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REINFORCED CONCRETE COLUMN, GIRDER, AND BEAM.

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976,182.

Patented Nov. 22, 1910.

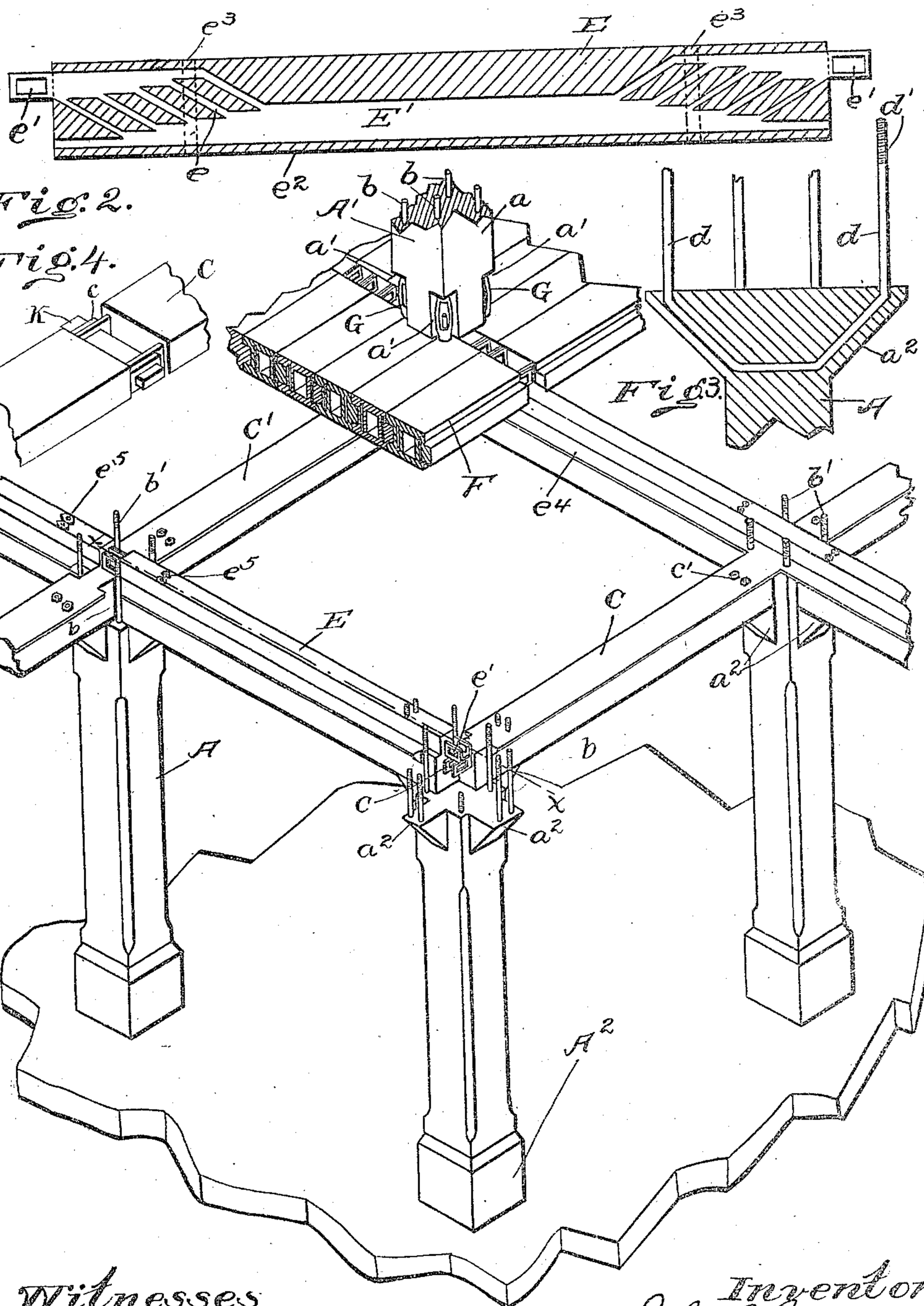


Fig. 2.

