Sept. 3, 1929. T. AHLBORN 1,727,022

AIRPLANE HANGAR

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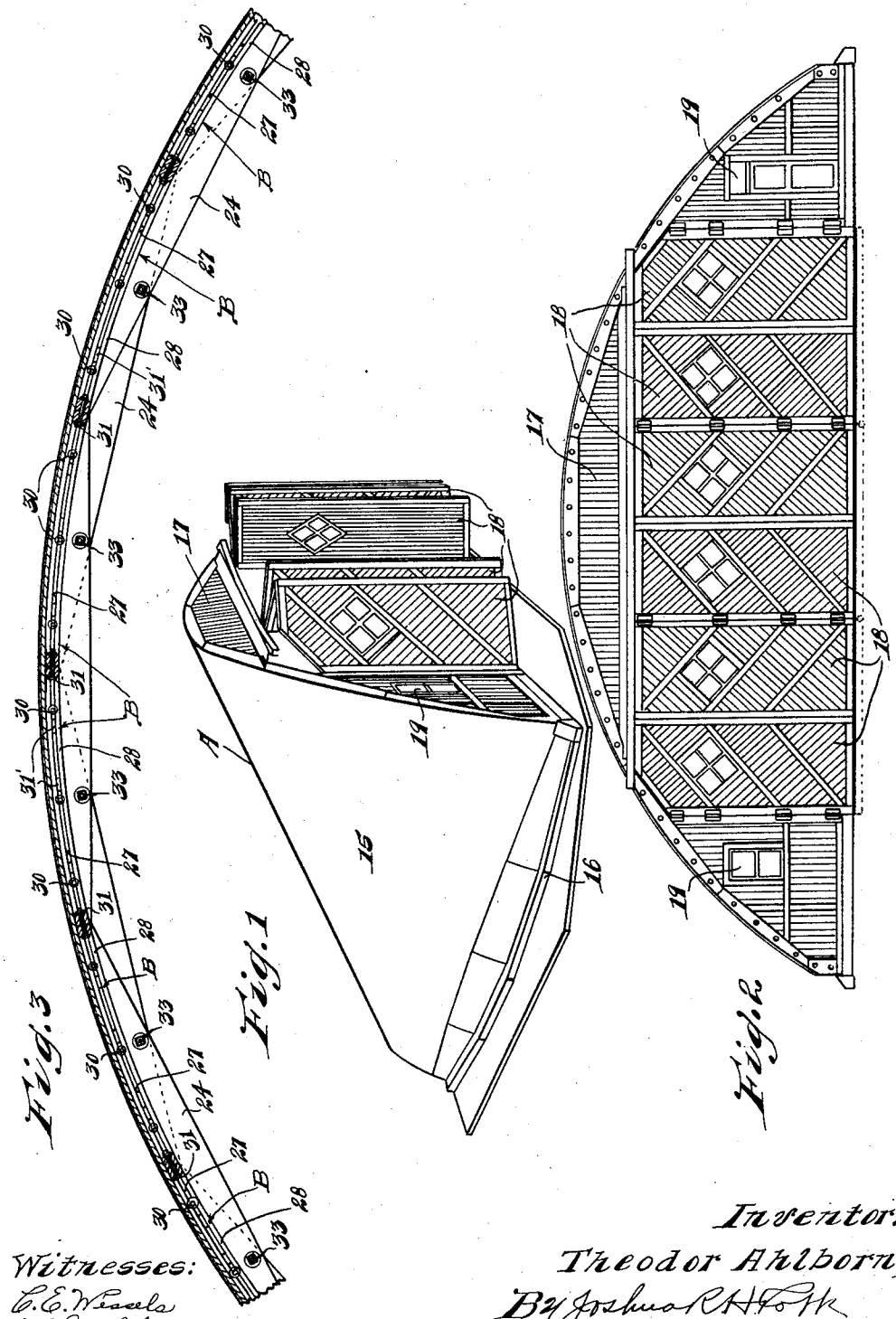


