

Jan. 5, 1943.

R. C. GRAEF

2,307,215

BUILDING STRUCTURE

Filed March 3, 1942

3 Sheets-Sheet 1

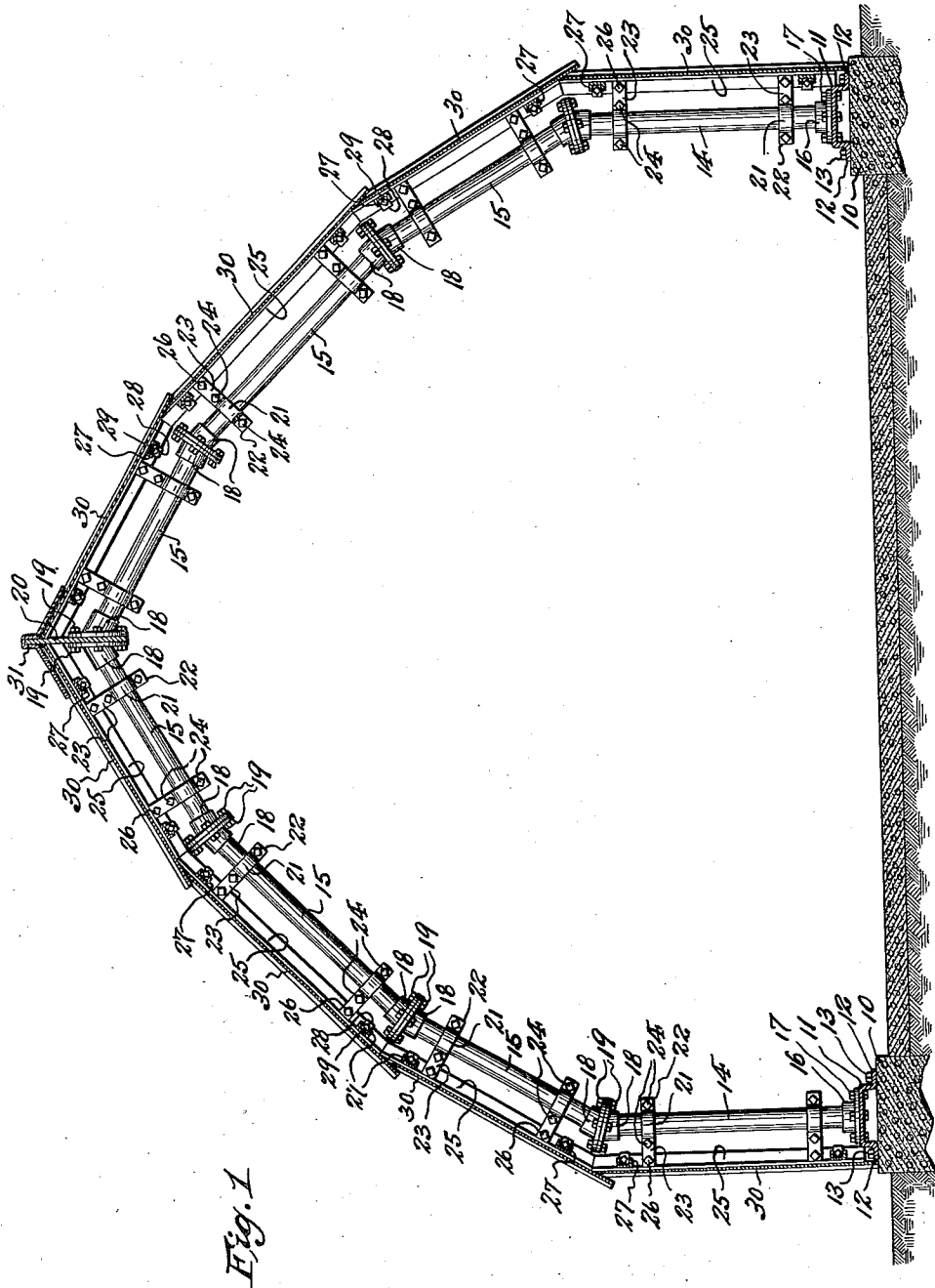


Fig. 1

