts, substantially as set forth.

2. In a framework of the character described, the combination of a pair of beams, apertured struts threaded thereonto and disposed in positions oblique to the beams, and ties connecting said beams; said ties being arranged to embrace said struts at the outer faces of said beams, substantially as set forth.

3. In a framework of the character described, the combination of a pair of beams, struts fitted to said beams in positions oblique thereto, ties fitted to and embracing said beams, and retaining-strips fitted to one of said beams to receive said ties, substantially as set forth.

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WILLIAM M. THOMAS.

In presence of—
NELLIE V. ALEXANDER,
E. S. KNIGHT.