

No. 693,494.

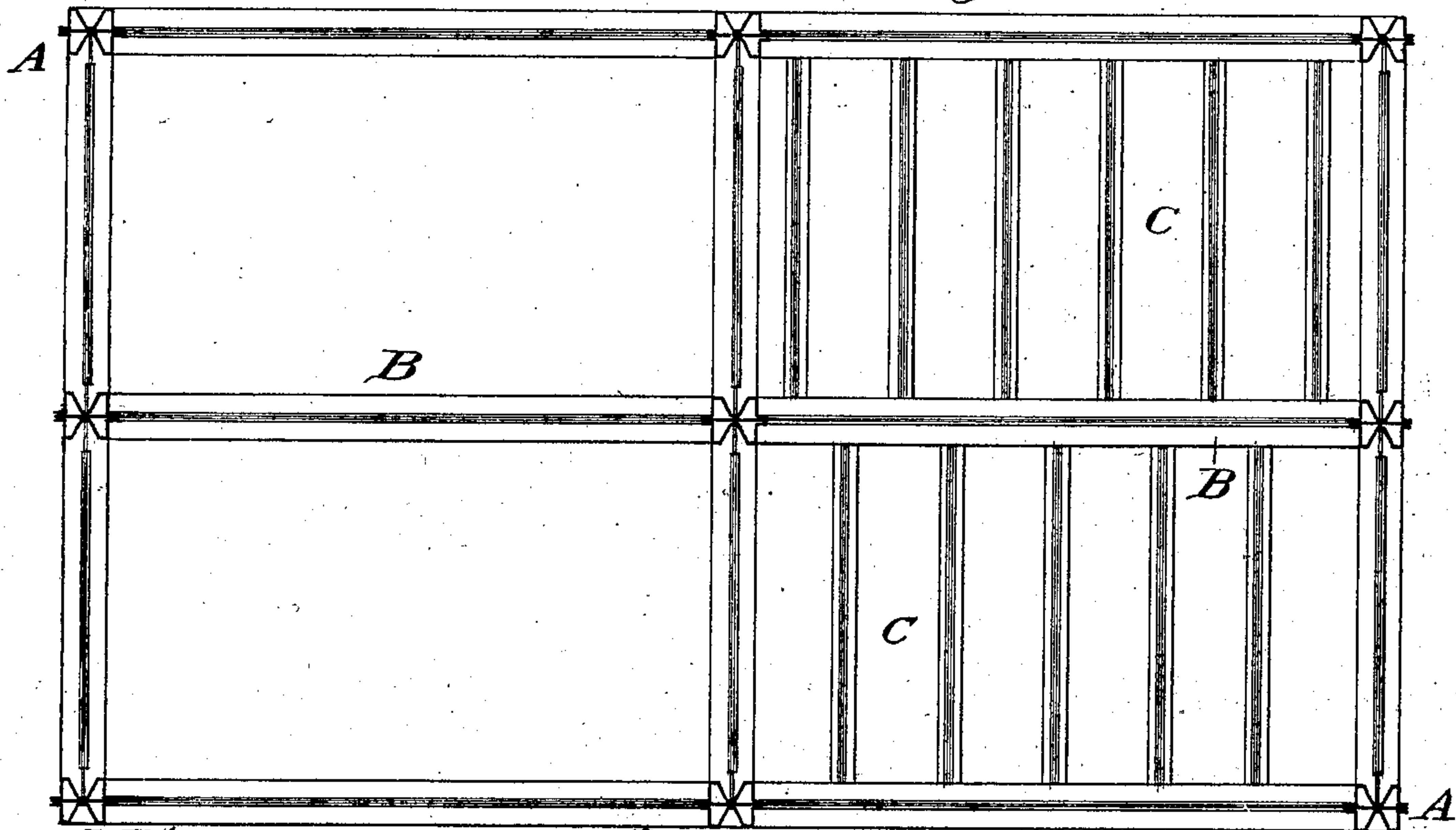
