Nov. 19, 1946. E. R. CAPITA 2,411,316

AIRPLANE HANGAR

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Fig. 1

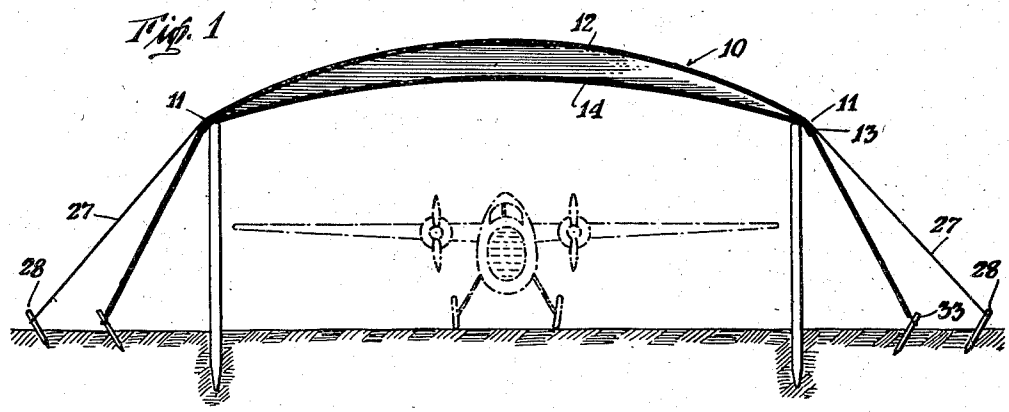


Fig. 2

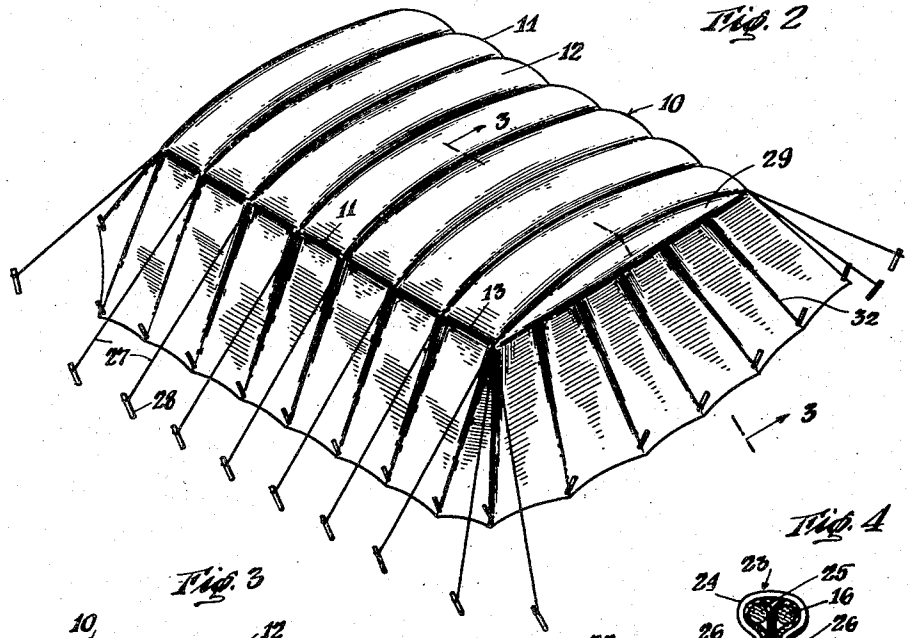


Fig. 3

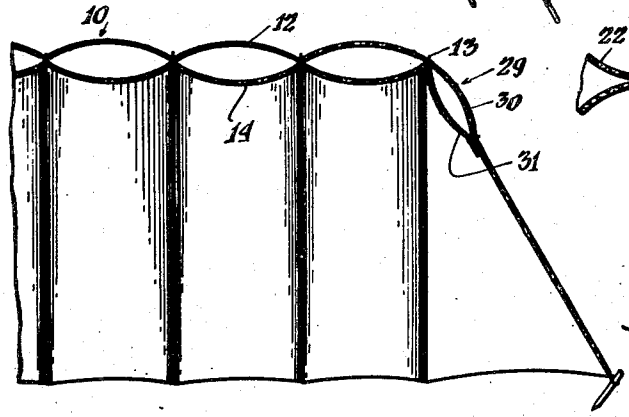
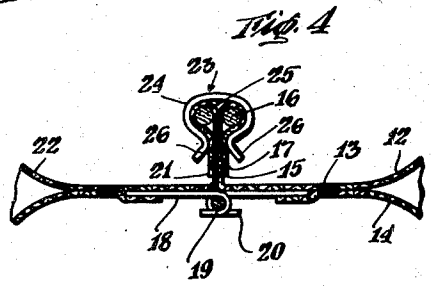


