United States Patent

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[54] **BUILDING FRAME WITH CABLE TRUSSES**
6 Claims, 5 Drawing Figs.

[52] U.S. Cl. ..... **52/641,** 52/63, 52/83, 52/148, 135/7.1 R
[51] Int. Cl. **E04b 1/347,** E04b 1/342, E04h 6/44
[50] Field of Search 52/83, 90, 63, 222, 247, 633, 641, 643, 650, 691, 690, 146, 148, 166, 23; 135/3, 7.1, 4

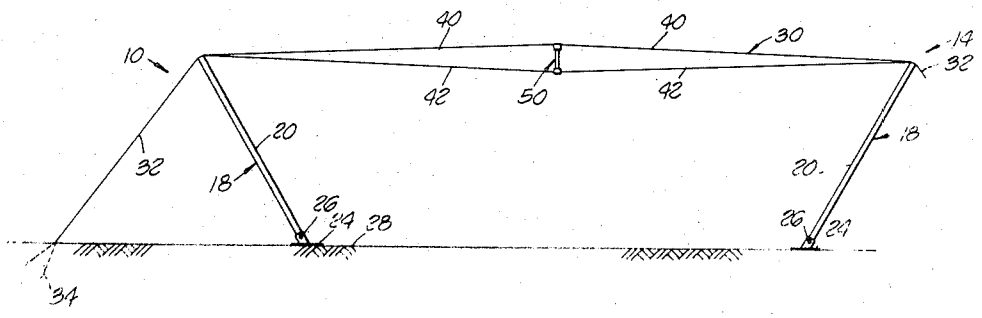
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ABSTRACT: A building frame comprising: two laterally spaced supporting frames forming opposite sides of the building; laterally extending cable trusses spanning the space between and carried by the supporting frames and including upper and lower cables; and a rigid, longitudinally extending truss located midway between the supporting frames and disposed between the upper and lower cables of the cable trusses to space them apart vertically. The upper cables slope downwardly from the central truss to the supporting frames so that this truss forms a central longitudinal ridge. The cable trusses are anchored laterally outwardly of the supporting frames to the surface on which the building frame is erected. The supporting frames slope laterally outwardly and upwardly so that the interior of the building frame, viewed in cross section, has the general configuration of an inverted trapezoid. This makes the building frame particularly suitable for use as a hangar frame of minimum width since the lateral spacing of the bottoms of the supporting structures may be less than the wingspan of an airplane to be hangared therein.