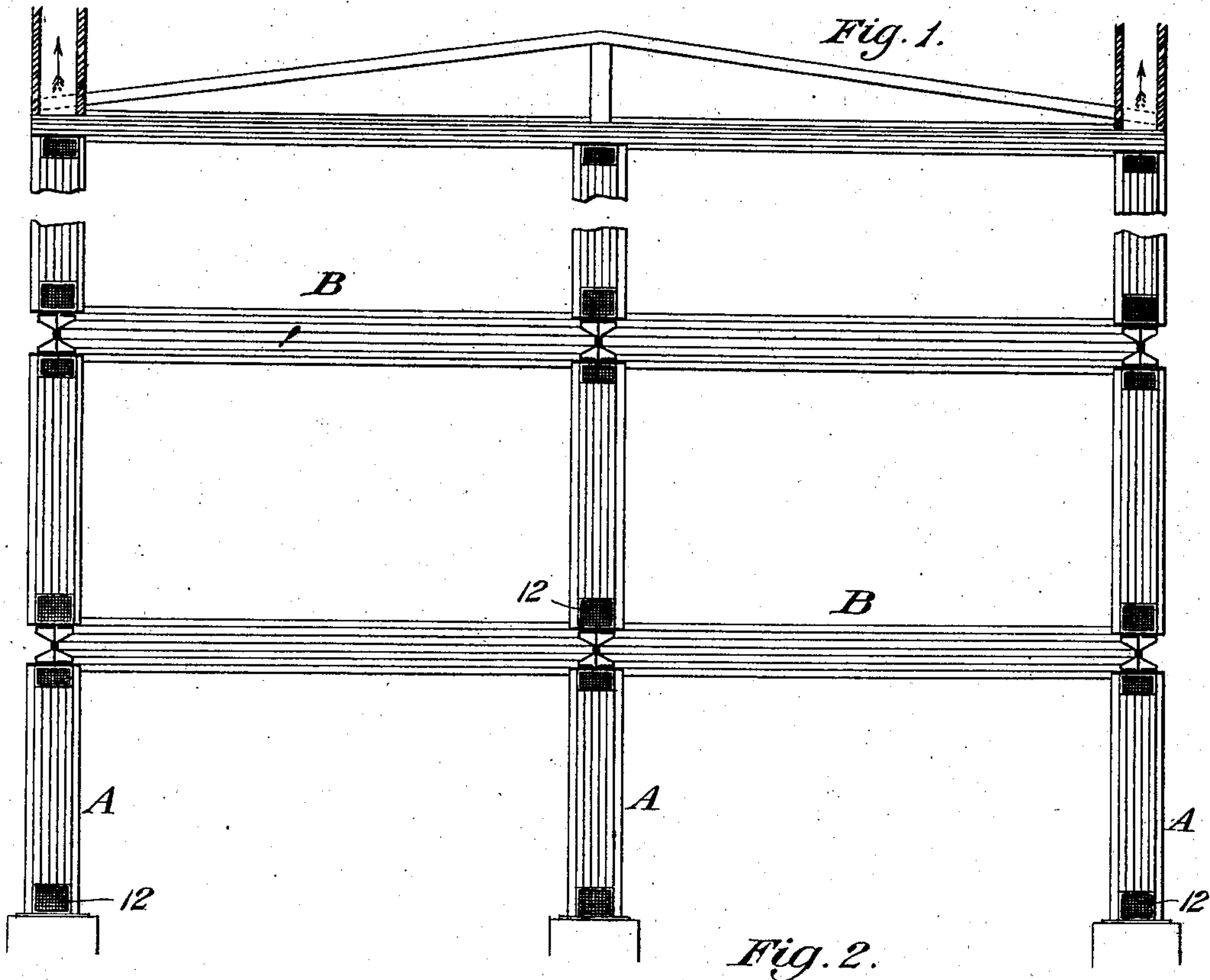
Patented Feb. 18, 1902.