Fig. 1

Fig. 2

Fig. 3

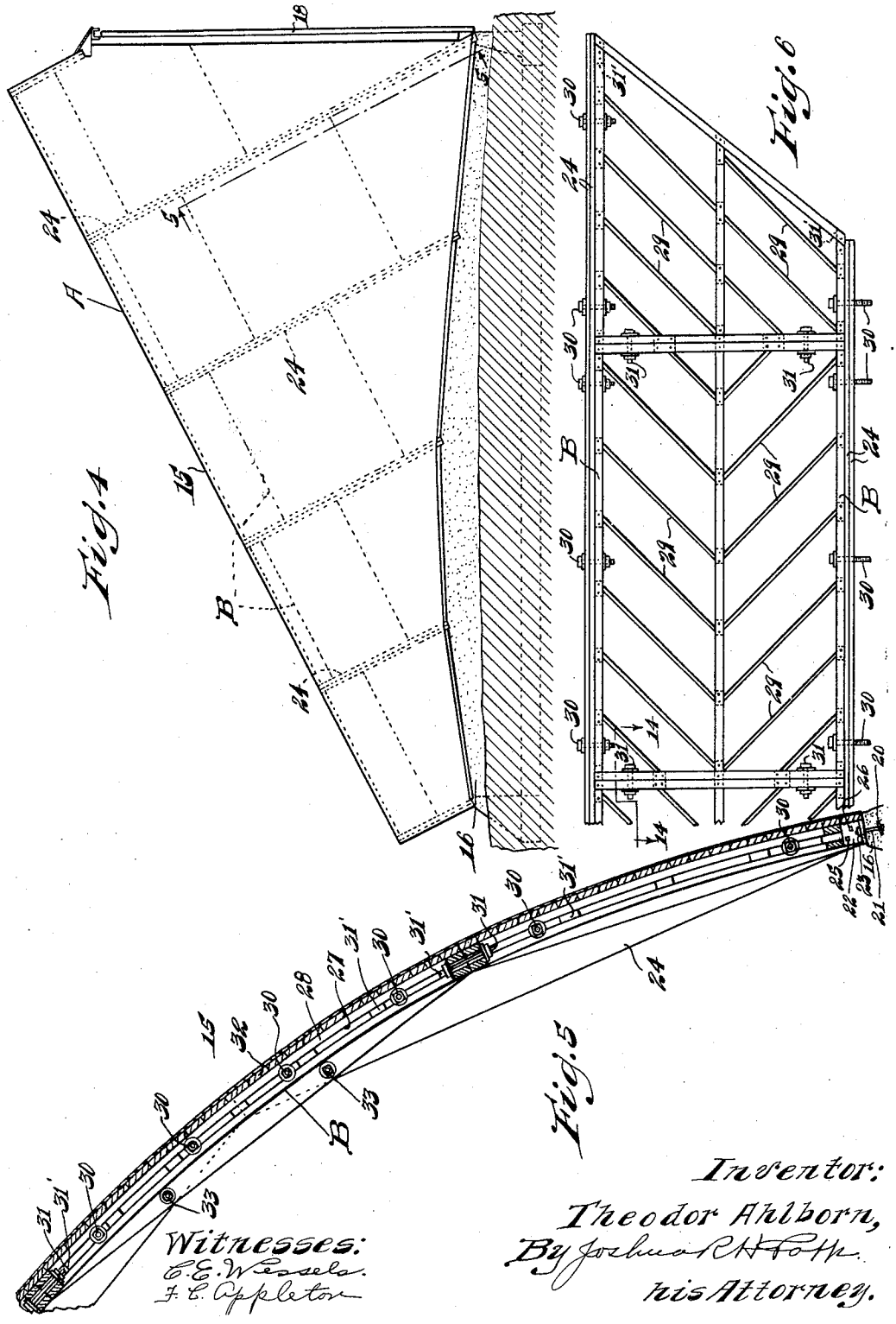
Witnesses:
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AIRPLANE HANGAR

