G. H. BARBOUR.

BUILDING STRUCTURE.

APPLICATION FILED JULY 9, 1913.

1,196,325.

Patented Aug. 29, 1916

2 SHEETS—SHEET 1.

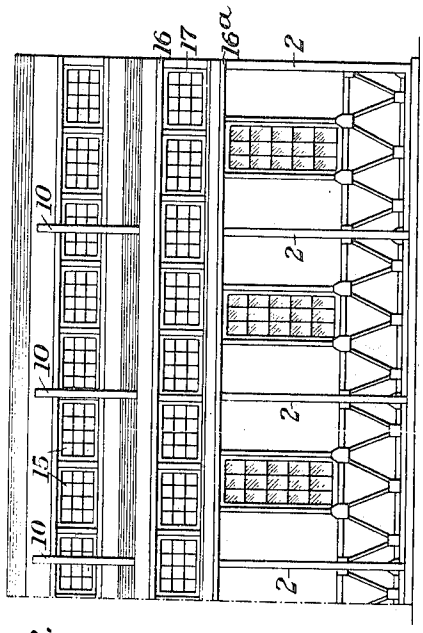


Fig. 2.

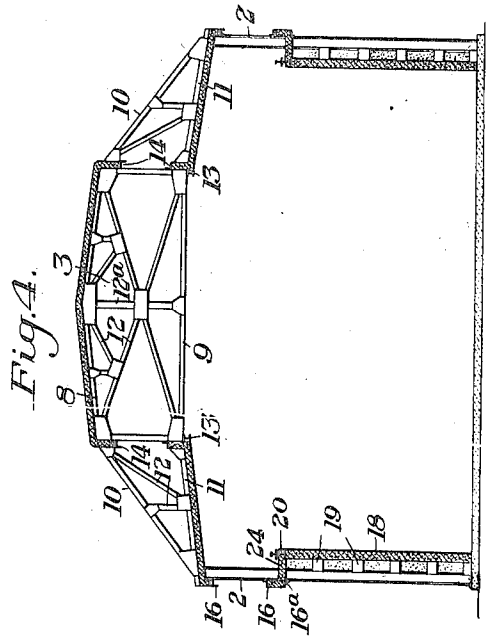


Fig. 4.

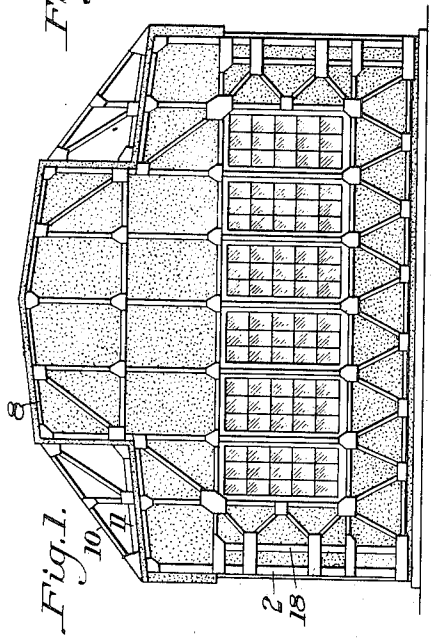


Fig. 1.

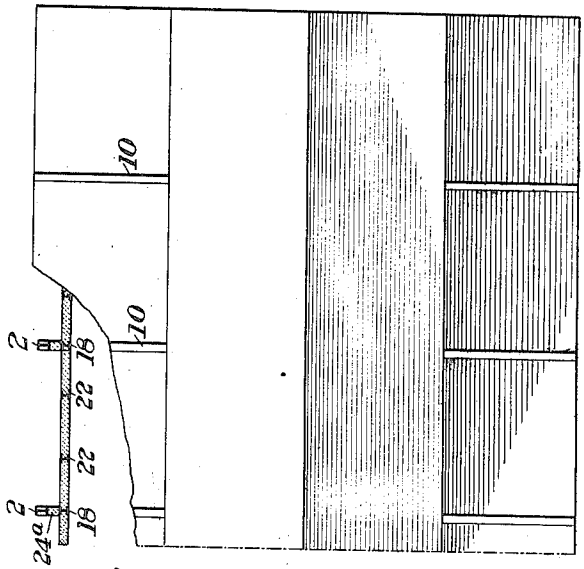


Fig. 3.