C. M. CARNAHAN.
BUILDING CONSTRUCTION.

(Application filed Oct. 27, 1900.)

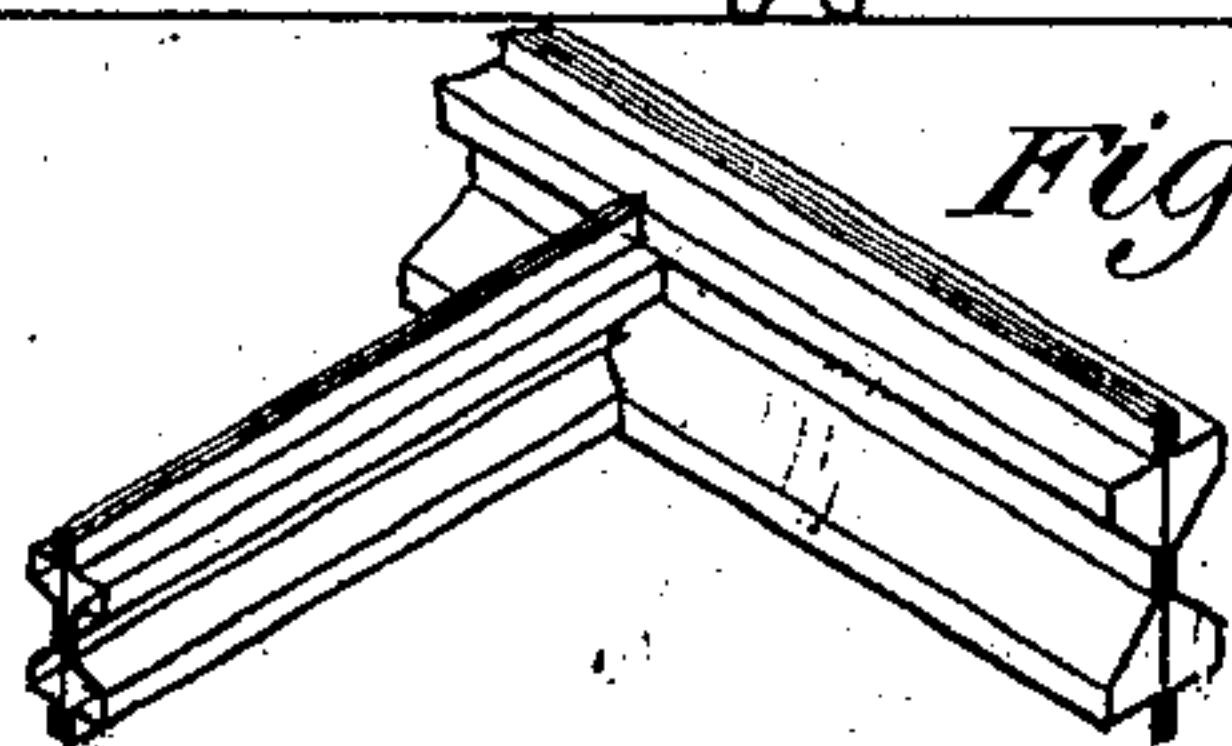
(No Model.)

2 Sheets—Sheet 1.



Witnesses:

J. S. Moore.
R. H. Saymon



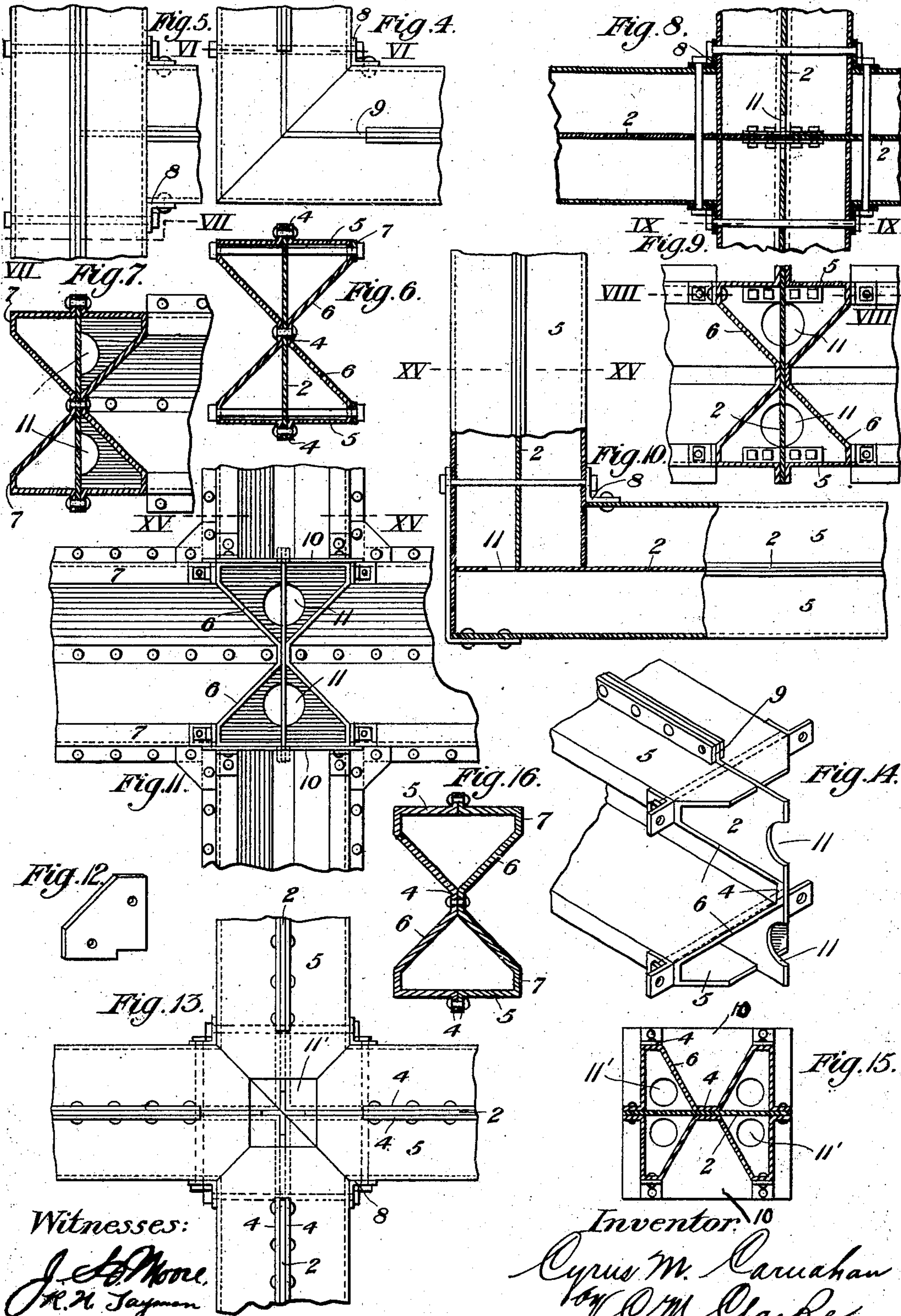
Inventor:
Cyrus M. Carnahan
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(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

CYRUS M. CARNAHAN, OF ALLEGHENY, PENNSYLVANIA.

BUILDING CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 693,494, dated February 18, 1902.

Application filed October 27, 1900. Serial No. 34,612. (No model.)

