

E. L. RANSOME.  
CONCRETE BUILDING CONSTRUCTION.  
APPLICATION FILED DEC. 31, 1906.

918,699.

Patented Apr. 20, 1909.

3 SHEETS—SHEET 1.

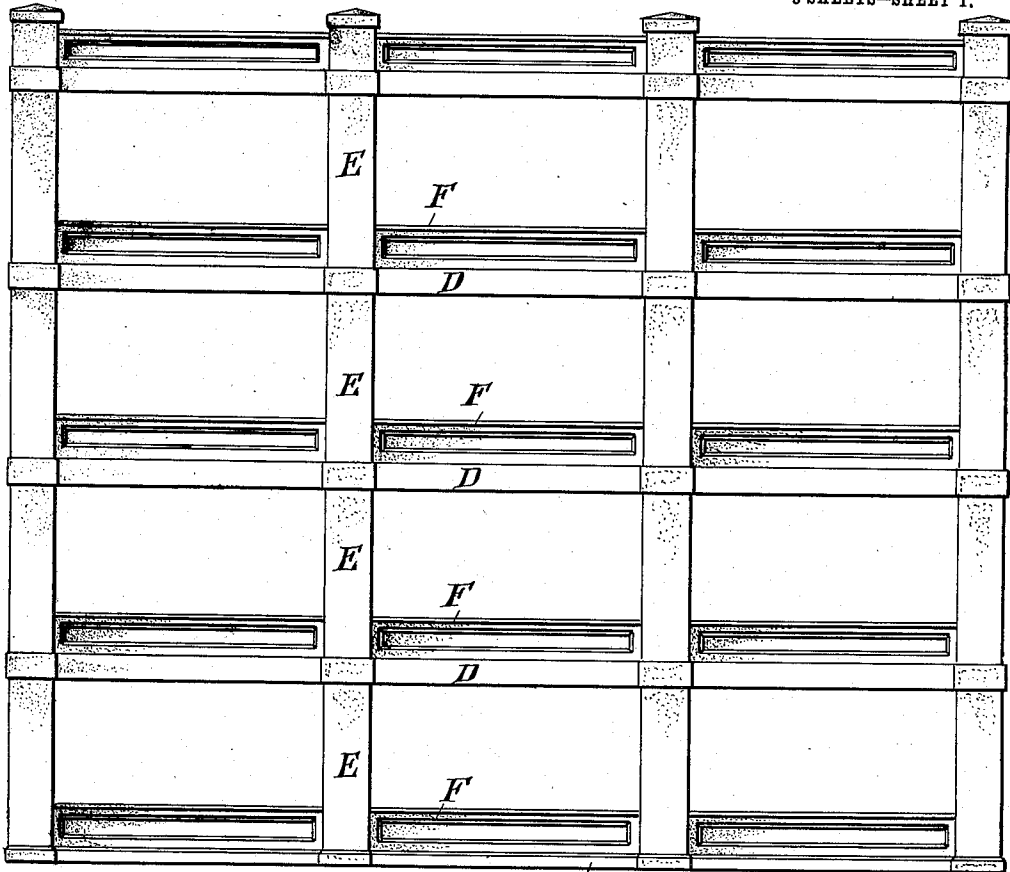


Fig. 1.

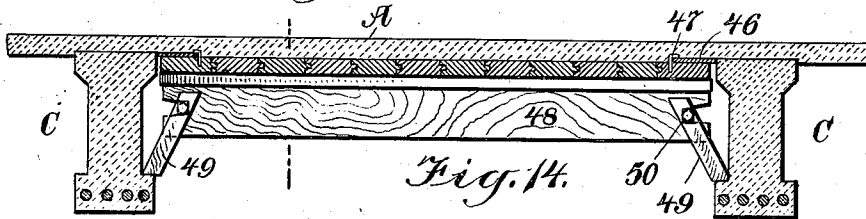


Fig. 14.

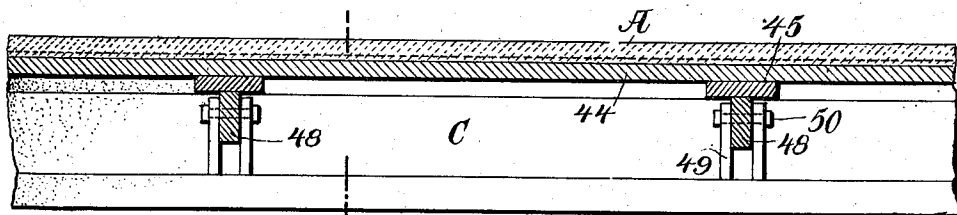


Fig. 15. Ernest L. Ransome  
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By his Attorney  
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Witnesses  
E. J. McLaughlin  
W. C. Abbott