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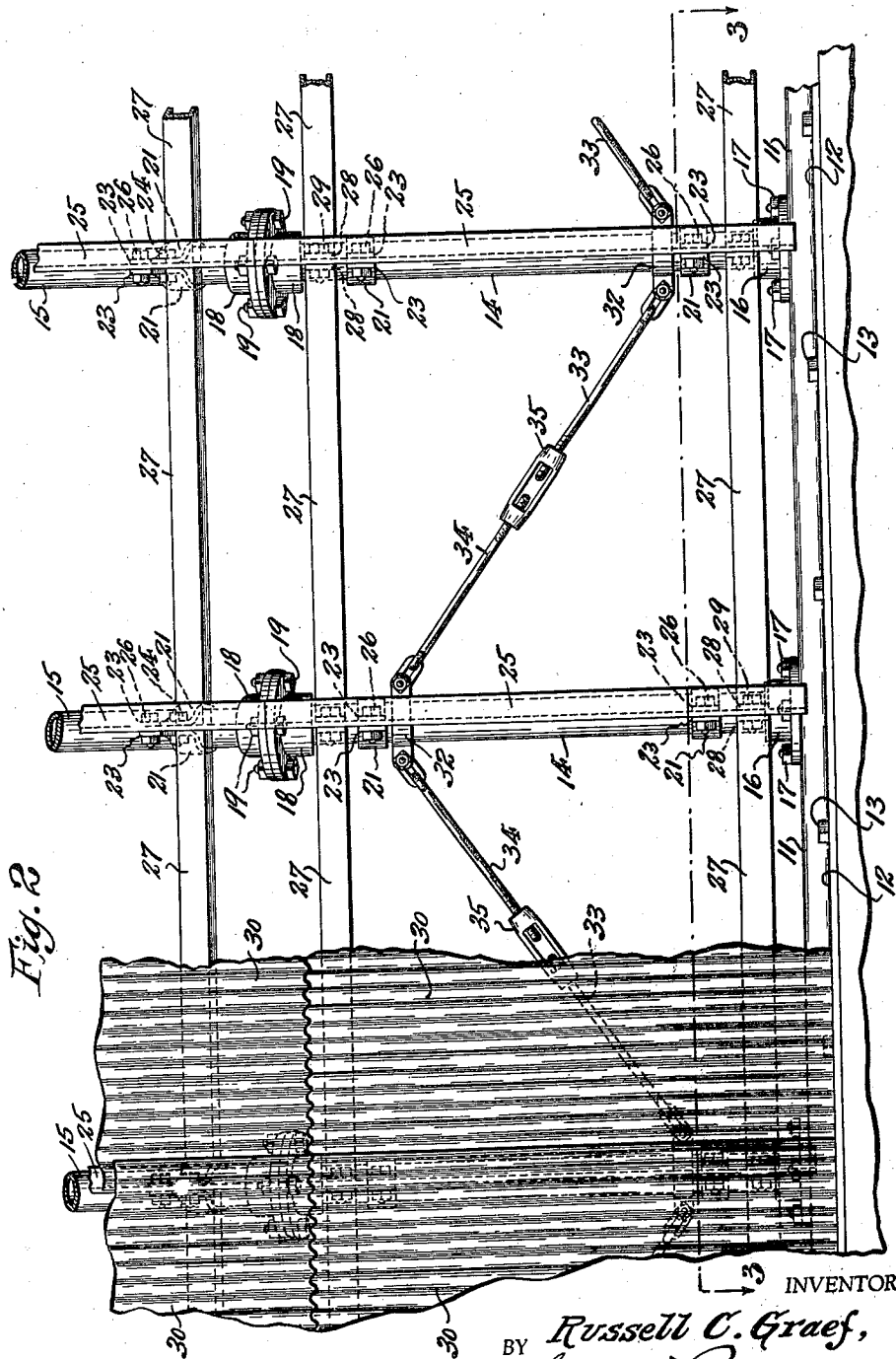
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

