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PATENTED FEB. 10, 1903.

W. C. LYON & K. BERLE.  
MONOLITHIC CONSTRUCTION.

APPLICATION FILED JAN. 20, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

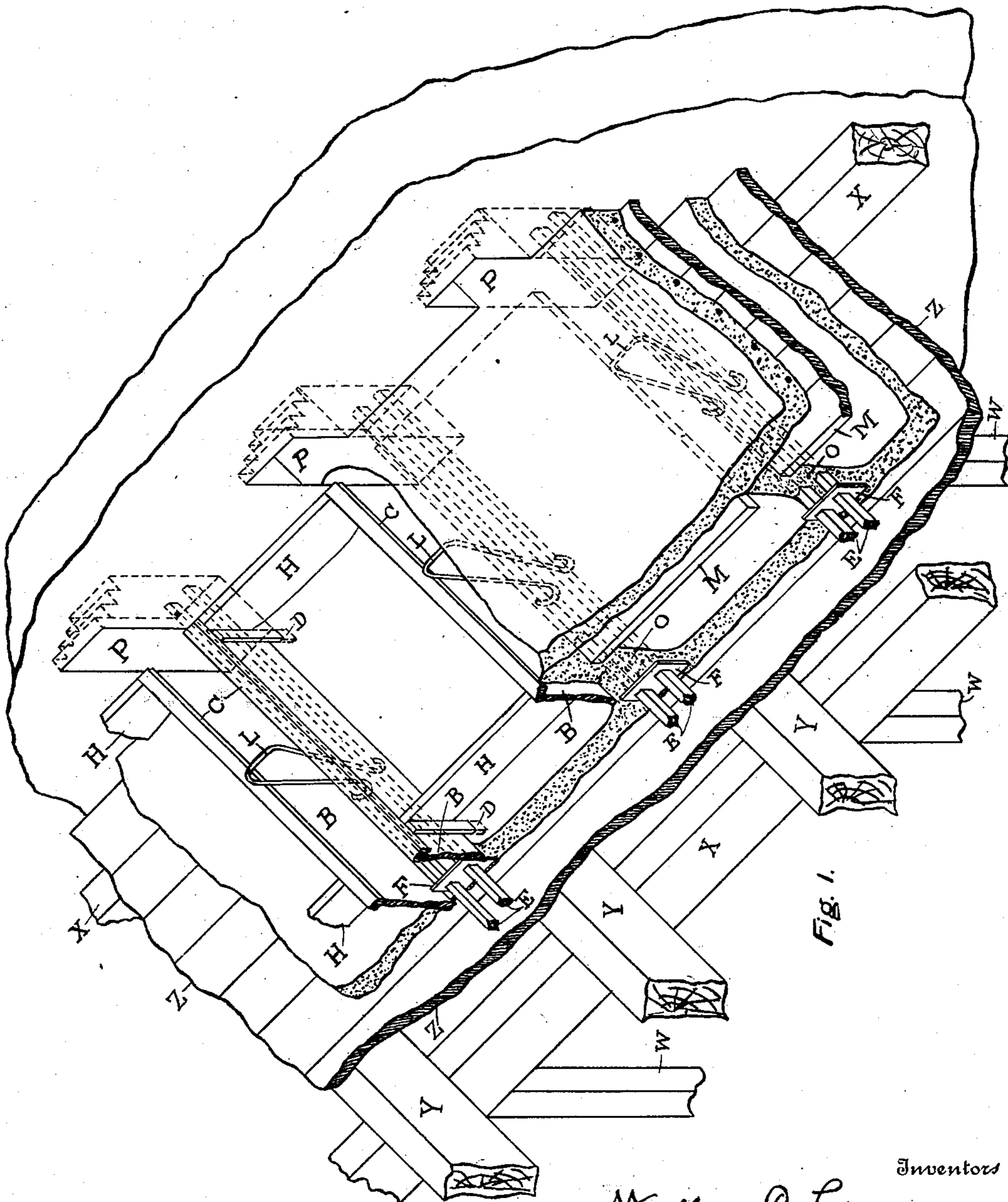


Fig. 1.