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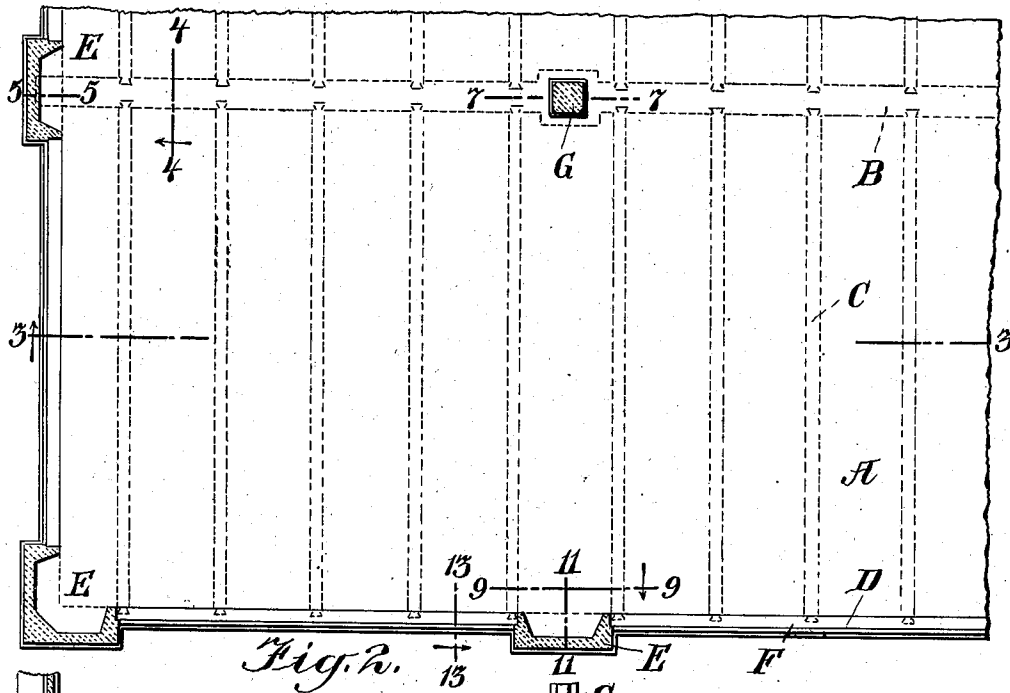


Fig. 2.

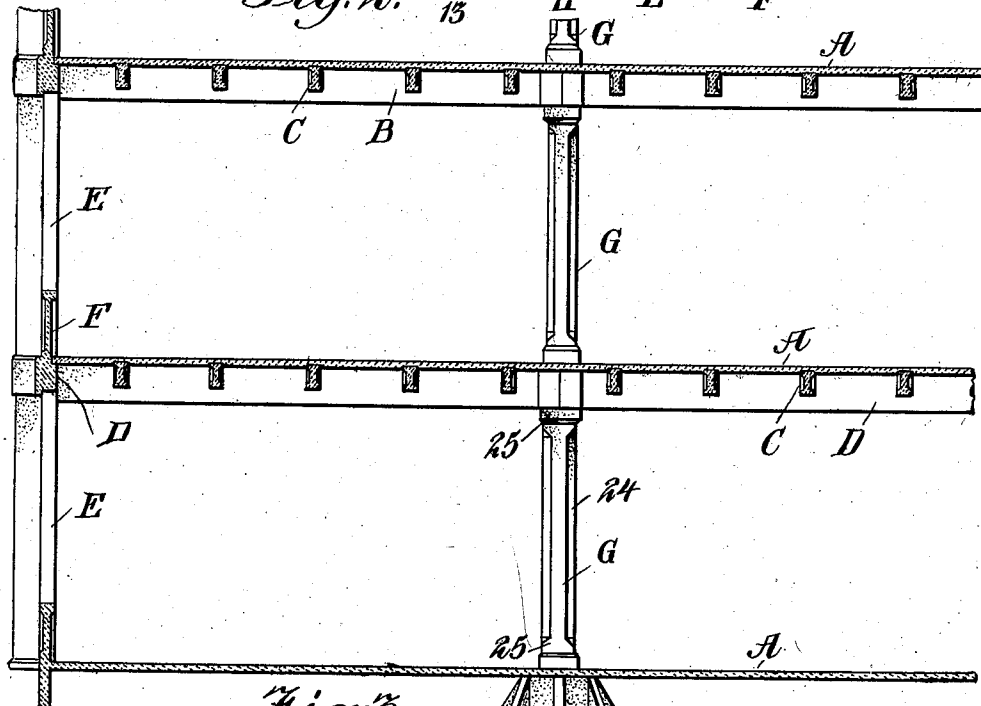


Fig. 3.