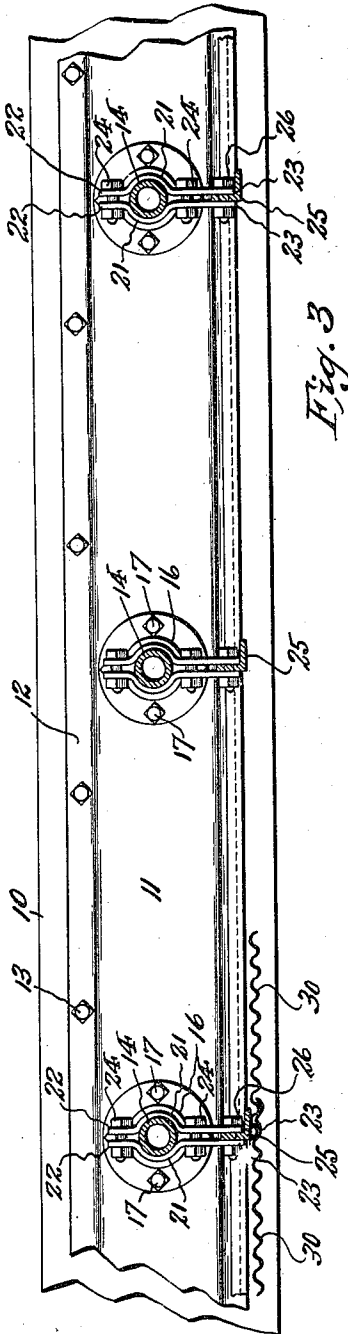


Fig. 3

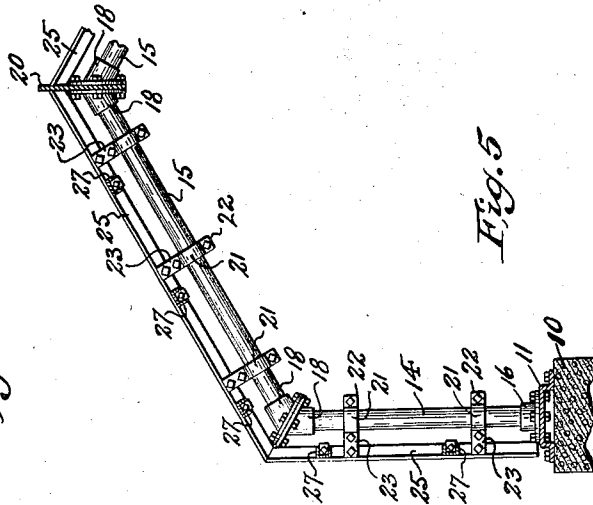


Fig. 5

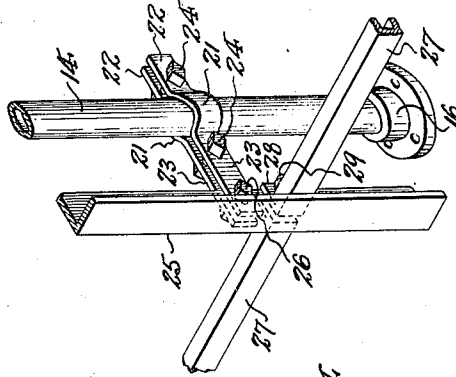


Fig. 4

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2,307,215

BUILDING STRUCTURE

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Application March 3, 1942, Serial No. 433,106

7 Claims. (Cl. 189—1)

This invention relates to improvements in building structures; and, more particularly, to an improved building structure comprising a metallic skeleton or framework to support externally applied sheathing and adapted to provide a continuous wall and roof construction; the resulting building structure being especially suitable for the erection of aeroplane and balloon hangars, garages, warehouse and pier sheds and similar buildings.

An object of this invention is to provide a relatively cheap, rapidly erectable, and yet strong and durable combined side wall and roof structure, including a novel skeleton framework by which suitable external sheathing can be supported in such manner as to provide a building structure wherein the roof and side walls are substantially continuous.