WITNESSES

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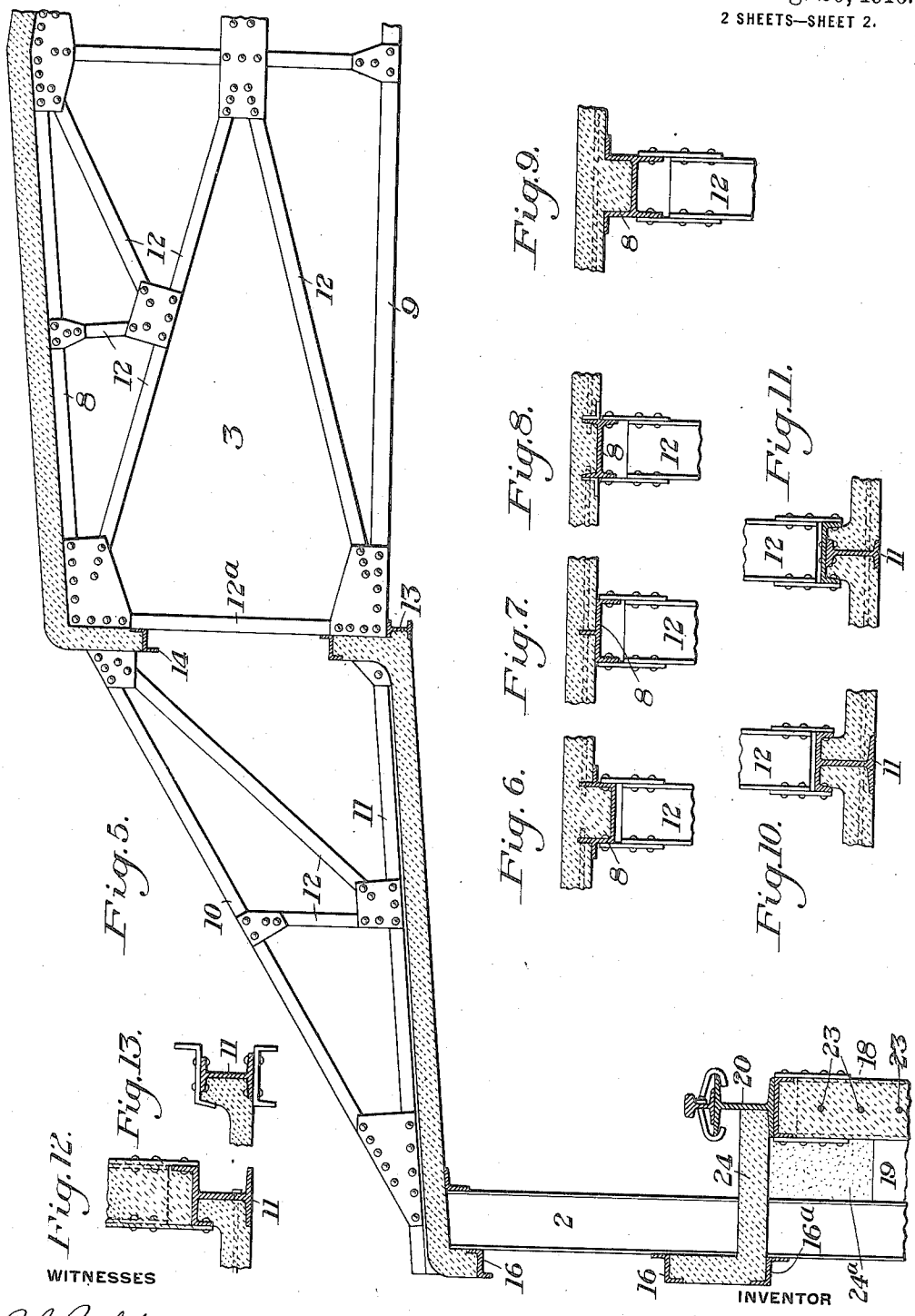


Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE H. BARBOUR, OF PITTSBURGH, PENNSYLVANIA.

BUILDING STRUCTURE.

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To all whom it may concern:

Be it known that I, GEORGE H. BARBOUR, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Building Structures, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an end view of one form of building constructed in accordance with my invention. Fig. 2 is a side elevation of a portion of a building similar to that shown in Fig. 1. Fig. 3 is a plan view of Fig. 2 with portions broken away. Fig. 4 is a transverse section through the building along one of the trusses. Fig. 5 is a detail sectional view of a portion of Fig. 4 on a larger scale. Figs. 6, 7, 8, 9, 10, 11, 12 and 13 are transverse detail sectional views through different portions of one of the trusses showing different forms of truss members.

My invention relates to building structures having roof portions supported by a series of metallic members.

One of the objects of my invention is to provide roof supports for a building having roof portions in different planes, and which supports have portions thereof between the roof portions on the exterior of the building.