Filed Dec. 6, 1927 5 Sheets-Sheet 2



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AIRPLANE HANGAR

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Fig. 7

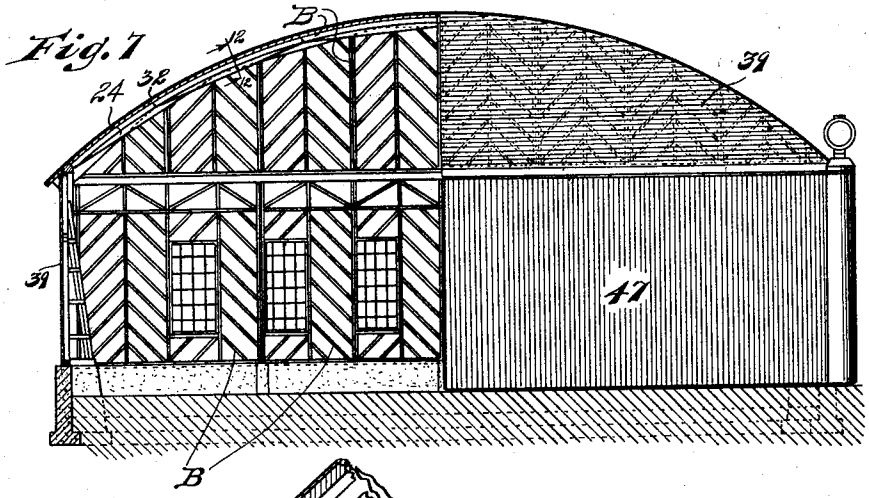


Fig. 8

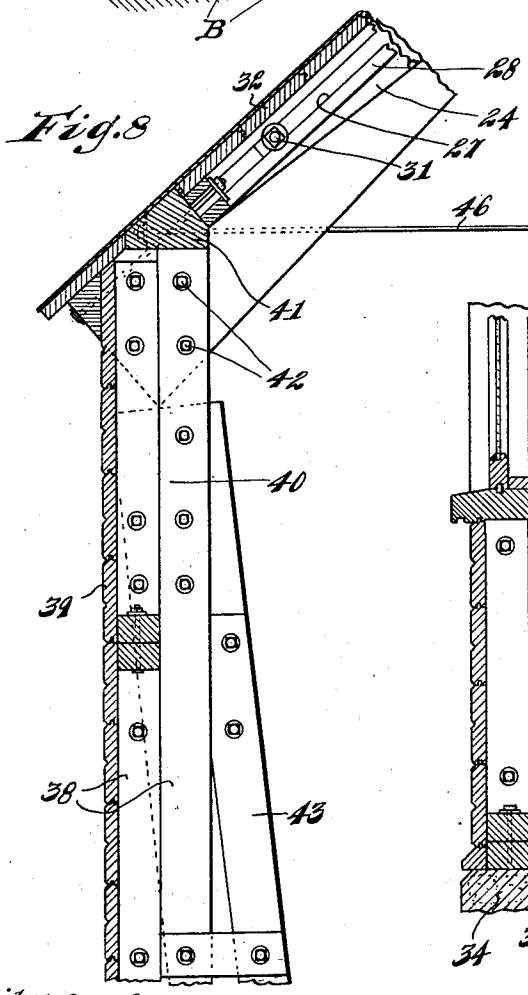
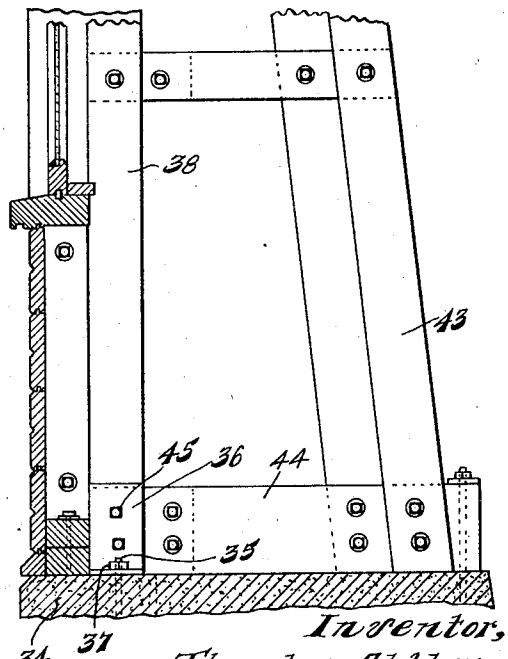