Fig. 4



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Fig. 5

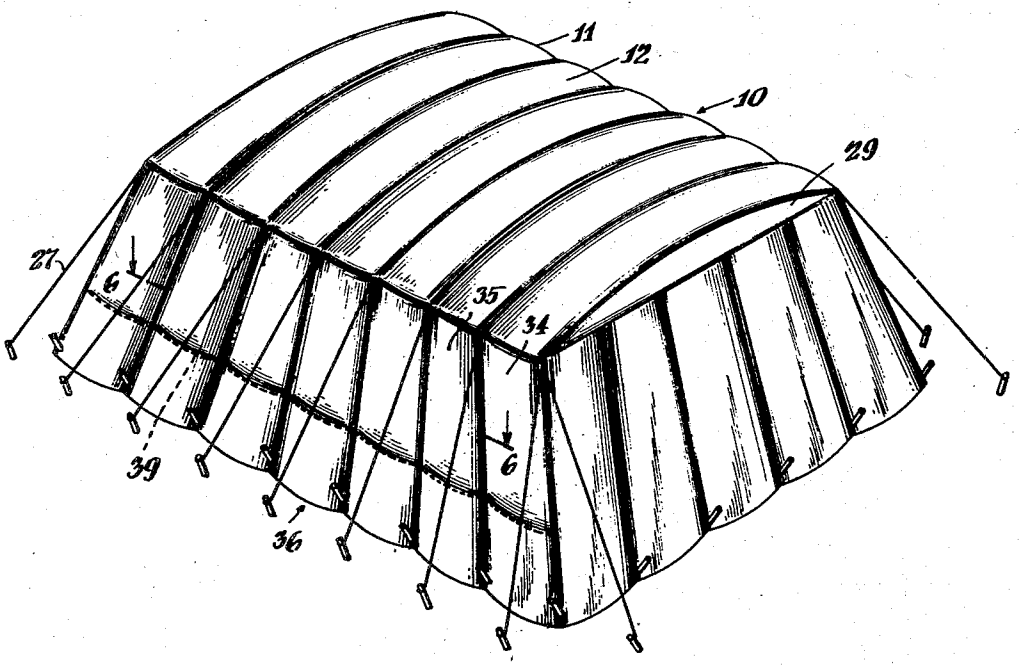
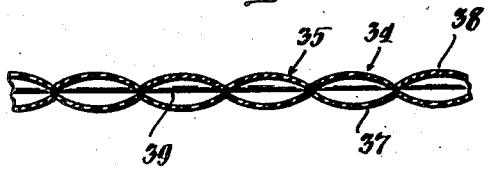


Fig. 6



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Patented Nov. 19, 1946

2,411,316

UNITED STATES PATENT OFFICE

2,411,316

AIRPLANE HANGAR

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Application August 17, 1944, Serial No. 549,917

16 Claims. (Cl. 135—1)

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This invention relates to airplane hangars and is herein illustrated in some detail as embodied in a hangar suitable for providing the wide span of opening necessary to accommodate large planes.

Such hangars usually require roofs giving upwards of one hundred feet clear opening in front, but the opening, and, in fact, the whole roof is ordinarily needed to give a height of only a fraction as much. For this reason a high arch provides much unnecessary space, while a low horizontal girder of 100 feet span exceeds the limit usually accepted for girders, and is necessarily heavy and expensive.

A low arch involves strong end thrust members, and therefore raises structural problems equal to the problems presented by a girder design, although the problems are different.