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E. J. McLaughlin  
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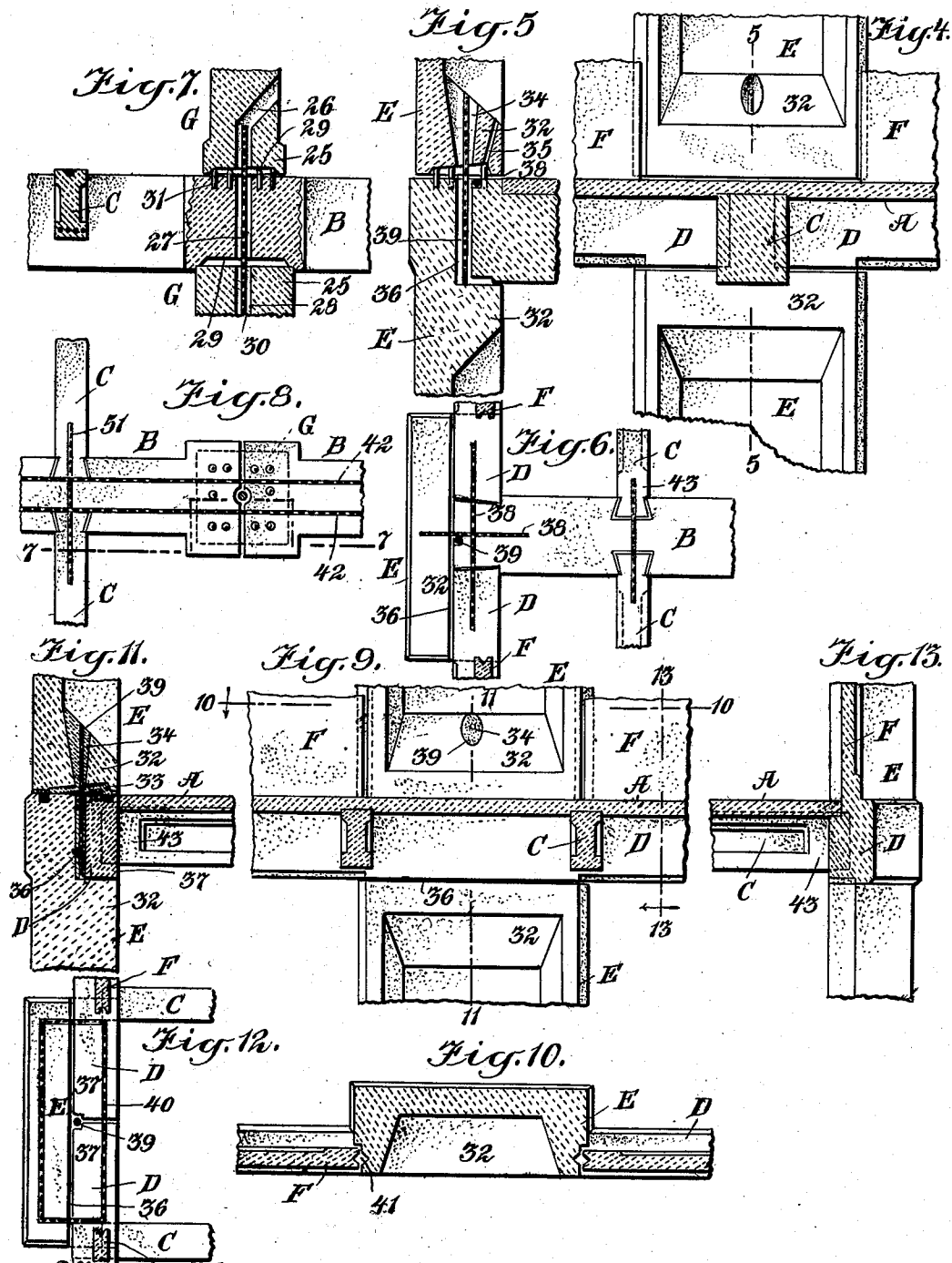
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3 SHEETS—SHEET 3.



Witnesses  
S. J. McLaughlin  
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# UNITED STATES PATENT OFFICE.

ERNEST LESLIE RANSOME, OF NEW YORK, N. Y.

## CONCRETE BUILDING CONSTRUCTION.

No. 918,699.

Specification of Letters Patent.

Patented April 20, 1909.

Application filed December 31, 1906. Serial No. 350,125.

To all whom it may concern:

Be it known that I, ERNEST L. RANSOME, of the borough of Richmond, city and State of New York, have invented certain new and useful Improvements in Concrete Building Construction, of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to concrete buildings in which the various elements are separately or individually molded—if desired at points removed from the site of the building; and it consists in certain special features of construction and relative arrangement of parts which will be fully set forth hereinafter and particularly pointed out in the claims. For this purpose, reference is had to the accompanying drawings, which illustrate, as an example of my invention, a building embodying its essential principles; in which drawings:—

Figure 1 is an elevational view showing the general exterior appearance of the building; Fig. 2 is a sectional plan of a part of the building showing the columns, and piers in horizontal section and illustrating the girders, beams and belt course by broken lines; Fig. 3 is a vertical section on the line 3—3 of Fig. 2; Fig. 4 is a fragmentary, sectional elevation on the line 4—4 of Fig. 2; Fig. 5 is a vertical section on the line 5—5 of Figs. 2 and 4; Fig. 6 is a plan view illustrating the cap of a beam and the juncture of the belt course and girder therewith; Fig. 7 is a section on the line 7—7 of Figs. 2 and 8 showing the juncture of the girders with the columns above and below them; Fig. 8 is a plan view of the parts shown in Fig. 7; Fig. 9 is a fragmentary section on the line 9—9 of Fig. 2; Fig. 10 is a sectional plan view on the line 10—10 of Fig. 9; Fig. 11 is a vertical section on the line 11—11 of Figs. 2 and 9; Fig. 12 is a plan view of the parts shown in Fig. 11; Fig. 13 is a section on the line 13—13 of Figs. 2 and 9, and Figs. 14 and 15 are detail views illustrating the manner of arranging the false work for the formation of the floors.