Fig. 9



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AIRPLANE HANGAR

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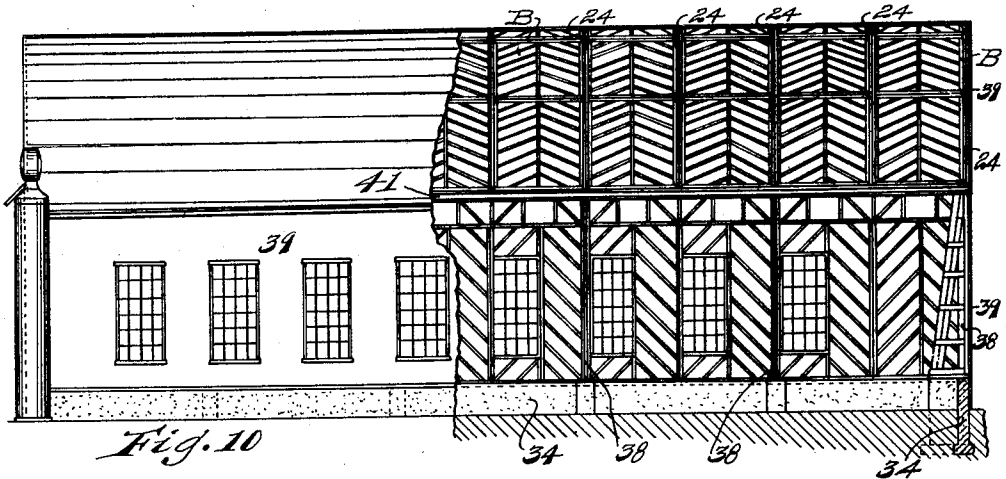