To all whom it may concern:

Be it known that I, CYRUS M. CARNAHAN, a citizen of the United States of America, and a resident of Allegheny, county of Allegheny, State of Pennsylvania, have invented certain new and useful Improvements in Building Constructions, of which the following is a specification, reference being had to the accompanying drawings, forming part of this specification, of which—

Figure 1 is a partial sectional elevation of the skeleton construction of a building made according to and incorporating the features of the construction of my invention. Fig. 2 is a sectional plan view thereof, the floor members being omitted at one side. Fig. 3 is a perspective detail view illustrating the framing of one of the floor members. Figs. 4 and 5 are detail views illustrating one method of connecting the main cross members at the corner and at intervening positions, respectively. Fig. 6 is a cross-sectional view on the line VI VI of Fig. 4. Fig. 7 is a similar view on the line VII VII of Fig. 5. Fig. 8 is a cross-sectional view showing a means of connecting the main and cross members, the section being indicated on the line VIII VIII of Fig. 9. Fig. 9 is a sectional view taken on the line IX IX of Fig. 8. Fig. 10 is a sectional plan view illustrating a further construction in making a corner-joint. Fig. 11 is a detail view in elevation, showing the construction of the cross-girders and their connection with the supporting-posts. Fig. 12 is a detail perspective view of a corner gusset-plate. Fig. 13 is a plan view of Fig. 11, the upper post being removed. Fig. 14 is a perspective detail view of one end of one of the girders as shown in Figs. 11 and 13. Fig. 15 is a cross-sectional view through the post, taken on the line XV XV of Fig. 11.

My invention relates to the art of steel or metal frame building, and has in view the construction of such framework as is commonly employed in what are known as "fire-proof buildings" in such a way as to simplify and cheapen the materials which are incorporated in the framework and to obtain the additional advantages of lightness, ventilation, and ease of erection, together with certain other advantages, as will be more fully hereinafter set forth and as comprised in the in-

vention as a whole. In the construction of this general class of work it has been customary to use commercial rolled shapes—such as I-beams, channels, angle shapes, &c.—either alone or incorporated together, and while the requisite strength may be obtained with such members they are peculiarly liable to be affected by heat and are apt to warp and bend to such an extent as to render their removal necessary in case of rebuilding after fire.

My invention has in view the construction of the skeleton framework of the building in such a manner as that all of the members, both vertical and horizontal, shall be hollow throughout from bottom to top and in all directions laterally, by which means cooling action of currents of air is of service in overcoming to a very great extent the injurious action of heat by keeping the temperature of the frame structure as low as possible. A further advantage is in the adaptation of such hollow members to the purpose of heating or ventilating the various rooms and hall of a building by employing the hollow interior of the structural members as conduits either for supplying heated air or for exhausting the foul air.

Referring now to the drawings, A represents the posts, upon which are supported the main cross members B, with which are incorporated the floor members C, in a manner generally similar to the usual type of building construction. In all of these members I have employed a composite construction consisting of members of rolled metal incorporated in such a manner as to provide a hollow girder or post of great stiffness and weight-supporting strength and in all respects similar to the construction shown in an application filed by me on May 1, 1900, covering improvements in girder construction, bearing the Serial No. 15,155.

In the present case, 2 represents a plate of the length desired and depth suited to the requirements in view, to one or both sides of which plate are secured by rivets or bolts longitudinally-disposed lateral rolled members bent so as to provide vertical faces coinciding with plate 2, a horizontal portion 5, and an inclined portion 6 which extends outwardly from the middle vertical portions and joins at

the corner-angle with the horizontal portions. In the form best adapted to the object at present in view these angle portions are flattened, so as to provide faces 7 parallel with members 4, which faces furnish good bearing-surfaces for angle connection 8 or such other means of connecting members together as may be best adapted to the purpose. It will be seen, as thus constructed and when used as a girder, this composite construction provides flat upper and lower bearing-faces for the posts, the flanges 4 and a portion of the plate 2 being cut away, as shown at 9. To provide a flat-surface post, the ends may be covered by flat plates 10, connected with the post in the manner shown or in any other suitable manner.