This invention has for another object to provide a novel combined wall and roof skeleton frame comprising rising columns, secured to and upstanding from a suitable supporting base or foundation sill, said columns being formed by interconnected column sections including perpendicular side wall column sections and angularly offset roof column sections secured end to end, and so arranged that the roof column sections converge at the peak or ridge of the roof portion of the structure; said columns having transverse bracket elements clamped thereto and formed to provide outwardly projecting carrying extensions or arms to carry the uprights of sheathing supporting frameworks, said latter frameworks including horizontal stretcher members secured to and between said uprights.

Another object of this invention is to provide a novel combined wall and roof skeleton frame of the kind above mentioned, wherein the elements making up the same comprise a minimum of standardized parts which may be quickly and easily assembled by simple operations requiring no skilled labor, and without requiring use of complicated tool equipment; in fact necessitating merely the use of simple wrench tools.

Other objects of this invention, not at this time more particularly enumerated, will be understood from the following detailed description of the same.

An illustrative embodiment of the novel building structure according to this invention is shown in the accompanying drawings, in which:

Fig. 1 is a transverse vertical section through a building structure including the novel combined wall and roof skeleton frame according to this invention; Fig. 2 is a fragmentary side

elevational view of the same, but drawn on an enlarged scale; Fig. 3 is a horizontal sectional view, taken on line 3—3 in Fig. 2; and Fig. 4 is a fragmentary perspective view of a portion of said form of the novel combined wall and roof skeleton frame.

Fig. 5 is a fragmentary transverse vertical section of a modified skeleton frame.

Similar characters of reference are employed in the above-described views to indicate corresponding parts.

In the drawings, the reference character 10 indicates a suitable foundation upon which the building structure according to this invention may be erected. Suitably affixed upon said foundation, to extend longitudinally along the tops of opposite side portions thereof, are sill members 11. In an illustrative form thereof, each sill member comprises an inverted channel-iron having footing flanges 12 outwardly projecting from its sides. Said sill members may be secured to the foundation portions by bolts 13 adapted to pass through the footing flanges 12 thereof, for anchorage in the foundation.

The novel combined wall and roof skeleton frame, according to this invention comprises a series of spaced columns arranged to rise from the sill members 11. Said columns each comprise perpendicular side wall column sections 14 and one or more angularly offset roof column sections 15; said column sections being coupled together end to end, and so that the roof column sections extending from transversely opposite side wall column sections are adapted to converge so as to form the peak or ridge of the roof supporting portions of the skeleton frame. Said column sections are preferably made of metal pipe of suitable size.

The side wall column sections 14 of each column is provided at its bottom end with a flanged footing socket 16 into which said bottom end is threaded or otherwise affixed. Said side wall column sections are erected to rise perpendicularly from a sill member 11, being affixed to the latter by bolts 17 which pass through the flanges of their footing sockets 16 and through said sill member 11.

As shown in Fig. 1, a plurality of roof column sections 15 extend upwardly end to end from the upper end of each side wall column section; said roof column sections 15 being successively angularly offset, whereby such roof column sections 15, which extend from transversely opposite side wall column sections 14, converge so as to meet at their upper ends on a longitudinal

line determining the peak or ridge of the building structure. This arrangement, comprising a plurality of successively angularly offset roof column sections 15, is a desirable arrangement for building structures of relatively large size and high roof design, such, e. g., as would be necessary to provide a hangar structure for balloons, aeroplanes and the like.

As shown in Fig. 5, however, the roof column portion of each column may comprise a single roof column section 15, angularly extending from each side wall column section at a selected angle according to the pitch of roof desired to be obtained. This arrangement is better adapted perhaps for small and comparatively low roofed building structures, such, e. g., as garages, sheds, and the like.

The column sections making up each column are joined end to end by suitable coupling connections. Such coupling connections are preferably provided in the form of flanged coupling sockets 18 of suitable angularity. One such coupling socket 18 is threaded onto or otherwise affixed to the respective opposed ends of adjoining column sections, so that their flanges may be brought into meeting relation, and then secured together by bolts 19 or like fastening means.