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Kort Berle

Witnesses

James J. Hill  
Frederick A. Kendall

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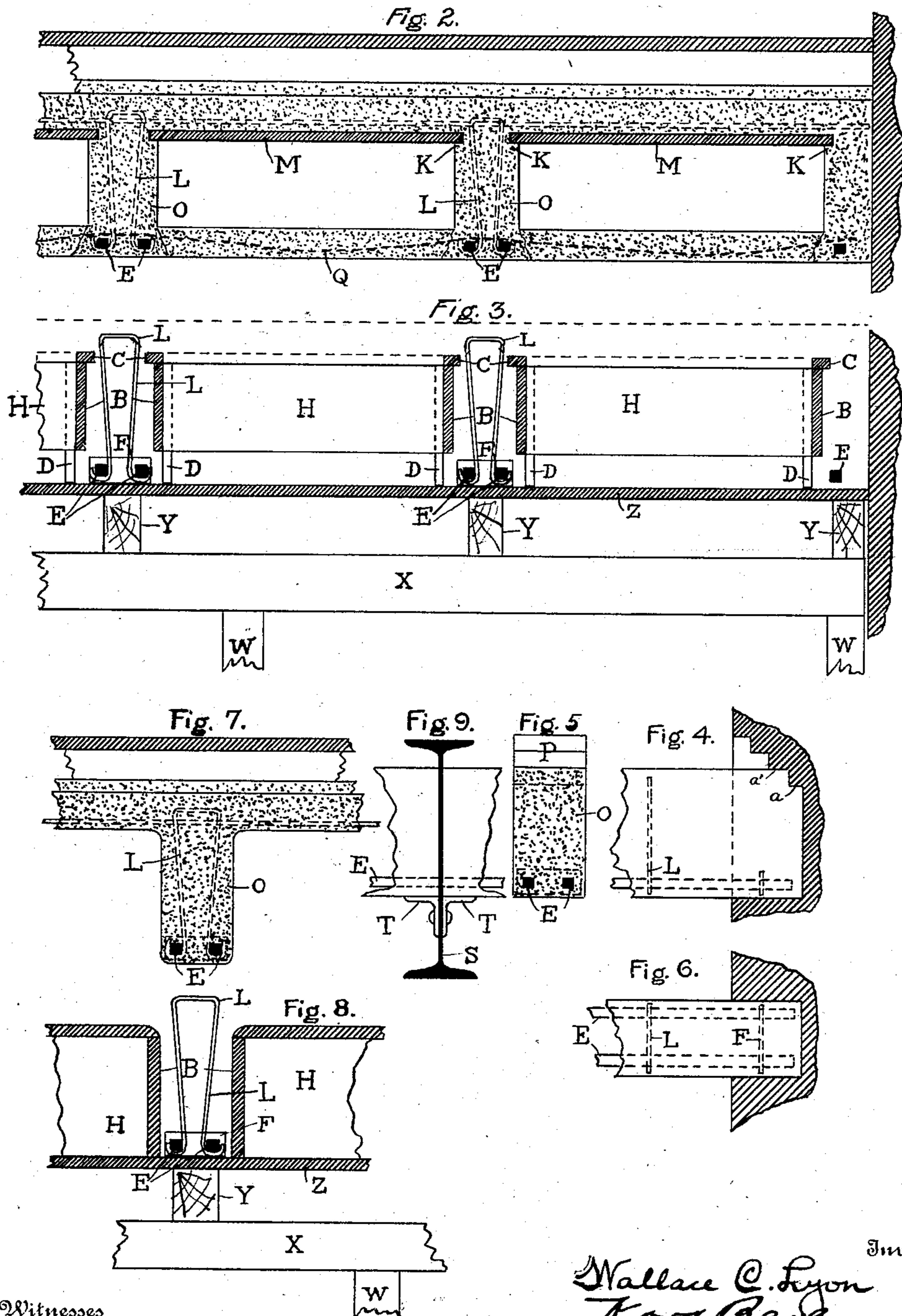
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# UNITED STATES PATENT OFFICE.