I have shown various methods of connecting the members, both vertical and horizontal. I do not desire to be limited to any particular means of joining them, as it is obvious that such connections may be made in various ways by the skilled mechanic accustomed to the use and erection of structural shapes, and I shall therefore not further describe this feature—to wit, the making of the various joints—as it does not properly constitute a portion of my invention, to which I desire to be specifically confined.

In order to establish and facilitate circulation of air through the various members and the entire construction, it is desirable and necessary that the joints shall be made in such a manner as not to cut off the continuity of the interior passages at any point, and to this end care must be observed in making the joints that these passages shall not be entirely closed. When framed together, a good joint may be made by allowing the plate members 2 to abut against each other, and in such cases these plate members are cut out, as shown at 11, or the plate members 10, upon which the posts rest, are cut out, as shown at 11', or any other members of the composite girders or posts may be cut out in a similar manner and in any shape desired, so as to provide for the free passage of the air.

Having erected the main frame as thus described, it will be seen that the interiors of all of the members communicate with each other, and in order to utilize this feature for the passage of air for any of the hereinafter-recited purposes inlet or outlet openings may be made in either the posts or girders at any point or points desired, as shown at 12 in Fig. 1, and these openings may be utilized either for the inlet or outlet of air at the natural or at a raised or lowered temperature for the purpose of ventilation or refrigeration. It is also obvious that connections may be made—as, for instance, at the base of the posts—with an air-pump, by which air may be forced throughout the structure, or that such connections may be made with the water-supply system, so as to provide means for extinguishing fire. The further modification and adaptation of this principle is entirely within the range of

those skilled in building construction and is contemplated as within the scope of my invention, and the further elaboration as to the use of gratings, valves, controlling devices, or other appliances is also contemplated and not necessarily the subject of further description. It will be seen that inasmuch as each post and girder is supplied with separate internal passages these may be utilized individually for different purposes, as for incoming and outgoing air within the same member. Further, various arts, modifications, and adaptations of my invention may be made by those skilled in the art, and all such are to be understood as within its scope as expressed in the following claims.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In building construction a framework consisting of hollow structural members having oppositely-disposed bearing portions with intermediate narrower portions, and having continuous interior communication, substantially as set forth.

2. In building construction a framework consisting of composite structural members having oppositely-disposed bearing portions with intermediate narrower portions, and provided with continuous hollow interior air-passages framed together so as to establish such continuous interior communicating passages throughout the structure, substantially as set forth.

3. In building construction, a framework consisting of composite structural members having oppositely-disposed bearing portions with intermediate narrower portions, and provided with continuous hollow interior air-passages framed together so as to establish such continuous interior communicating passages throughout the structure, and provided with inlet and outlet openings in the members, substantially as set forth.

4. In building construction, a framework consisting of hollow structural members composed of rolled sections, having outwardly-disposed portions and inwardly-extending meeting portions incorporated together, whereby interior communicating passages are provided, for the purpose set forth.

5. In building construction, a framework consisting of hollow structural members composed of rolled sections, having outwardly-disposed portions and inwardly-extending meeting portions incorporated together, whereby interior communicating passages are provided, with means for connecting the members, for the purpose and in the manner set forth.

6. In building construction, a framework composed of posts, girders, &c., comprising composite structural members of rolled metal, having oppositely-disposed bearing and strain supporting portions and intermediate meeting portions incorporated together, whereby interior communicating passages are pro-

vided, with means for connecting the members, for the purpose and in the manner set forth.

5 7. In building construction, composite structural members composed of sides having oppositely-extending bearing-faces, meeting flanges and an intermediate connecting portion incorporated to provide a building-framework and having interior communicating passages, substantially as set forth.

10 8. In building construction, composite structural members composed of rolled mem-

bers, having intervening connecting portions, a central plate member, means for incorporating the parts together to provide a building-framework, and communicating interior passages throughout the structure, substantially as set forth.

Signed at Pittsburg this 26th day of September, 1900.

CYRUS M. CARNAHAN.

Witnesses:

PETER J. EDWARDS,
C. M. CLARKE.