To define the peak or ridge of the building structure roof, it is preferable to provide a longitudinally extending ridge plate 20 against which the flanges of the coupling sockets 18 of the uppermost converging roof column sections 15 of opposite columns may abut, and to which said coupling socket flanges may be mutually secured by bolts 19 or like fastening means.

Mounted on the several column sections of each column, in suitably spaced apart relation, are a plurality of transverse bracket elements. Each bracket element comprises a pair of opposed members, each such member including a semi-circular clamp section 21 having a rearwardly projecting perforate ear 22 at one end, and a forwardly or outwardly projecting perforate carrying arm 23 at the other end. Cooperative members of such bracket elements are arranged to straddle the column sections so as to embrace the latter by their clamp sections 21, being thereupon clamped thereto by fastening bolts 24 disposed respectively through the opposed ears 22 and the inward portions of the opposed carrying arms 23 adjacent to said clamp sections.

Carried by the carrying arms 23 of the bracket elements are sheathing supporting frameworks. These frameworks comprise uprights 25, preferably in the form of angle-irons so as to provide rigidity; inwardly projecting flanges of said uprights being inserted between the free end portions of the opposed carrying arms 23 of the bracket elements which are supported by the respective column sections, and then secured thereto by bolts 26. Said uprights are provided in suitable sectional lengths so as to extend from end to end of each column in outwardly spaced or offset relation thereto and parallel to the respective column sections by which they are respectively supported, thus conforming to the planes of the side wall column sections and to the planes of the successively angularly offset roof column sections. Suitably secured to and between adjacent upright sections are stretcher bars 27, preferably in the form of channel irons so as to provide rigidity. Said stretcher bars 27 terminate at their ends in angular perforate ears 28 to abut the faces of the inwardly projecting

flanges of the upright sections 25, to which they are secured by bolts 29, or other suitable fastening means.

From the above description it will be obvious that a very simple, and yet strongly rigid and easily fabricated combined wall and roof skeleton frame is provided, including outwardly facing intertying sheathing supporting frameworks. Since the parts of such skeleton frame are capable of being assembled and joined together by bolts, it will be obvious that skilled labor is not required, and that little tool equipment other than wrench tools are needed in performing the assembling operations.

The wall and roof skeleton frame may be externally faced with any suitable form of sheathing to close in the building structure. For example, sheathing comprising corrugated sheet iron panels 30 as shown, may be utilized, the same being overlaid upon the face flanges of the upright sections 25, and then riveted or otherwise suitably secured thereto. Preferably the sheathing panels are of such vertical length as to overlap at each apex of the divergent angles formed by adjoining column sections; thus providing desirable water shedding joints between successive courses of the sheathing.

While corrugated sheet iron has been suggested as a sheathing material, it will be understood that sheathing of any other kind, form or material, suitable for wall and roof closure, may be utilized.

The ridge plate 20 is preferably of such height or width as to project exteriorly beyond the planes of the adjacent sheathing panels, whereby there may be affixed to the freely projecting marginal portion of said ridge plate 20 a ridge coping member 31 of suitable conformation.

It may be desirable to reenforce the skeleton frame or desired portions thereof by intertying adjacent columns thereof. As shown in Fig. 2 by way of illustration, this may be done by providing intertying stay rods extending between suitably disposed anchoring collars 32 clamped to the columns. Said stay rods preferably comprise opposed sections 33-34, having opposed threaded end portions joined by turn-buckles 35, whereby the stay rods may be tensionally adjusted.

While I have shown and described certain specific embodiments of this invention by way of illustration, it will be obvious that various changes could be made in the form and constructions thereof without departing from the scope of this invention as defined in the appended claims. It is therefore intended that all matter hereinabove described and shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a building structure, a combined wall and roof skeleton frame comprising transversely opposed columns affixedly upstanding from a foundation base, a plurality of said columns being spaced apart in the direction of the length of the building structure, each column comprising side and roof column sections angularly joined end to end and in such manner that roof column sections of transversely opposite columns converge in meeting relation along a line in the vertical plane of the roof ridge of the building structure, transversely disposed bracket elements embracingly secured to the column sections in spaced apart relation along the length of each column, said bracket elements having outwardly

projecting carrying arms, sheathing supporting frameworks comprising upright sections affixed to the extremities of said carrying arms in outwardly offset but conformably parallel relation to the angular disposition of the column sections, said frameworks further including horizontal stretcher members affixed to and between said upright sections, and roof and side wall sheathing externally applied and affixed to the frameworks thus provided.