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SHEET 1 OF 2

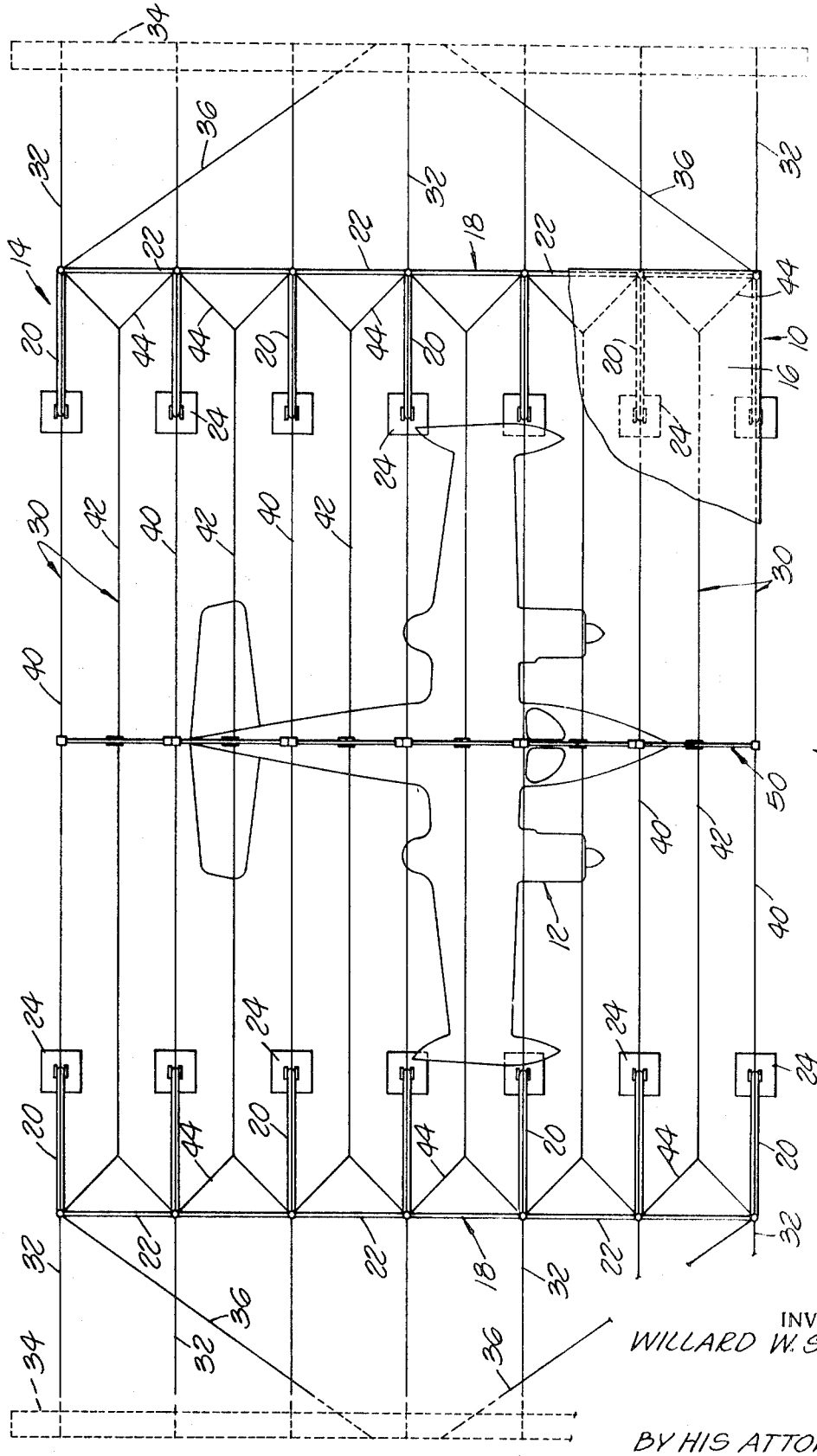


FIG. 1.

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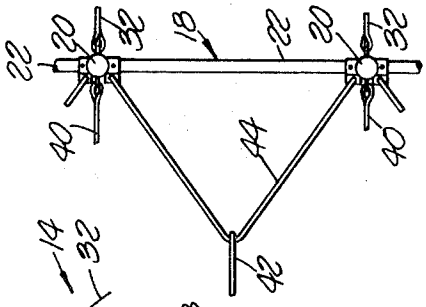


FIG. 5.