Fig. 10

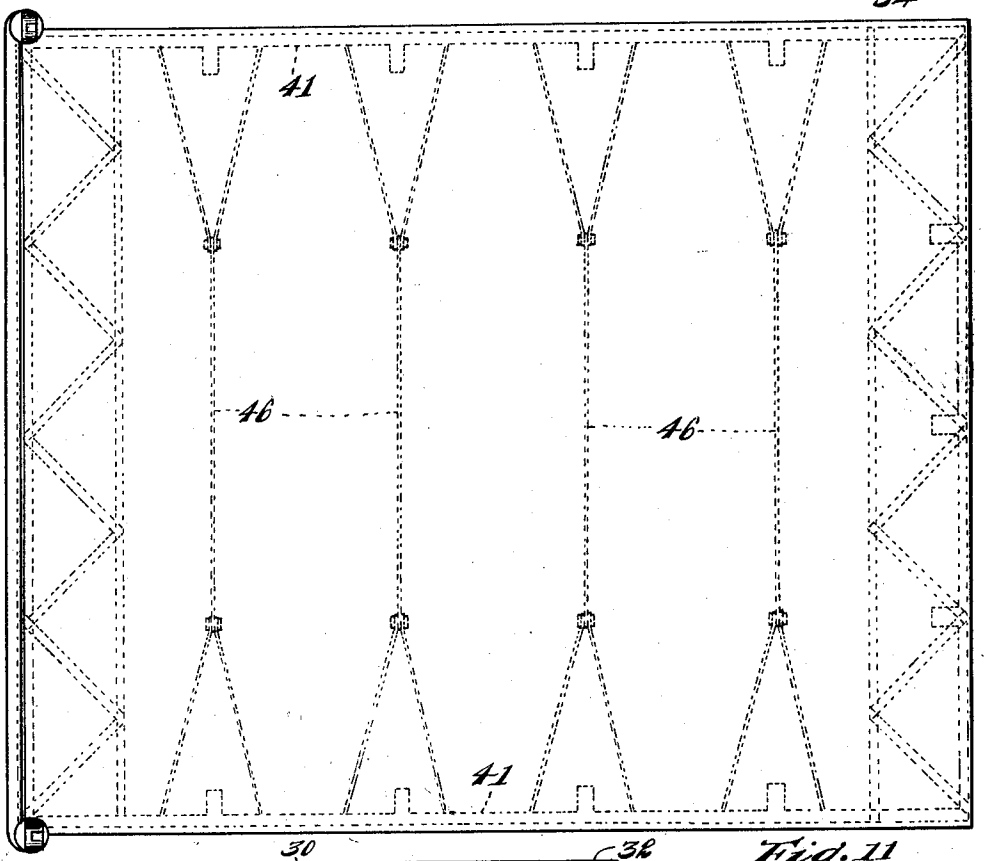


Fig. 11

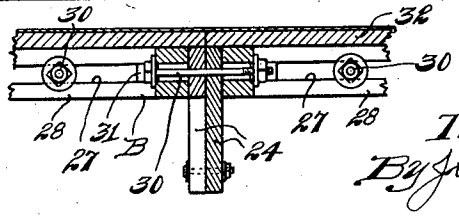


Fig. 12

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AIRPLANE HANGAR

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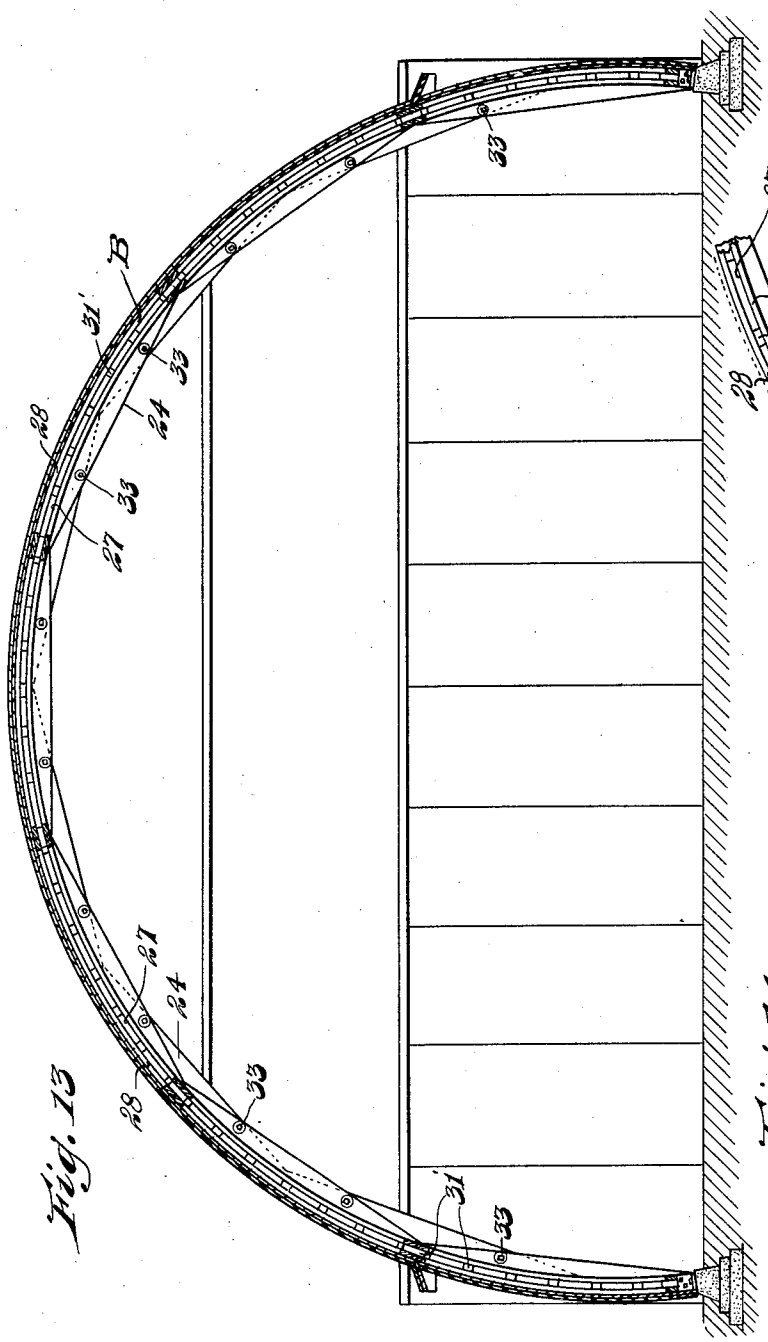


Fig. 13

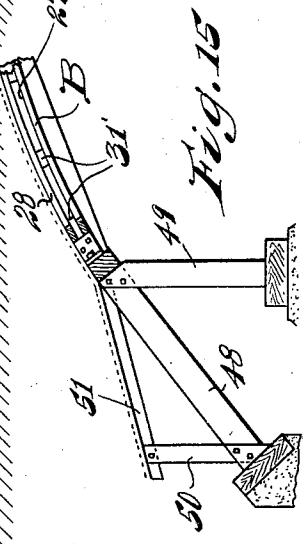


Fig. 15

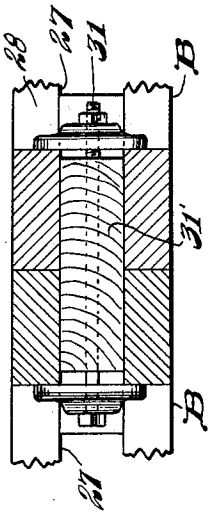


Fig. 14

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Patented Sept. 3, 1929. 1,727,022

UNITED STATES PATENT OFFICE.

THEODOR AHLBORN, OF HOUSTON, TEXAS.

AIRPLANE HANGAR.