A indicates the floors of the building. The upper floors are laid *in situ*, in a monolithic reinforced concrete sheet, over the girders B, and beams C, and meeting the belt course D, piers E and curtain walls F. The lower-

most or ground floor is also laid *in situ*, but rests on the foundation in the event that the building has no cellar or basement, if it has, however, the ground floor is laid as the others, on girders and beams. The other parts of the building are of peculiar formation enabling them to be individually molded as independent members and erected and assembled in the special manner which I shall now set forth. All of the various members or elements of the building are suitably reinforced with iron or other tension bars embedded therein as is well known in the art and no special illustration or description of this is given.

As shown best in Figs. 5 and 11, the piers E are set directly upon each other, the joints coinciding with the level of the floors A, and the bottom-most piers resting on the foundation. The columns G are in vertical alinement, and as shown best in Fig. 7 bear respectively above and below the girders B. The lower-most columns G are set on a specially prepared foundation or base H which is placed just below the floor line. The foundation or base H of concrete with a body or core 20, a bottom 21 and strengthening webs 22 extending upward and inward from the wide bottom 21 to the upper end of the body 20. This element H of the building is molded or cast of concrete and is placed in position or in the foundation. Its construction in the manner described provides a strong and practically indestructible support for the column. I construct the main bodies or main portions of the piers and columns of various cross sectional forms and of such area as is adapted to the stresses involved, while the ends of the piers and columns or other parts, at the points where contact is made, are provided with enlarged portions furnishing wide bonding surfaces, and hence enabling me to secure that degree of bonding force which the nature of the concrete requires.

The specific columns G are preferably octagonal in cross-section throughout their bodies or main portions 24 and are given sufficient cross-sectional area to furnish the necessary strength. The ends 25 of the columns are enlarged to furnish the bonding surface and as shown best in Fig. 7, the lower ends of the columns are provided at such enlarged portions 25 with ducts or

canals 26 extending from the sides downward and inward to the bottom. The girders B are formed with ducts 27 directly under and alined with the ducts 26 while the upper ends of the columns are formed with ducts 28 registering with the ducts 26 and 27. I also form at the points of contact of the ends of the columns with the girder, pockets 29 to receive the bonding cement or other substance. These pockets may be formed either in the columns or girders; in Fig. 7 one pocket is in the lower end of the column and the other in the under side of the girder. In the construction of the building the parts are assembled as shown in Fig. 7 with a metallic bar 30 in the alined ducts 26, 27 and 28. The upper column is supported on the girder and, if desired, the girder on the lower column, by pegs 31 of wood or metal, so that a space is left at all points for the cement. The bonding cement in the fluid state, known as grouting, is then run into the duct 26 and flowing through the same fills the pockets 29 and ducts 27 and 28. As the cement hardens a perfect bond is effected and the strength of a monolithic structure results. The bottom-most column G, is set on the base H, in substantially the same manner that the upper column in Fig. 7 is set on the girder. Thus it will be seen that by enlarging the bearing surfaces and providing for the flow of the cement grouting over the whole of the same, I effect the necessary security of the joint without giving to the column excessive weight or impairing its strength or appearance. Where the pegs 31 are employed, these may be molded in the column or girder when the same is formed, or holes may be formed therein and the pegs inserted as desired, and as the grouting is poured into the pockets it hardens around the pegs which remain permanently in the work.

The structure and assemblage of the piers E is also important. As shown in the drawing particularly Fig. 2, the corner piers are L-shaped in cross section with inward flanges at the edges while the facade piers are channel shaped in cross section. The ends of the piers are enlarged as at 32, and the lower ends of the piers are formed with pockets 33 to which vertical ducts 34 lead, so that cement grouting may be run into the pocket to bond the pier to its setting, by essentially the same method as that before described with reference to the columns. If desired, the enlarged lower ends 32 of the piers may be formed with vents 35 to permit escape of air as the grouting is poured into the pocket. The piers, it will be observed, from Figs. 5 and 11, are set the one on the other and the upper ends of the piers are recessed at 36 to receive the belt courses D. The belt courses run around

the building at the level of the floors, and are in sections meeting at each pier, see Figs. 6 and 12. Fig. 6 shows the meeting of the belt course sections at the sides of the building to which the girders run and Fig. 12, the meeting of the belt courses sections at the sides to which the beams run. The dotted lines in Fig. 2 show the arrangement of the girders and beams. From Fig. 6, it will be seen, that the girders project into the recesses 36 and are sustained by the piers, while the belt course sections project into the recesses and abut the sides of the girders, the end of the girder being dove-tailed as shown, to form a lock. The upper ends of the piers and the top surfaces of the girders and belt courses are level with each other and the enlarged lower ends of the piers above rest on these parts capping and covering the same as shown. The parts shown in Fig. 6—B, D, and E—are provided with crossing tie rods 38 set in cavities therein to prevent spreading, and as shown in Fig. 5 a vertical tie rod 39 projects through the duct 34 down into the cavity 36 or into a groove formed in the end of the girder. The grouting flows through the duct into the pocket 33 and down into the recess 36 and cavities between the girder and belt course sections. Tie rods 40 are employed where the belt course sections meet as in Fig. 12 and these bars have the same function as the bars 38. It will thus be seen that all of the parts are firmly placed in position with full regard to the proper distribution of stresses and stability of arrangement and that with the aid of the tie bars and bonding cement, the whole structure is rendered essentially monolithic and hence the maximum degree of strength is imparted to it.