Fig. 4.

Fig. 3.

Fig. 1.

Witnesses

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JOHN A. JONES, OF CINCINNATI, OHIO.

## REINFORCED-CONCRETE COLUMN, GIRDER, AND BEAM.

976,182. Specification of Letters Patent. Patented Nov. 22, 1910.

Application filed June 25, 1908. Serial No. 440,211.

*To all whom it may concern:*

Be it known that I, JOHN A. JONES, a citizen of the United States of America, and resident of Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Reinforced-Concrete Columns, Girders, and Beams, of which the following is a specification.

In constructing buildings of reinforced concrete, one of the largest items of expense is that of the temporary frame work. This expense consists in the labor in erecting it and tearing it down, and in the damage it sustains in these processes. Another item of expense in this character of work is due to delays occasioned by cold weather, during which the work must be suspended, because the concrete will not set properly below a certain temperature.

The object of my invention is reinforced concrete construction members which are manufactured and then erected in a firm construction to form a concrete building without the use of temporary framing and in the construction of which the condition of the weather does not form such a necessary consideration. This object is attained by the means described in the specification and illustrated in the accompanying drawings, in which,

Figure 1 is a perspective view of a part of a building constructed of the columns, girders and beams embodying my invention. Fig. 2 is a longitudinal sectional view of a girder, upon a somewhat enlarged scale; the section being taken along line $x$—$x$ of Fig. 1. Fig. 3 is a detail sectional view of the top of a column. Fig. 4 is a detail perspective view of the ends of adjacent beams and of the key which couples the reinforcing bars thereof.

The columns, A, may be made square or cylindrical, or of whatever contour desired. They consist of metal rods, $b$, preferably steel, and four in number, which extend the full length of the column, and which are embedded in concrete, $a$. At the bottom of the column, recesses, $a'$, are left, in alinement with each rod, into which recesses the screw-threaded ends of the rods extend. At the upper ends of the columns the screw-threaded ends, $b'$, of rods $b$, project beyond the concrete of the column a distance somewhat greater than the thickness of girders, E. In the upper end of each column four U-shaped rods, $d$, are embedded in the concrete, to form wind braces. The distance between the legs of each U-rod is greater than the width of the column. The concrete at the top of the column is molded into brackets, $a^2$, to conform to the bend in the U-rods. The U-rods are placed in the end of the column between the rods, $b$. The screw-threaded ends, $d'$, of the U-rods extend above the end of the column a distance greater than the thickness of the girders, E and the beams, C. Girders, E, are manufactured of bars, E′, expanded at their ends, $e$, as described in United States Letters Patent No. 848,105, granted to me upon March 26th, 1907. Bars, E′, are provided with key-holes, $e'$. Bars, E′, preferably two, are embedded in concrete, $e^2$, leaving the ends with the key-holes, $e'$, projecting beyond each end of the girder. The width of the girders is made less than the distance between the rods, $b$. In each end of girder, E, vertical holes, $e^3$, are left in molding them. Holes, $e^3$, are made a distance from the ends of the girders such as to register with the legs, $d'$, of the U-rods, $d$. Upon each side, girders, E, are provided with off-sets, $e^4$, to support the ends of floor slabs, F.

Beams, C, have embedded in them metal bars similar to bars, E′, and have ends, $c$, provided with key-holes. The beams, C, have likewise holes molded in them similar to holes, $e^3$ for receiving the ends, $d'$, of the U-rods. The beams, C, are made of a thickness less than the thickness of the girders, E, so that the ends, $c$, of their reinforcing bars will stand below the ends, $e'$, of the bars, E′, when the girders and beams rest upon the end of the same column.