Application filed December 6, 1927. Serial No. 238,098.

My invention relates to airplane hangars and has for its object the provision of a novel hangar of the type described of compact and pleasing design, of simple yet strong construction and particularly adapted to yield the maximum of convenience and safety with a minimum of material employed.

Another object of my invention is to provide a hangar of a novel turtle back configuration adapted to lessen wind resistance, economize space and to conform to the particular shape of the airplane or ship which it may be used for.

A further object of my invention is to provide a novel form of airplane hangar construction whereby ease of construction and dismantling is obtained, and which may be enlarged if desired by the use of standardized sections.

A still further object is to provide a portable airplane hangar.

Additional objects and advantages of the method and construction herein employed will appear more fully in the hereinafter specification when taken in connection with the accompanying drawings in which,

Figure 1 is a perspective view of my turtle back hangar.

Figure 2 is a front elevation thereof.

Figure 3 is a fragmentary section of the laminated arch ribs, with several of the herring bone panels in place.

Figure 4 is a side view of the turtle back hangar, outlines of panel sections being shown in dotted lines.

Figure 5 is a section taken on line 5—5 of Fig. 4, illustrating a laminated arch rib construction at the base.

Figure 6 is a plan view of 2 of the panels used in the construction of my turtle back hangar.

Figure 7 is an end elevation and section of an airdrome with the laminated arch ribs arranged parallel.

Figure 8 is an enlarged section of the reinforcing members of the studding and the laminated arch rib roofing members.

Figure 9 is an enlarged view of the base section of the studding for supporting one of the laminated arch ribs.

Figure 10 is a side view, partly in section of the airdrome, illustrating the herring bone panel construction employed.

Figure 11 is a plan view of an airdrome, illustrating the end bracing and tie rods employed for reinforcing the roof and side walls.

Figure 12 is a detail section taken on line 12—12 of Figure 7 illustrating a section of the laminated arch ribs and the herring bone panels bolted together, also the roof boards.

Figure 13 is a cross section of a modified form of an airdrome wherein the arch of the roof is carried to the ground foundations.

Figure 14 is an enlarged detail view taken on line 14—14 of Figure 6 of the construction employed to join the panels together.

Figure 15 is an elevational view, partly in section, of a bracing or "lean to" construction used to reinforce my airdromes.

In the preferred form of my invention illustrated in Figures 1 to 6 inclusive, A designates an airplane hangar consisting broadly of arched, sloping roof 15, having approximately the so-called turtle back configuration, and a foundation 16,—the inclosure formed thereby, being closed by a front wall 17 provided with a plurality of doors 18 and windows 19, whereby admittance to and exit from the hangar is obtained.

Embedded in the concrete foundation 16 are plates 20 and anchor bolts 21, the threaded shanks of the bolts 21 being passed through angle plates 22 which are secured thereon by nuts 23. As an important feature of my invention I now secure arch rib members 24 to the angle plates 22 by bolts and nuts 25 and 26,—the arch rib members being arranged in laminated, overlapping relation in a member to form substantially double polygonal shaped supporting ribbing, as best shown in Figure 3, on which is applied novel sectional herring bone panel units B, the latter having slots 27, sills 28, and forming with the herring bone members 29, the completed herring bone panel B. The herring bone panels B, in pairs, are placed on and brought into alignment with the laminated arch ribs 24 by bolts or rivets 30, in conjunction with the additional bolts 31, and aligning spacer blocks 31′, as best shown in Figures 5 and 6, which serve also to separate the panels B to provide for the slots 27. A sheeting 32 placed over the arch rib supported panels completes the roof. The laminated arch ribs 24 together with the herring bone sections B, present substantially the geometric configuration of in-

scribed polygons within a circle, a segment of which is illustrated in Figures 3 and 5,—the laminated arch ribs being so placed in overlapping relation that the mid-point of an arc described by the curvature of the roof, and a cooperating arch rib 24 is made the junction point of the ends of two of the other arch ribs.

As particularly shown in Figure 3, each of the segments of the circle formed by an arc of the roof and a single arch rib, provide three points of support for the roof by the insertion of another rib in the overlapping position shown. The arch ribs in the process of construction, after being placed in the relative position, shown in Figure 3, are bolted together adjacent a point of tangency 33. By the arcuate configuration of my hangar and the employment of ribs joined and attached to form the polygon shaped reinforcement illustrated, I am enabled to provide practically a maximum in the way of load, stress and strain resistance with the use of a minimum of materials.