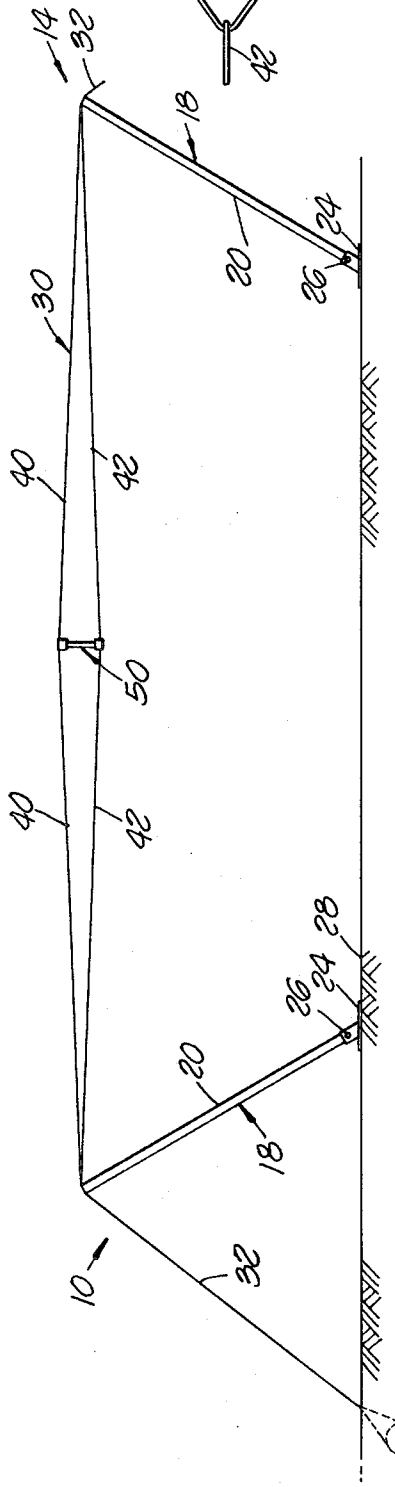


FIG. 2.

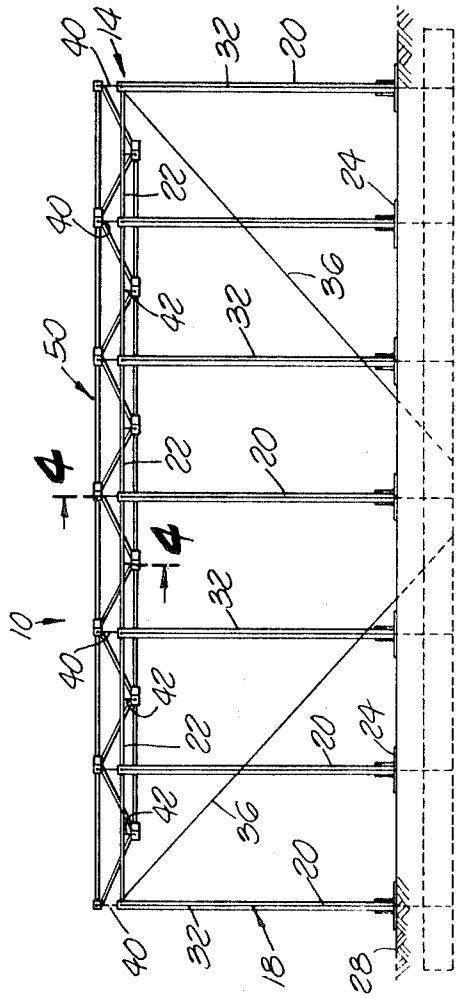


FIG. 3.

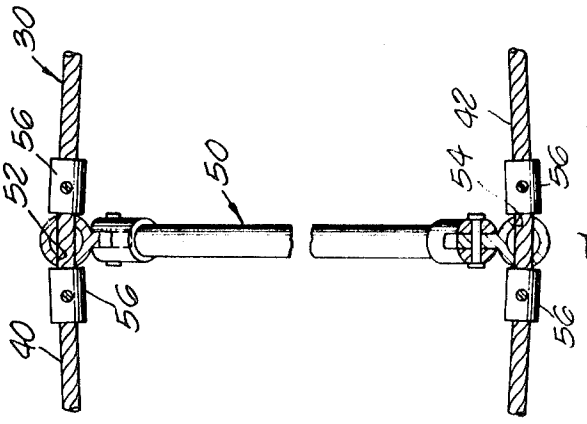


FIG. 4.

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BUILDING FRAME WITH CABLE TRUSSES

BACKGROUND OF INVENTION

The present invention relates in general to building frames designed for quick and easy erection and, more particularly, to a building frame of the type which utilizes two laterally spaced supporting structures respectively extending longitudinally along opposite sides of the building, and laterally extending cable trusses spaced apart longitudinally of the building and spanning the space between the supporting structures to form a roof frame for the building, the cable trusses being anchored to the ground, or other surface on which the building is erected, laterally outwardly of the supporting structures. Generally, each cable truss includes upper and lower cables and some means for spacing them apart vertically.