In erecting construction members heretofore described, the columns upon the first floor are connected at their bases to the foundation, in any suitable manner, as, for instance, the foundation may have secured in it vertical metal rods to register with the ends of the rod, $b$, to which they would be connected by turn-buckles, in the same manner as described hereafter for connecting the lower ends of the columns of the second floor to the upper ends of the columns of the first floor. The columns, A, of the first floor having been erected, beams, C, are placed upon the upper ends of adjacent columns, so that the ends, $d'$, of the U-rods pass through the holes in the ends of the beams and the ends of the beams stand between the rods, $b$. Then nuts, $c'$, are screwed down upon the

ends, $d'$, of the U-rods, which pass through the beams. The ends, $c$, of the reinforcing bars of adjacent beams, should stand with their key-holes registering. A key K is then to be passed through these registering key-holes. Girders, E, are then placed upon the columns, with the ends of the girders standing between the rods, $b$, the ends, $d'$, of the U-rods projecting through the perforations, $e^3$, the ends of the girders abutting against the ends of the beams, C, the ends, $e'$, of the bars, E, standing above the end, $c$, and with their key-holes registering with the key-holes in the bars of adjacent girders. The registering key-holes then have a key passed through them in a manner similar to that in which key K is passed through the ends $c$. The ends of the U-rods then receive nuts, $e^5$. The ends of the columns are then grouted with concrete so as to cover the rods, $b$, to the level of the beams and girders and to fill in the spaces between the abutting ends of the beams and girders. It is seen that the rods, $b$, project above the beams and girders. Floor slabs, F, are then placed upon the shoulders, $e^4$, of the girders. The floor slabs adjacent to the columns are cut away so as to pass the rod, $b$. Columns, A', of the next floor, are then placed above the columns, A, so that the lower ends of their rods, $b$, register with the upper ends, $b'$, of the rods of columns, A. The registering ends of the rods are connected by means of turn-buckles, G. The lower ends of the columns, for the sake of appearance, may then be finished with slabs similar to the slabs, $A^2$, shown upon the bottom of the column, A.

What I claim is:

1. The combination of columns and girders, each column consisting of a concrete body and rods embedded longitudinally in and projecting beyond the concrete body, means for connecting said rods to the corresponding rods of superposed columns, wind bracing rods embedded in the ends of the column and projecting beyond the ends thereof, and concrete girders having bars embedded longitudinally in the concrete and projecting beyond the ends thereof, the girders being provided with holes, through which the wind bracing rods of the columns project.

2. A structure consisting of concrete columns formed prior to erection and provided with reinforcing bars which project vertically above said columns, concrete girders formed prior to erection supported by said columns and provided with reinforcing bars which extend beyond the ends of the girders to form links for securing the ends of adjacent girders together, turn buckles for engaging the reinforcing rods of said columns and for securing the supporting columns to the columns supported by them, and U-rods embedded in the upper end of each column for securing the girders to the columns.

3. A structure consisting of concrete columns formed prior to erection and provided with reinforcing bars which project above said columns, concrete girders formed prior to erection and supported by said columns, reinforcing bars embedded in the concrete of said girders and projecting beyond the ends of the girders to form means for securing the ends of adjacent girders together, separately formed reinforced concrete beams supported by said columns, and interlocking floor slabs supported by said beams and girders, independent means for positively securing the ends of adjacent girders together, means for securing the ends of adjacent beams together, and means for securing the ends of adjacent floor slabs together, means for positively securing each supporting column to the column supported by it, and means for securing the girders and the beams to the supporting column.

4. A structure consisting of concrete columns and girders, each formed prior to erection, each column consisting of concrete having longitudinal reinforcing rods extending through it and projecting beyond the ends thereof and having brace rods embedded in and projecting above the top of the column, the girders consisting of concrete with longitudinal reinforcing members extending beyond the ends of the concrete, each girder having in its ends bores for fitting over the brace rods of the column, means for coupling the reinforcing rods of one girder to the reinforcing rods of an adjacent girder, the reinforcing rods of a column projecting above the girders which rest upon the column and being supplied with means for coupling them to the reinforcing rods of the column next above.

5. As an article of manufacture a concrete column having concrete brackets formed at its upper end, reinforcing rods extending longitudinally through the column and brace rods extending across the top of the column and through the brackets, and projecting above the brackets.

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