2. In a building structure, a combined wall and roof skeleton frame comprising transversely opposed columns affixedly upstanding from a foundation base, a plurality of said columns being spaced apart in the direction of the length of the building structure, each column comprising side and roof column sections angularly joined end to end and in such manner that roof column sections of transversely opposite columns converge in meeting relation along a line in the vertical plane of the roof ridge of the building structure, transversely disposed bracket elements embracingly secured to the column sections in spaced apart relation along the length of each column, said bracket elements having outwardly projecting carrying arms, sheathing supporting frameworks comprising upright sections affixed to the extremities of said carrying arms in outwardly offset but conformably parallel relation to the angular disposition of the column sections, said frameworks further including horizontal stretcher members affixed to and between said upright sections, reinforcing tying means extending between adjacent longitudinally aligned columns, and roof and side wall sheathing externally applied and affixed to the aforesaid frameworks.

3. In a building structure as defined in claim 1, a longitudinally extending ridge plate upon which roof column sections converge and to which the same are secured, and an external coping member supported by said ridge plate to overlie the adjacently disposed portions of the roof sheathing.

4. In a building structure, a combined wall and roof skeleton frame comprising a longitudinally extending ridge-plate, transversely opposed columns affixedly upstanding from a foundation base, a plurality of said columns being spaced apart in the direction of the length of the building structure, each column comprising side and roof column sections angularly joined end to end and in such manner that roof column sections of transversely opposite columns converge upon and are secured to said ridge plate, transversely disposed bracket elements embracingly secured to said column sections in spaced apart relation along the length of each column, said bracket elements having outwardly projecting carrying arms, and sheathing supporting frameworks comprising upright sections affixed to the extremities of said carrying arms in outwardly

offset but conformably parallel relation to the angular disposition of the column sections and including horizontal stretcher members affixed to and between said upright sections.

5. In a building structure, a combined wall and roof skeleton frame comprising transversely opposed columns affixedly upstanding from a foundation base, a plurality of said columns being spaced apart in the direction of the length of the building structure, each column comprising a side column section and a plurality of roof column sections arranged in successively angularly offset end to end relation and in such manner that the uppermost roof column sections converge in meeting relation, means to join opposed ends of the column sections of each column in rigid coupled together relation, transversely disposed bracket elements embracingly secured to said column sections in spaced apart relation along the length of each column, said bracket elements having outwardly projecting carrying arms, and sheathing supporting frameworks comprising upright sections affixed to the extremities of said carrying arms in outwardly offset but conformably parallel relation to the angular disposition of the column sections, said frameworks including horizontal stretcher members affixed to and between said upright sections.

6. In a building structure, a combined wall and roof skeleton frame comprising transversely opposed columns affixedly upstanding from a foundation base, a plurality of said columns being spaced apart in the direction of the length of the building structure, each column comprising a side column section and a plurality of roof column sections arranged in successively angularly offset end to end relation and in such manner that the uppermost roof column sections converge in meeting relation, means to join opposed ends of the column sections of each column in rigid coupled together relation, transversely disposed bracket elements embracingly secured to said column sections in spaced apart relation along the length of each column, said bracket elements having outwardly projecting carrying arms, sheathing supporting frameworks comprising upright sections affixed to the extremities of said carrying arms in outwardly offset but conformably parallel relation to the angular disposition of the column sections, said frameworks including horizontal stretcher members affixed to and between said upright sections, and roof and side wall sheathing externally applied and affixed to the frameworks thus provided.

7. In a building structure as defined in claim 6, a longitudinally extending ridge plate upon which the uppermost roof column sections converge and to which the same are secured, and an external coping member supported by said ridge plate to overlie the adjacently disposed portions of the roof sheathing.

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