In Figures 7, 8 and 9, a modified form of my hangar is shown. Herein 34 is the concrete foundation and 35 the anchor bolts on which are secured the angle plates 36 by the nuts 37. As best shown in Figure 9 the supporting columns 38 of this modified form of my invention comprise the siding 39, studding 40, which carries the rafter wall plates 41, on which the laminated arch ribs 24 are secured by bolts 42. The vertical studding 38 is also provided with brace members 43 secured to a base beam 44, which is held by bolts 45 to angle plates 36, the latter being anchored to the foundation.

It is to be noted that the structure described as reinforcing the columns 38 is typical of the structure used at the other similar columns. The columns 38 are also provided with tie rods 46 which rigidify and hold the hangar intact, as best shown in Figure 11.

Between the columns 38 and the laminated arch ribs 24 the herring bone panels B are inserted and then secured to the arch ribs 24 by the rivets 30, the spacer blocks 31′ secured by bolts 31 serving to align and separate the panels to provide the slots 27 therebetween. Over the herring bone panels B and the laminated arch ribs 24 roofing boards 32 are fastened in the usual manner. It is understood that a suitable roofing material is then applied over the roofing boards.

As shown in Figures 7 and 10 the sides and ends of the hangar are made up of a plurality of the herring bone panels B,—one end being preferably provided with a roller shutter door 47, it being also understood that the panels B are faced with a siding 39, thereby completing the hangar.

In Figure 15, the "lean to" or bracing construction comprises the diagonal post 48, uprights 49, 50 and oblique member 51,—the diagonal and uprights being secured to the foundation in the usual manner. This is a modified form of my hangar which is employed under conditions where it is desirable to further reinforce the construction against severe strains.

It is to be noted that as the configuration of the hangar presents a gradual slope from the roof to the ground, the segments of the arc of the roof are made progressively smaller, this being best shown in Figure 4.

The construction herein described and illustrated is not only particularly applicable to the housing of airplanes, but the same structure is admirably adapted for garages, boathouses and with slight changes may be employed for building construction in general.

While I have herein described and illustrated with some degree of particularity a preferred embodiment of my invention, I do not desire to be understood as confining myself to the specific details as set forth but wish to avail myself of such variation and modifications as fairly lie within the intent and scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. An inclosing structure comprising a foundation, and a superstructure secured to and rising from said foundation to form an arcuate protecting covering thereover, said superstructure consisting of a plurality of rib members connected in overlapping sections to form a polygonal shaped frame work, all of the apices of which provide a support for a roof covering, said roof covering consisting in part of individual structural building forms having four sides with an interior bracing of herring-bone formation.

2. An inclosing structure comprising a foundation, an arcuate roof secured to and rising from said foundation, said arcuate roof consisting of a plurality of individual panel sections superimposed on a polygonal shaped frame work said individual panel sections consisting of four-sided frames having a central transversal member to which are secured a plurality of elements arranged in herring-bone formation, and joined to opposite sides of said frames, said sections being flexed over and secured to said frame work, and boards suitably faced with a roofing material fastened to said frame work and said panel sections, substantially as described.

3. A portable hangar comprising structural panel units having a supporting framework of substantial herring-bone formation and arranged in pairs to provide a slot therebetween, a plurality of laminated ribs connected to a polygonal shaped frame work,

all of the apices of which form points of support for said panel units, the latter being connected to and flexed thereover in an arcuate configuration, providing means for fastening roofing boards thereto, said roofing boards being faced with a suitable coating.

4. A structural building unit comprising side and end members and a central member joined thereto, a plurality of ribs connected in herring bone formation between said side members and said central member, said building unit being provided with perforations whereby a quick connection with suitable fastening means and co-acting aligning spacer blocks may be had with similar building units in multiples.

5. A hangar comprising a foundation, side walls secured to said formation, an arcuate roof resting on and fastened to said side walls, said arcuate roof consisting of a plurality of laminated ribs connected together to form a polygonal shaped frame work, a plurality of individual panel units flexed over and secured to said frame work, said panel units consisting of a frame having a central transversal member to which are connected ribs and herring-bone formation connected to opposite sides of the frame, a plurality of suitably faced roofing boards joined to said frame work and said panel units, and a plurality of bracing members for said side walls, substantially as described.

In testimony whereof I have signed my name to this specification.

THEODOR AHLBORN.