SUMMARY AND OBJECTS OF INVENTION

A primary object of the invention is to provide a building frame of the foregoing general nature wherein the upper and lower cables of all of the cable trusses are vertically spaced apart by at least one structure extending longitudinally the entire length of the building frame, and preferably centrally located midway between the laterally spaced supporting structures of the building frame.

With the foregoing construction the various cable trusses are all tied together intermediate the supporting structures at the sides of the building frame, thereby stabilizing the cable trusses and providing the building frame with a better integrated roof frame, which are important features.

Another object of the invention is to provide a building frame wherein the central, longitudinally extending structure interconnecting the cable trusses is in itself a rigid truss disposed between the upper and lower cables of the cable trusses to space them apart vertically.

A further object is to provide a construction wherein the upper cables slope downwardly from the central truss to the supporting structures at the sides of the building frame so that the central truss forms a central longitudinal ridge. With this construction, a covering over the building frame slopes laterally outwardly and downwardly from the central ridge for drainage purposes.

Still another important object of the invention is to provide a building frame wherein the supporting structures at the sides are frames which slope laterally outwardly and upwardly from their bottoms to their tops. With this construction, the interior of the building frame, viewed in cross section, has the general configuration of an inverted trapezoid. This is particularly important where the building is used as a hangar since the lateral spacing of the bottoms of the supporting frames may be less than the wingspan of an airplane hangared in the building Thus, the width is minimized.

Another important feature of the upwardly and outwardly sloping supporting frames at the sides of the building is that they are subjected primarily to column loads by the cable trusses and their anchoring means, instead of to bending loads.

Another object of the invention is to provide a construction wherein the upper and lower cables are staggered longitudinally of the building frame.

The foregoing objects, advantages, features and results of the present invention, together with various other objects, advantages, features and results which will be evident to those skilled in the building art in the light of this disclosure, may be achieved with the exemplary embodiment of the invention illustrated in the accompanying drawings and described in detail hereinafter.

DESCRIPTION OF DRAWINGS

Referring to the drawings:

FIG. 1 is a plan view of a building which embodies the invention, most of an outer covering of the building being omitted to reveal the details of the frame of the building;

FIG. 2 is an end elevational view of the building frame;

FIG. 3 is a side elevational view of the building frame;

FIG. 4 is an enlarged, fragmentary sectional view taken as indicated by the arrowed line 4—4 of FIG. 3; and

FIG. 5 is an enlarged, fragmentary plan view duplicating a portion of FIG. 1 on a larger scale for clarity.

DESCRIPTION OF EXEMPLARY EMBODIMENT OF INVENTION

Referring to the drawings, the building of the invention is designated generally therein by the numeral 10 and is illustrated as a hangar for an airplane 12. The hangar 10 includes an open-ended frame 14 which permits taxiing, towing, or otherwise moving, the airplane 12 in one end of the hangar and out the other. The hangar frame 14 may be provided with a suitable cover, fragmentarily shown at 16 in FIG. 1, which forms no part of the present invention and which thus will not be referred to again.

The hangar frame 14 includes two laterally spaced supporting structures 18 respectively extending longitudinally along opposite sides of the hangar 10. The structures 18 are supporting frames which slope laterally upwardly and outwardly and which comprise longitudinally spaced, laterally upwardly and outwardly sloping, columns 20 rigidly interconnected at their upper ends by longitudinal struts 22. The lower ends of the columns 20 are connected to baseplates 24 by longitudinal pivots 26. The baseplates 24 may be secured to the ground 28, or other surface on which the hangar 10 is erected, in any suitable manner, as by spikes, or the like, not shown.