The curtain walls F are preferably molded integrally with the belt course sections and are in position with the same between the piers as shown. The meeting surfaces of the curtain walls and piers are cemented together and I prefer to groove the piers and curtain walls as indicated at 41 to permit running the cement in to form the joint. The walls F serve not only to seal the buildings, but to strengthen and brace the same, acting as truss members on the belt course and between the piers.

As shown best in Figs. 2 and 3, the girders B run through the building from end to end, while the beams C, run between the girders and from the girders to the belt course at the sides of the building. These girders and beams are individually molded, hardened and set in position. The girders meet over the columns G, as shown best in Fig. 8 and are bonded by cement assisted by the tie bars 42, which are set in grooves in the girders and may extend the whole or a part of the length thereof. This bonding

of the girders takes place simultaneously with and is part of the bonding of the column to the girders as before described. The beams C, are dove-tailed into the girders and cemented thereto. The beams are also mortised and if desired dove-tailed into the belt course. It will thus appear that all the parts of the building are secured firmly together, by cementing the parts at the joints, making a strong, well balanced structure.

The form of the beams C, is of much importance. I construct the beams substantially I-shaped in cross section, utilizing the lower flange of the beam to carry the reinforcing bars as shown at Fig. 7. These bars are embedded in the beam and may be of any number desired, varying according to the varying conditions. I enlarge the ends of the beams and make them substantially rectangular in form as shown at 43 in Figs. 11 and 13. These enlarged ends are then dove-tailed and set into the girders as explained, see Fig. 6. In order further to strengthen the connections, the aligned beams are joined by tie rods 51 similar to the rods 42.

The building being thus formed of the separately molded or cast concrete elements, I mold *in situ* the floors A. This is formed in a monolithic sheet over the girders and beams meeting the piers, belt course, and curtain walls, and being bonded to these elements greatly increases the strength of the building. In forming the floors, the construction of the beams becomes of much importance, since it not only permits a great saving in amount of material necessary for the construction of the false work, but enables me greatly to reduce the time and labor necessary in erecting and removing the false work after the floor has been set. This operation is illustrated in Figs. 14 and 15. The false work is constructed between the beams, level or approximately level with the tops thereof, so that the floor A may be laid over the beams and false work and united to the former. This false work consists of planking 44 preferably the well-known tongue and groove material nailed to battens which extend between the beams. To close the crevices between the planking 44 and the beams C, metal plates 46 are provided and these are held in place by spikes 47 or the like, driven into the planking. The planking is supported by scantling 48 which bear under the battens and are in turn supported by dog-bars 49. These are in pairs, the members of which are connected by bolts 50 arranged in slots 51 in the ends of the scantling. Said dog-bars 49 bear on the lower flanges of the beams C, as shown in Figs. 14 and 15. The false work being in position, the floor is laid over it and the beams and girders, and after the floor har-

dens the false work is removed by the simple operation of knocking the dog-bars 49 off the flanges of the beams. The false work, therefore, is formed of the fewest possible parts; it may be used over and over again and placed in and removed from position by simply throwing the dog-bars in or out of engagement with the bottom flanges of the beams. It will thus appear that not only is the form of the beams C, of itself important, but it enables the false work to be reduced in amount and erected and removed with great ease.

To summarize my invention therefore, it enables all the parts of the building excepting the floors to be cast or molded separately, independently of the work of erection of the building and at a point removed therefrom if desired; it enables the building elements to be assembled with entire adaptability to surrounding conditions and to be united firmly with both positive locks and cement bonding, and it allows the floors to be laid *in situ* over the girders and beams at a slight expenditure for false work, and in such a way as to tie together and greatly strengthen the building as a whole.

Having thus specifically described the preferred embodiment of my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:—

1. A building having individually molded concrete girders, running parallel the length of the building in one direction, individually molded concrete columns on which the meeting ends of the girders are set, additional individually molded concrete columns standing on said meeting ends of the girders, the columns having their main portions reduced in cross sectional area and the ends engaging the girder ends enlarged to furnish adequate bonding surface, said ends of the columns being furnished with cavities to receive the bonding cement, metallic tie rods extending between said meeting ends of the girders, individually molded concrete beams extending between the girders, the beams having cavities in the sides of their main portions and enlarged ends furnished with dove-tails set into the girders at the points of their juncture with the girders, metallic tie rods extending across the girders between the meeting ends of the beams and joined thereto, individually molded concrete piers rising at the sides and corners of the building, the corner piers having their main portions L-shaped in cross section, with inward flanges at their side edges and the side piers having their main portions channel-shaped in cross section, the upper ends of the piers being enlarged and formed with recesses at the inner sides, individually molded concrete belt course sections extending around the building

and set into the said recesses in the enlarged upper ends thereof, the girders at the points of contact with the sides of the building being set in the recesses of the side piers between the ends of the belt course sections, metallic tie rods extending between and connecting the meeting ends of the piers, belt course sections and girders, additional individually molded concrete piers respectively set on the first named piers and having their main portions of cross sectional forms respectively corresponding to the piers below the lower ends of said additional piers, being enlarged to meet the enlarged ends of the piers below and furnished with cavities to carry bonding cement to the bonded surfaces, concrete curtain walls bonded between the piers on the belt course, and a monolithic concrete floor laid *in situ* over the girders and beams and meeting the belt course piers and curtain walls to unite the said elements into a firmly knitted structure.