WALLACE C. LYON, OF HYATTSVILLE, MARYLAND, AND KORT BERLE, OF WASHINGTON, DISTRICT OF COLUMBIA.

## MONOLITHIC CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 720,165, dated February 10, 1903.

Application filed January 20, 1902. Serial No. 90,483. (No model.)

*To all whom it may concern:*

Be it known that we, WALLACE C. LYON, residing at Hyattsville, Prince George county, Maryland, and KORT BERLE, residing at Washington, in the District of Columbia, citizens of the United States, have invented certain new and useful Improvements in Monolithic Construction; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in methods and means for producing and also in new and useful improvements in a composite structure at small expense which is designed to be very light, strong, and durable, possessing the quality of being perfectly fireproof, and so simple in construction that unskilled labor may be employed in its production, thereby effecting great saving in the cost of structures wherein it is employed.

Heretofore difficulties have been encountered in the construction of concrete and composite structures, particularly in the formation of beams, floors, and ceilings, which have greatly retarded the successful introduction of that class of structures. We have overcome such difficulties in our invention, in which the distinguishing feature is the formation of the beams of metal and concrete in such manner as to form at the same time and by the same means a permanent support for the ceiling dependent therefrom, which ceiling may be placed in position immediately upon forming said beams and allowed to set while the concrete of said beams is setting, at the same time providing a rigid support for the floor-boards or permanent centering entirely below the line of the subsequently superimposed flooring-concrete and on a line with the upper line of the beams. The ceiling-concrete being placed after the beams are formed and before the concrete thereof is entirely set, the two become practically integral, and such a perfect union thereof is thus established

that the ceiling, though of an inferior quality of concrete, is fixed in position, so as to prevent all subsequent rising thereof at or between the lines of its junction with said beams.

For a more perfect understanding of the details of our invention reference is made to the accompanying drawings, in which similar letters of reference denote like parts in all the views, in which—

Figure 1 is an isometric view of a portion of the vertical supporting-wall of a building with a portion of a floor, floor-beams, ceiling, and the several parts hereinafter mentioned shown in position. Fig. 2 is a sectional view showing a portion of the finished construction completed. Fig. 3 is a view similar to Fig. 2, showing the means employed in producing the parts shown in Fig. 2. Fig. 4 is a vertical section of a wall-pocket with a beam finished and resting therein. Fig. 5 is a face view of said wall-pocket, taken sectionally through said beam. Fig. 6 is a section through a vertical supporting-wall, with a plan view of the girder of Figs. 4 and 5 therein. Fig. 7 is a section of a beam and floor where no ceiling is suspended therefrom, and Fig. 8 illustrates the means employed in the formation thereof. Fig. 9 shows the supporting-girder for the concrete beams where no wall-pocket is provided, which may also be of concrete or concrete and metal produced in the same manner as the beams herein described.

In the formation of the new ceiling, beams, and floors we proceed as follows: False work is first erected consisting of suitable vertical supports W X Y, upon which rest boards Z, preferably left rough or undressed on their upper faces. Upon this false work at such predetermined distances apart as it may be desired to have the permanent beams are placed pairs of moldboards B. Each of said moldboards is provided with an inwardly-projecting strip C of wood or suitable material, which projects from said boards toward its companion board at a right angle to its sides, while projecting downwardly therefrom and resting on said rough boards are slender legs D, which rest upon and support from said