According to the present invention the foregoing and other difficulties and objections are overcome, and a roof is provided which works on a different principle, and involves none of the structural problems inherent in girders and arches, and which exerts no side thrust requiring expensive foundations.

On the contrary the roof is well adapted to be packed in a small space and to be set up rapidly without the need of skilled metal workers or structural engineers.

In the form shown a fabric surface provides the top of the roof, and the roof is shown as consisting of hollow cells made of suitable fabric and inflated with a suitable gas, such as helium, so that the gas supports the fabric surface. The side-edges of the roof are shown as made of fabric, which may be utilized as the walls of gas-inflated cells to carry the load of the walls, or help to carry that load.

The side edges and back of the roof may be held down by cords stretched outwardly and secured to tent pegs of an ordinary type.

Such a fabric roof may be set up hastily, is well adapted to be so designed that it serves other uses, such as a cover for fabric gasoline tanks, movable repair shops, and many other purposes.

The fabric units may be rolled up for shipment and rapidly unrolled, filled with gas from portable cylinders of compressed gas, and assembled, together with accessories such as tents or hangars, and equally rapidly demounted and shipped away by plane or otherwise.

The roofs are lighter and less bulky than hangar girder roofs and require no special vehicles for transporting them. In addition, minor repairs are easily made by unskilled workmen, and

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they are less expensive than the metal roofs with girders generally used.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Fig. 1 is a front view of a hangar embodying the present invention;

Fig. 2 shows the hangar in perspective from near a back corner;

Fig. 3 is a diagrammatic section on the line 3—3 of Fig. 2;

Fig. 4 is a sectional view diagrammatically showing how units may be joined;

Fig. 5 is a perspective view of a modification; and

Fig. 6 is a sectional view along the line 6—6 of Fig. 5.

In the form shown, the hangar includes roof units 10 made of a suitable fabric, such, for example, as is used in balloons or dirigible units. Each roof unit is shown as extending from one edge or eave 11 of the roof to the opposite eave 11, being preferably several times as long as it is wide, and containing sufficient helium or other gas to give it considerable net buoyancy.

In the form shown, the top fabric 12 of each unit 10 extends beyond its seam 13, by which it is stitched to the bottom fabric 14, so that the free end 15 may be carried around a rope or steel cable 16 and stitched down over the cable 16 by a seam 17.

When the hangar roof is assembled the units are brought together, edge to edge, and hooks 18 lying against the insides of the ends 15 and fastened to the fabric are hooked over a free steel cable 19. The hooks 18 are shown as alternating with similar hooks 20 on an adjacent free end 21 (like the end 15) of the adjacent unit 22, so that the cable 19 holds two units together.

When the adjacent units are thus firmly united the joint may be made tight against rain by slipping a resilient clamp-like molding member 23 over the now loose and projecting end fabrics 15 of the units and hold them together. The molding member 23 thus presents its convex outer surface 24 to the weather and rain and its U-shape enables its outwardly bent edges 26 to be sprung or slipped over the bulges 25 produced by the cable 16, 16 with the fabric over them.

The free cables 19 may include long free ends 27 which extend well beyond the eaves 11 and are shown as carried down to earth to be fastened to tent pegs 28.

In order that the whole weight of the walls and cables of the hangar may not fall upon the

net buoyancy of the roof units 10, the end wall 29 is shown as made of two layers of fabric 30, 31, spaced apart and forming a cell inflated by buoyant gas like the cells 10, and as held down by cables 32, pulling from its lower end and drawn down by tent pegs 33 forming an inner row so that the end walls may be nearly vertical although the pegs 28 are shown as pulling their cables at a far flatter angle.

The side walls may be fabric or may be inflated cells 34, 35, held down by pegs 33 in an inner row.

Fig. 5 shows the modified form in which the side walls 36 include the additional buoyant cells 34, 35 along an edge of the roof 10 having outer fabric faces 37 and inner fabric faces 38, and closed at their bottoms by seams 39. Thus the side cells carry at least part of the weight of the cables.

As appears in Fig. 1, the buoyancy of the gas raises the center of the roof formed by the cells 10 well above the height of the eaves so that the roof sheds rain. The molding members are accordingly curved lengthwise and of suitable shorter length to assemble readily. It will be noted they supply a certain stiffness to give the roof an arched shape.