Another object of my invention is to form the roof portions in various sections, so that the roof will not crack when it expands or contracts. Also to provide means for supporting the inner longitudinal edges of some of the roof portions by structural members connected to adjacent trusses.

A still further object is to provide a building structure in which the outer portions of the roof between a pair of trusses is approximately at the level of the lower chords or truss members of the trusses, and the center portions between the same pair of trusses are approximately at a level with the top chords or truss members of the trusses. The roof portions are arranged to provide spaces between the outer edges of the top portions of the roof and the inner edges of the bottom portions of the roof for windows.

A further object of my invention is to build the trusses from various shaped sections which have the same web depth or flange width so that when the trusses are assembled, all of the members of each truss excepting the gusset plates and securing devices lie between two parallel planes.

Another object is to so interlace reinforcing rods with the truss members that the various roof portions in the same planes between different trusses will be reinforced and secured to each other.

The precise nature of my invention will be best understood by reference to the accompanying drawings which will now be described, it being premised, however, that various changes may be made in the details of construction and the general arrangement of the parts without departing from the spirit and scope of my invention as defined in the appended claims.

Referring to the accompanying drawings, the numeral 2 designates a plurality of vertical columns or posts which extend from a suitable foundation to the roof trusses 3. Each of the trusses 3 comprises a top chord or truss member 8, a center bottom chord or truss member 9, end bottom chords or truss members 11, and inclined rafters 10, which are braced by means of web or tie members 12. The web or tie members are connected to each other and to the chords and rafters by means of gusset plates and rivets.

Extending longitudinally of the building and connected to the bottom chords at the junction of the chord members 9 and 11 are beams 13 which I have shown of I-beam cross section.

14 are Z-bars extending in a longitudinal direction, having one of their flanges connected to the vertical web member 12^a, and are arranged to form guides or supports for the window sashes 15 between the upper and lower portions of the roof. 16 are similar members connected to the posts or columns 2 for the window frames 17, and 16^a is another Z-bar connected to the posts or columns 2 for supporting a portion of a concrete wall as hereinafter described.

18 designates vertical posts or columns extending parallel with the posts 2 and connected thereto by means of gusset plates 19. Connected to the upper ends of these posts 18 is a longitudinal beam 20 which may be of any desired shape and size to support one of the longitudinal rails for the traveling crane; the other rail being supported in a similar manner from posts adjacent to the posts 2 on the other side of the building. Extending in a vertical direction from the

foundation between the posts 18 and connected to the beam 20 are flanged members 22, and 23 are reinforcing rods which may extend in either a vertical or horizontal direction.

After the frame work has been erected, the spaces between the outer and inner planes of the posts or columns 18 and the flanged members 22 are filled with concrete up to the level of the bottom of the beam 20. Connected to the beams 20 are slabs of concrete, such as indicated at 24, which extend in a horizontal direction from the beam 20 to the Z-bar 16^a and then in a vertical direction from the Z-bar 16^a to the Z-bar 16. This portion of concrete 24 may be reinforced by means of rods or other metal extending from structural element to structural element. The concrete between the posts or columns 18 together with concrete 24 forms the side wall of the building.

The spaces between the posts 2 and the posts 18 are also filled with concrete, as indicated at 24^a, and if desired the spaces between the flanges of the posts 2 may be filled with concrete as indicated at 25. The posts and their connections may be covered with concrete which may be anchored by reinforces 25^a to the side wall. The concrete surrounding the posts 2 extends from the foundation to the slabs 2, and form buttresses for the side walls.

In erecting the wall just described, the forms for the concrete are connected to the posts 18 and 22 by wires or bolts, or in any desired manner, and the space between them is filled with concrete, and after the concrete has set the forms are removed.

The chords 11 may be formed of sections such as shown in cross section in Figs. 10, 12 and 13, or may be formed of a channel section and an I-beam section, such as shown in Fig. 11. The top chord 8 may be formed as shown in section in Figs. 6, 7, 8 and 9, or in numerous other ways. Chords 11 and 8 are provided with openings through which reinforcing rods 26 may extend in a longitudinal direction throughout the building or may extend from truss to truss. After these reinforcing rods are placed in position suitable forms are secured to the lower faces of the longitudinal beams 13 and the lower faces of the chords 11, and the space is filled with concrete or other material to form the outer portion of the roof. The spaces between the lower portion of the Z-bar 14 and the upper portion of the Z-bar 16 are also filled to form continuations of the roof so that there will be no leakage between the vertical portion below the Z-bar 14 and the roof proper.