The roof frame of the hangar frame 14 is formed by laterally extending cable trusses 30 spaced apart longitudinally of the hangar and anchored to the ground 28 laterally outwardly of the supporting frames 18 by cables 32. The latter are shown as having their upper ends connected to the supporting frames 18 at the upper ends of the columns 20, and as having their lower ends connected to deadmen 34 buried in the ground 28, the cables 32 sloping laterally outwardly and downwardly from the tops of the supporting frames to the deadmen. The supporting frames 18 are braced longitudinally by cables 36 having upper ends connected to the upper corners of the supporting frames and having lower ends connected to the deadmen 34 adjacent the midpoints thereof. It will be understood that anchoring means other than the deadmen 34, such as stakes, spikes, or the like, may be employed.

The cable trusses 30 comprise longitudinally staggered upper an lower cables 40 and 42, the upper cables being shown in FIG. 5 as connected at their ends to the upper ends of the columns 20 opposite the anchor cables 32. The lower cables 42 are located longitudinally intermediate the upper cables 40 and are shown in FIG. 5 as connected to the supporting frames 18 adjacent the upper ends of the columns 20 by bridles 44.

The upper and lower cables 40 and 42 of the cable trusses 30 are maintained in spaced-apart relation, in the vertical direction, by a rigid, central, longitudinal truss 50 located midway between the supporting frames 18 and disposed between the upper and lower cables The truss 50, which may be of any suitable construction is provided along its upper edge with openings 52, FIG. 4, for the upper cables 40 and along its lower edge with openings 54 for the lower cables 42, the openings 54 being longitudinally staggered relative to the openings 52. Collars 56 suitably secured to the cables 40 and 42 on opposite sides of the central truss 50 maintain the truss in position relative to such cables.

As will be apparent from FIG. 2, the upper cables 40 slope downwardly from the upper edge of the central truss 50 to the upper edges of the supporting frames 18. Consequently, water falling on the cover 16 will drain to the longitudinal edges of the roof of the hangar 10.

The use of the rigid central truss 50 to tie the upper and lower cables 40 and 42 of the cable trusses 30 together results, in combination with the rigid supporting frames 18, in a very stable and well integrated hangar frame 14, which is an important feature.

Another important feature resides in the laterally outward and upward inclinations of the supporting frames **18**. More particularly, inclining the supporting frames **18** in this fashion causes the cable trusses **30** and the anchor cables **32** to impose substantially pure column loads on the columns **20**, as opposed to bending loads, which is an important feature. Second, the inverted-trapezoid cross-sectional configuration resulting from such inclinations of the supporting frames **18** permits the spacing of the lower edges of the supporting frames to be less than the wingspan of the airplane **12**, which minimizes the overall width of the hangar **10**. This effect is enhanced further if the airplane is a high-wing monoplane since the wingtips may then extend into the upper interior corners of the hangar frame **14**.

Although an exemplary embodiment of the invention has been disclosed for illustrative purposes, it will be understood that various changes, modifications and substitutions may be incorporated in such embodiment.

I claim as my invention:

1. In a frame for a building, or the like, the combination of:

a. two laterally spaced supporting structures respectively extending longitudinally along opposite sides of the building;

b. laterally extending cable trusses spaced apart longitudinally of the building, said cable trusses spanning the space between and being carried by said supporting structures and including upper and lower cables;

c. a longitudinally extending structure carried by and forming parts of said cable trusses and spacing said upper and lower cables thereof apart vertically;

d. said supporting structures including laterally outwardly and upwardly sloping supporting frames; and

e. means anchoring said cable trusses to the surface on which the building is erected, laterally outwardly of said supporting frames.

2. A building frame as defined in claim **1** wherein said longitudinally extending structure is located midway between said supporting structures.

3. A building frame as defined in claim **2** wherein said upper cables extend downwardly from said longitudinally extending structure to said supporting structures so that said longitudinally extending structure forms a central longitudinal ridge.

4. A building frame as defined in claim **3** wherein said longitudinally extending structure is a rigid truss disposed between said upper and lower cables of said cable trusses.

5. A building frame as defined in claim **1** having an interior which, viewed in transverse cross section, has the general configuration of an inverted trapezoid.

6. A building frame according to claim **1** wherein said upper and lower cables are staggered longitudinally of the building.