The seams, including the seam 13, are shown only diagrammatically, as also the edges from which spring the free ends 27 of the draw ropes, and these are made gas tight and strengthened in any ordinary or suitable manner, as is well known to those skilled in the art of balloons.

Having thus described in some detail one form of the invention, what is claimed is:

1. A roof including cells inflatable with buoyant gas, and releasable means for uniting said cells along their edges to form a continuous roof.

2. A roof including cells inflatable with buoyant gas and extending from eave to eave at their end edges, and releasable means for uniting said cells along their longitudinal edges to form a continuous roof.

3. A roof including cells inflatable with buoyant gas and extending from eave to eave at their end edges, means uniting said cells along their longitudinal edges to form a continuous roof, cables stretched outwardly and at intervals, holding the roof at its edges, and additional buoyant cells along an edge carrying at least part of the weight of the cables.

4. A roof including cells inflatable with buoyant gas and extending from eave to eave at their end edges, means uniting said cells along their longitudinal edges to form a continuous roof, cables stretched outwardly and at intervals, holding the roof at its edges, and additional buoyant cells along an edge forming a wall and carrying at least part of the weight of the cables.

5. A roof including cells inflatable with buoyant gas and extending from eave to eave at their end edges, means uniting said cells along their longitudinal edges to form a continuous roof, cables stretched outwardly at a low angle and holding the roof at intervals at its edges, additional buoyant cells along an edge forming a wall and carrying at least part of the weight of the cables, and devices holding said wall more nearly vertical.

6. A roof including two buoyant cells, fabric walls for said cells, extensions of said fabrics beyond the cell edge, and releasable means for uniting two cells by said extensions.

7. A roof including two buoyant cells, fabric walls for said cells, extensions of said fabrics beyond the cell edge, a cable in each extension producing a bulge and means for uniting said cells by said cable bulges.

8. A roof including two buoyant cells, fabric walls for said cells, extensions of said fabrics beyond the cell edge, a cable in each extension producing a bulge and means embracing said bulges for uniting said cells by said cable bulges.

9. A roof including two buoyant cells, fabric walls for said cells, hooks along an edge of each of said cells adapted to grasp a cable to hold the cells together, and an extension of said cable adapted to hold the cells to the ground.

10. A roof including two buoyant cells, fabric walls for said cells, hooks along an edge of each of said cells adapted to grasp a cable to hold the cells together, buoyant side cells nearly vertical, and an extension of said cable adapted to be stretched at a low angle to hold the roof cells to the ground.

11. A roof including two buoyant cells, fabric walls for said cells, extensions of the fabric enclosing cables to hold the cells together, hooks along an edge of each of said cells adapted to grasp a cable to additionally hold the cells together, and an extension of said cable adapted to hold the cells to the ground.

12. A roof including two buoyant cells, fabric walls for said cells, extensions of the fabric enclosing cables to hold the cells together, hooks along an edge of each of said cells adapted to grasp a cable to additionally hold the cells together, an extension of said cable adapted to hold the cells to the ground, and a member embracing the fabric extensions to hold the cells.

13. A roof including buoyant fabric cells extending from eave to eave, extensions of the cell fabric enclosing cables to hold the cells together, hooks along the cell edges to additionally hold them together, and a cover member adapted to embrace the cables to hold the cells.

14. A roof including buoyant fabric cells extending from eave to eave, extensions of the cell fabric enclosing cables to hold the cells together, hooks along the cell edges to additionally hold them together, a cover member adapted to embrace the cables to hold the cells, and an additional cable through the hooks having an extension to hold the roof.

15. A roof including buoyant fabric cells extending from eave to eave, extensions of the cell fabric enclosing cables to hold the cells together, hooks along the cell edges to additionally hold them together, a cover member adapted to embrace the cables to hold the cells, and side wall buoyant cells nearly vertical.

16. A roof including buoyant fabric cells extending from eave to eave, extensions of the cell fabric enclosing cables to hold the cells together, hooks along the cell edges to additionally hold them together, a cover member adapted to embrace the cables to hold the cells, an additional cable through the hooks having extension to hold the roof, and side wall buoyant cells nearly vertical.

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