The central portion of the roof above the upper chord 8 is then formed in a similar manner and the roof is extended down to the top of the upper Z-bars 14. As can readily be seen by reference to the drawings the Z-bars 14 and 16 form supports for the roof and at the same time form guide ways for the window sashes.

The advantages of my invention result from the provision of roof-supporting trusses for a roof having portions in different horizontal planes and in which the trusses and roof portions are so arranged that the bottoms of the trusses extend very little, if any, below the lower portions of the roofs supported thereby. Also from the provision of supporting members connected to adjacent trusses for supporting the inner edges of the lower portions of the roof. Further, from the provision of means for supporting one portion of the roof on the bottom chord of the building and supporting the other portion of the roof from the top chord of the roof. By this arrangement I am enabled to overcome the use of monitors which have heretofore been supported by a structure built on the top of the roof trusses and on which the upper portion of the roof is supported and am enabled to bring the windows closer to the floor.

Another advantage results from the fact that the structure is considerably lower than the customary framed structures, which greatly economizes in the material as well as labor and at the same time reduces the area exposed to the wind and the inclosed volume of air to be heated. This is accomplished by supporting a portion of the roof from the lower chords or rafters of the trusses, while the other portion of the roof is supported on the top chord.

Still another advantage of my invention results from the provision of a truss, having lower chord or truss members which are provided with vertical webs and flanges on the lower ends thereof for supporting the sections of the roof portions, so that small sections of the roof portions extend from truss to truss and are supported on the flanges thereof so that said portion of the roof is broken up into a number of small units, thereby reducing the liability of shrinkage cracks.

I claim:

1. A roof structure comprising a metallic supporting member, said supporting member having a vertical web and a flange member at each end thereof, and a roof portion extending from said supporting member and supported on the bottom flange member of said supporting member, said roof portion having an upwardly extending end rib, the upper flange of said supporting member having a downwardly extending end member overlapping the end rib of the roof portion; substantially as described.

2. A building structure having roof trusses, some of said roof trusses having supporting members for supporting roof

portions, said supporting members having vertical webs and flanges at each end of the webs, roof portions extending from truss to truss and supported on the lower flange members of said supporting members, said roof portions having upwardly extending end ribs, the upper flange members of the supporting members having downwardly extending end members overlapping the end ribs of said roof portions; substantially as described.

3. A building structure having a plurality of roof trusses, said roof trusses having bottom chord members for supporting roof portions, said bottom chord members having vertical webs and flanges at each end thereof, roof portions extending from truss to truss and supported on the bottom flanges of said chord members, said roof portions having upwardly extending end ribs, the upper flanges of the chord members having downwardly extending end members overlapping the end ribs of the roof portions, said trusses also having upper chord members, and other roof portions supported on the upper chord members; substantially as described.

4. A roof structure comprising an I-beam supporting member, roof portions supported on the lower flanges of the I-beam, the end of said roof portions being provided with an upwardly extending rib, and a downwardly extending flange member on the end of the top flange of the I-beam, said downwardly extending flange overlapping the rib on the roof portions; substantially as described.

5. A roof-support, comprising upper and lower truss members, one of said truss members having a vertical web and flanges at one end thereof, vertical portions connected to the ends of said flanges, tie members connected to said vertical portions of the flanges of the truss member and to the other truss member, and roof portions supported on the first mentioned truss member; substantially as described.

6. A roof truss comprising upper and lower members, one of said members having a vertical web and flanges at the ends thereof, vertical portions connected to the flanges at one end of the web, tie members connected to said vertical portions of the flanges of the member and to the other member, said tie members having webs the full width of the truss, other flanges on the first mentioned truss member being arranged to support the ends of roof portions; substantially as described.

7. A roof structure, comprising a metallic supporting member, a roof portion extending from the top of said supporting member, a second roof portion supported from the bottom thereof, and a support extending at right angles to the metallic supporting member and arranged to support the inner longitudinal edge of the last mentioned roof portion; substantially as described.

8. A roof structure, comprising a plurality of trusses, each of said trusses comprising upper and lower truss members, the lower truss members having vertical webs and flanges at each end of the webs, tie members connecting the lower truss member to the upper truss member of each truss, roof portions supported on upper truss members and extending from truss to truss, roof portions supported on the lower flanges of bottom truss members and extending from truss to truss, and longitudinal members connected to the trusses having flanges for supporting longitudinal edges of roof portions; substantially as described.

In testimony whereof, I have hereunto set my hand.

GEORGE H. BARBOUR.

Witnesses:
JESSE B. HELLER,
H. M. CORWIN.