2. A building having individually molded concrete girders running parallel the length of the building in one direction, individually molded concrete columns on which the meeting ends of the girders are set, additional individually molded concrete columns standing on said meeting ends of the girders, the columns having their main portions reduced in cross sectional area and the ends engaging the girders enlarged to furnish adequate bonding surface, said ends of the columns being furnished with cavities to receive the bonding cement, metallic tie rods extending vertically from column to column above and below the girders, additional metallic tie rods extending horizontally between the meeting ends of the girders, individually molded concrete beams extending between the girders the beams having cavities in the sides of their main portions and enlarged ends furnished with dovetails set into the girders at the points of their juncture with the girders, metallic tie rods extending across the girders between the meeting ends of the beams, individually molded concrete piers rising at the sides and corners of the building, the corner piers having their main portions L-shaped in cross section with inward flanges at their vertical side edges and the end and side piers having their main portions channel shaped in cross section, the upper ends of the piers being enlarged and formed with recesses at the inner sides, individually molded concrete belt course sections extending around the building and set into the said recesses in the enlarged upper ends of the piers, the girders at the point of contact with the ends of the building being set in the recesses of the end piers between the ends of the belt course sections, metallic

tie rods extending between and connecting the meeting ends of the piers, belt course sections and girders, additional individually molded concrete piers respectively set on the first named piers, and having their main portions of cross sectional forms respectively corresponding to the piers below, the lower ends of said additional piers being enlarged to meet the enlarged ends of the piers below and furnished with cavities to carry bonding cement to the bonded surfaces, vertically extending metallic tie rods passing between the contiguous ends of the piers, concrete curtain walls bonded between the piers and on the belt course, and a monolithic concrete floor laid *in situ* over the girders and beams and meeting the belt course, piers and curtain walls to unite said elements into a firmly knitted structure.

3. A building having individually molded concrete girders running the length of the building in one direction, individually molded concrete columns sustaining the girders at interior points in the building, additional individually molded concrete columns placed above the first named columns and respectively sustained thereby, the adjacent edges of the columns having aligned cavities to receive a bonding agent, individually molded concrete beams running the width of the building transversely of the girders and set thereon at interior points in the building, individually molded concrete piers at the exterior walls of the building, the corner piers being L-shaped in cross section and the side and end piers being channel shaped in cross section, and all of the piers having their upper ends enlarged or filled in between their webs and flanges and such enlarged ends formed with recesses in their inner corner, individually molded concrete belt course sections extending around the building and set in the said recesses of the piers, the girder ends at the end walls of the building being set in the pier recesses between the meeting ends of the corresponding belt course sections and the beam ends at the side walls of the building being set in the corresponding belt course sections, additional piers set on and supported by the first named piers and having enlarged lower ends covering the said recesses in the piers below with ducts in such ends leading to the recesses to permit the application of a bonding agent, curtain walls on the belt course sections and bonded between the lower portions of said additional piers, and a monolithic concrete floor laid *in situ* over the beams and girders and meeting the piers, belt course sections and curtain walls to unite said elements into a firmly knitted structure.

4. A building having individually molded concrete girders running the length of

the building in one direction, individually molded concrete columns sustaining the girders at interior points in the building, additional individually molded concrete columns placed above the first named columns and respectively sustained thereby, individually molded concrete beams running the width of the building transversely of the girders and set thereon at interior points in the building, individually molded concrete piers at the exterior walls of the building, the corner piers being L-shaped in cross section and the side and end piers being channel shaped in cross section, and all of the piers having their upper ends enlarged or filled in between their webs and flanges and such enlarged ends formed with recesses in their inner corner, individually molded concrete belt course sections extending around the building and set in the said recesses of the piers, the girder ends at the end walls of the building being set in the pier recesses between the meeting ends of the corresponding belt course sections and the beam ends at the side walls of the building being set on the corresponding belt course sections, additional piers set on and supported by the first named piers and having enlarged lower ends covering the said recesses in the piers below, curtain walls on the belt course sections and bonded between the lower portions of said additional piers, and a monolithic concrete floor laid *in situ* over the beams and girders and meeting the piers, belt course sections and curtain walls to unite said elements into a firmly knitted structure.