rough boards the pairs of moldboards before mentioned. After placing in position the false work and moldboards, rods E are placed in the spaces between the moldboards, said rods being supported at or near their ends and at such intervals along their entire length as may be desired by means of washers F, sufficiently large to support said rods above and out of contact with said false work sufficiently high to permit of clear space below for the entire length of said rods. Said rods are not anchored at their ends. When the rods are placed in position, upwardly-projecting loops L are placed in position with their lower ends partially or wholly encircling the said rods E and their upper ends projecting above the line of the top of said mold, for the purpose hereinafter specified. Separators H are placed in position between said molds to hold them firmly in position, said separators consisting of boards. When this is done, the spaces between the several moldboards and strips is filled to their top edges with a superior quality of concrete, which is rammed into place and because of the opening below said moldboards flows laterally out for a short distance beyond the vertical line of said moldboards at the base-line thereof, thereby forming a shoulder or projection for a short distance from the bottom line of said concrete beam. In practice it will be found that about two inches vertically and the same or less will be quite sufficient for all practical purposes. After the molds have been filled with the superior concrete the space between the pairs of moldboards may be filled with an inferior concrete of sufficient thickness to form the ceiling of the room below with sufficient adhesive strength to support its own weight. After sufficient time has elapsed to permit the concrete to properly set the separators H and side boards or moldboards B are removed by withdrawing vertically the separators H, when the permanent centering should be placed in position as follows: The shoulders K are used as a support for suitable boards M, which rest at either end upon said shoulders, and upon said boards M and the tops of the beams O is filled the concrete on a matrix of metal for the floor or floor-support, which should be of a superior quality and which becomes anchored to the beams by and also because of the loops or anchors L, hereinbefore described, which extend upward and into said concrete for the floor-support or into the flooring-concrete, if it is desired. Where extra thickness is desired, an inferior quality of concrete may be added above the floor-support, in which may be embedded the usual nailing-strips for securing carpet or other floor-covering. The rods E E, with one or more washers F, project at their ends into wall-pockets P, formed in the vertical supporting-walls of the building, which pockets are of such area and conformation that the finished beams O will entirely fill the lower portion thereof up to and

above the first shoulder *a*, so that it, with the next higher shoulder *a'*, will form stops to prevent the possibility of upward thrust of said beams after they have been formed. The opening of said pockets above the shoulder *a'* permits first greater accessibility to permit tamping the concrete of said beams in position in forming and finally serves as an anchor for the concrete of the floor, which rests next above said beams and extends upward sufficiently high to entirely close said pockets in the finished structure. In places where pockets cannot be provided to support the ends of the beams they may be supported from girders S, as shown in Fig. 8, in which angles or brackets T are provided as supporting means for the ends of the beams, or, if it is desired, the lower flange of the girder may be utilized for the purpose.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A composite structure, comprising concrete beams having portions thereof flaring, ceiling-blocks with beveled edges resting upon the flaring portions of said beams, a flooring with metal ties embedded therein, resting upon said beams, bars embedded in the flaring portions of the beams and metallic ties connected to said bars and embedded in the beams and flooring, as set forth.

2. A composite structure comprising concrete beams having flaring portions, ceiling-blocks resting upon said flaring portions of the beams, bars embedded in the flaring portions of the beams, metallic ties of substantially inverted-U shape having their ends bent into hooks and engaging said bars, the upper portion of each of said ties projecting beyond the upper portion of the beam in which it is embedded, and a flooring resting upon said beams and in which the metallic tie is anchored, as set forth.

3. A composite structure comprising beams with flaring portions, ceiling-blocks supported by said flaring portions, bars embedded in said flaring portions, supporting members with their ends seated in rabbets in said beams, a flooring resting upon said beams and supports, and metallic ties embedded in the beams and flooring as set forth.

4. In a composite structure of the class described, supporting-beams, wall-pockets in the supporting-wall holding the ends of said beams, a ceiling formed in position and supported from said beams by beveled extensions thereof and by metal ties molded in said beams and ceiling, in combination with a concrete floor anchored to both beams and supporting-walls, substantially as described and shown.

5. In a structure of the described class a supporting-wall with angular pockets therein, beams of concrete supported in said pockets, a concrete ceiling supported primarily from continuously-projecting concrete ledges upon the lower portions of said beams, a floor-

support carried near the upper side of said  
beams and a concrete floor resting upon said  
beams and floor-support and entering said  
wall-pockets, said beams, ceiling and floor  
5 being anchored together by means of inter-  
laced metallic ties so as to firmly unite the  
several parts, substantially as described.

In testimony whereof we affix our signa-  
tures in presence of two witnesses.

WALLACE C. LYON.  
KORT BERLE.

Witnesses:

FREDERICK H. GIBBS,  
CHAUNCEY G. GRAHAM.