5. A building having individually molded concrete girders running the length of the building in one direction, individually molded concrete columns sustaining the girders at interior points in the building, additional individually molded concrete columns placed above the first named columns and respectively sustained thereby, individually molded concrete beams running the width of the building transversely of the girders and set thereon at interior points in the building, individually molded concrete piers at the exterior walls of the building, the corner piers being L-shaped in cross section and the side and end piers being channel shaped in cross section, and all of the piers having their upper ends enlarged or filled in between their webs and flanges and such enlarged ends formed with recesses in their inner corner, individually molded concrete belt course sections extending around the building and set in the said recesses of the piers, the girder ends at the end walls of the building being set in the pier recesses between the meeting ends of the corresponding belt course sections and the beam ends at the side walls of the building being set on the

corresponding belt course sections, additional piers set on and supported by the first named piers and having enlarged lower ends covering the said recesses in the piers below, and a monolithic concrete floor laid *in situ* over the beams and girders and meeting the piers, and belt course sections to unite said elements into a firmly knitted structure.

6. A building having individually molded concrete girders running the length of the building in one direction, means for sustaining the girders at interior points in the building, individually molded concrete beams running the width of the building transversely of the girders and set thereon at interior points in the building, individually molded concrete piers at the exterior walls of the building, the corner piers being L shaped in cross section and the side and end piers being channel shaped in cross section, and all of the piers having their upper ends enlarged or filled in between their webs and flanges and such enlarged ends formed with recesses in their inner corner, individually molded concrete belt course sections extending around the building and set in the said recesses of the piers, the girder ends at the end walls of the building being set on the pier recesses between the meeting ends of the corresponding belt course sections and the beam ends at the side walls of the building being set on the corresponding belt course sections, additional piers set on and supported by the first named piers and having enlarged lower ends covering the said recesses in the piers below, and a monolithic concrete floor laid *in situ* over the beams and girders and meeting the piers, and belt course sections to unite said elements into a firmly knitted structure.

7. A building having individually molded concrete girders running the length of the building in one direction, individually molded concrete columns sustaining the girders at interior points in the building, additional individually molded concrete columns placed above the first named columns and sustained thereby, individually molded concrete beams running the width of the building transversely of the girders and sustained thereon at interior points in the building, individually molded concrete piers at the exterior walls of the building said piers having recesses at the upper extremities of their inner sides, individually molded concrete belt course sections extending around the exterior walls of the building and set in the recesses of the piers, the girder ends at the end walls of the building being set in said recesses of the piers between the ends of the corresponding belt course sections and the beam ends at the side walls of the building being set on the corresponding belt course sections, additional individually molded con-

crete piers set on the first named piers and covering the said recesses therein, curtain walls on the belt course sections and bonded between the lower ends of the said additional piers and a monolithic concrete floor laid *in situ* over the girders and beams and meeting the belt course sections, piers and curtain walls to unite the whole into a firmly knitted structure.

8. A building having individually molded concrete girders running the length of the building in one direction, individually molded concrete columns sustaining the girders at interior points in the building, additional individually molded concrete columns placed above the first named columns and sustained thereby, individually molded concrete beams running the width of the building transversely of the girders and sustained thereon at interior points in the building, individually molded concrete piers at the exterior walls of the building said piers having recesses at the upper extremities of their inner sides, individually molded concrete belt course sections extending around the exterior walls of the building and set in the recesses of the piers, the girder ends at the end walls of the building being set in said recesses of the piers between the ends of the corresponding belt course sections and the beam ends at the side walls of the building being set on the corresponding belt course sections, additional individually molded concrete piers set on the first named piers and covering the said recesses therein, and a monolithic concrete floor laid *in situ* over the girders and beams and meeting the piers and belt course sections to unite the whole into a firmly knitted structure.

9. A building having individually molded concrete girders running the length of the building in one direction, means for sustaining the girders at points within the building, individually molded concrete beams running the width of the building transversely of the girders and sustained therein at interior points in the building, individually molded concrete piers at the exterior walls of the building, said piers having recesses at the upper extremities of their inner sides, individually molded concrete belt course sections extending around the exterior walls of the building and set in the recesses of the piers, the girder ends at the end walls of the building being set in said recesses of the piers between the ends of the corresponding belt course sections and the beam ends at the side walls of the building being set on the corresponding belt course sections, additional individually molded concrete piers set on the first named piers and covering the said recesses therein, and a monolithic concrete floor laid *in situ* over the girders and beams and meeting the piers

and belt course sections to unite the whole into a firmly knitted structure.

10. A building having individually molded concrete girders running the length of the building in one direction, means for sustaining the girders at points within the building, individually molded concrete beams running the width of the building transversely of the girders and sustained therein at interior points in the building, individually molded concrete piers at the exterior walls of the building, said piers having recesses at the upper extremities of their inner sides, individually molded concrete belt course sections extending around the exterior walls of the building and set in the recesses of the piers, the girder ends at the end walls of the building being also set in said recesses of the piers, and the beam ends at the side walls of the building being set on the corresponding belt course sections, additional individually molded concrete piers set on the first named piers and covering the said recesses therein, and a monolithic concrete floor laid *in situ* over the girders and beams and meeting the piers and belt course sections to unite the whole into a firmly knitted structure.

11. A building having pairs of individually molded concrete piers resting one on the other end to end and one pier of each pair having a notch or recess at its end adjacent to the other pier, individually molded concrete girders with their outer ends received in the said recesses, means for supporting the girders at interior points in the building, individually molded belt course sections extending around the building and also set in said recesses of the piers, individually molded concrete beams set on the girders and on the belt course sections at the side of the building, and a monolithic concrete floor laid *in situ* over the girders and beams and meeting the piers and belt course sections to unite the whole into a firmly knitted structure.

12. A building having pairs of individually molded concrete piers set on each other end to end, one pier of each pair having a recess in its extremity adjacent to the other pier, an individually molded concrete belt course section set in said recess and sustained by the lower pier, individually molded concrete beams set on said belt course and a monolithic concrete floor laid *in situ* over the beams and meeting the belt course and piers to unite the whole into a firmly knitted structure.

13. A building having pairs of individually molded concrete piers set on each other end to end, one pier of each pair having a recess in its extremity adjacent to the other pier, individually molded concrete girders set in said recesses in the piers, individually

molded concrete belt course sections extending around the building and also set in said recesses of the piers, and a monolithic concrete floor laid *in situ* over the girders and meeting the piers and belt course sections to unite the whole into a firmly knitted structure.

14. A building having pairs of individually molded concrete piers set on each other end to end, one pier of each pair having a recess in its extremity adjacent to the other pier, individually molded concrete girders set in said recesses in the piers, individually molded concrete belt course sections extending around the building and also set in said recesses of the piers with their ends respectively contacting with the sides of the girder ends and a monolithic concrete floor laid *in situ* over the girders and meeting the piers and belt course sections to unite the whole into a firmly knitted structure.

15. A building having pairs of individually molded concrete piers set on each other end to end, one pier of each pair having a recess in its extremity adjacent to the other pier, individually molded concrete girders set in said recesses in the piers, individually molded concrete belt course sections extending around the building and also set in said recesses of the piers with their ends respectively contacting with the sides of the girder ends, a metallic tie extending across the girder end between the belt course sections, and a monolithic concrete floor laid *in situ* over the girders and meeting the piers and belt course sections to unite the whole into a firmly knitted structure.

16. A building having pairs of individually molded concrete piers set on each other end to end, one pier of each pair having a recess in its extremity adjacent to the other pier, individually molded concrete girders set in said recesses in the piers, individually molded concrete belt course sections extending around the building and also set in said recesses of the piers with their ends respectively contacting with the sides of the girder ends, a metallic tie extending across the girder end between the belt course sections, a second metallic tie extending longitudinally from the girder end between the pier ends and a monolithic concrete floor laid *in situ* over the girders and meeting the piers and belt course sections to unite the whole into a firmly knitted structure.

17. A building having an individually molded concrete girder, two individually molded concrete beams mortised therein and extending transversely thereto on opposite sides, a metallic tie extending across the girder between the beam ends, and a monolithic concrete floor laid *in situ* over the girder and beams to unite them firmly.

18. A building having an individually

molded concrete column with a duct in its upper end, an individually molded concrete girder set on the column and having a duct communicating with the first named duct, a second individually molded concrete column set on the girder and having in its lower end a duct communicating with the other ducts and a cementing substance uniting the parts and contained in said ducts.

19. A building having an individually molded concrete column with a duct in its upper end, an individually molded concrete girder set on the column and having a duct communicating with the first named duct, a second individually molded concrete column set on the girder and having in its lower end a duct communicating with the other ducts, the duct of the second column being open at its upper end to permit pouring a liquid cement into the ducts and a cementing substance uniting the parts and contained in said ducts.

20. A concrete building having an individually molded concrete pier with a recess at the side of its upper portion, an individually molded concrete building element set in said recess, a second individually molded concrete pier set on the first pier and on said building element in the recess thereof, the second pier having a duct therein adapted to lead the bonding agent to the joint between the piers and said building element and a cementing substance uniting the parts and contained in said ducts.

21. A concrete building, having an individually molded concrete pier with an enlarged upper end furnishing a bonding surface and provided with a recess, a building element set in said recess, a second individually molded concrete pier set on the enlarged upper end of the first pier and on the building element therein and provided with an enlarged lower end furnishing a bonding surface, the second pier having a duct in its enlarged lower end adapted to lead a bonding agent to the joint and a cementing substance uniting the parts and contained in said ducts.

22. A concrete building having an individually molded concrete pier with an enlarged upper end furnishing a bonding surface and provided with a recess, a building element placed in said recess, a second individually molded concrete pier set on the enlarged upper end of the first pier and on the building element therein and provided with an enlarged lower end furnishing a bonding surface, the second named pier having a pocket in its enlarged lower end to receive the bonding agent and a duct to lead the bonding agent to said pocket and a cementing substance uniting the parts and contained in said ducts.

23. An individually molded concrete pier for concrete buildings composed of webs an-

angularly disposed to each other and having an end portion enlarged between the webs for the purpose specified, the said enlarged end of the pier having a pocket therein to receive a bonding substance and a duct leading from the pocket upward and open at its upper end to permit pouring the bonding substance into said pocket.

24. An individually molded concrete pier for concrete buildings composed of webs angularly disposed to each other and having

an end portion enlarged between the webs for the purpose specified, the said enlarged end of the pier having a pocket therein to receive a bonding substance. 15

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERNEST LESLIE RANSOME.

Witnesses:

EDITH J. FULLER,  
ISAAC B. OWENS.