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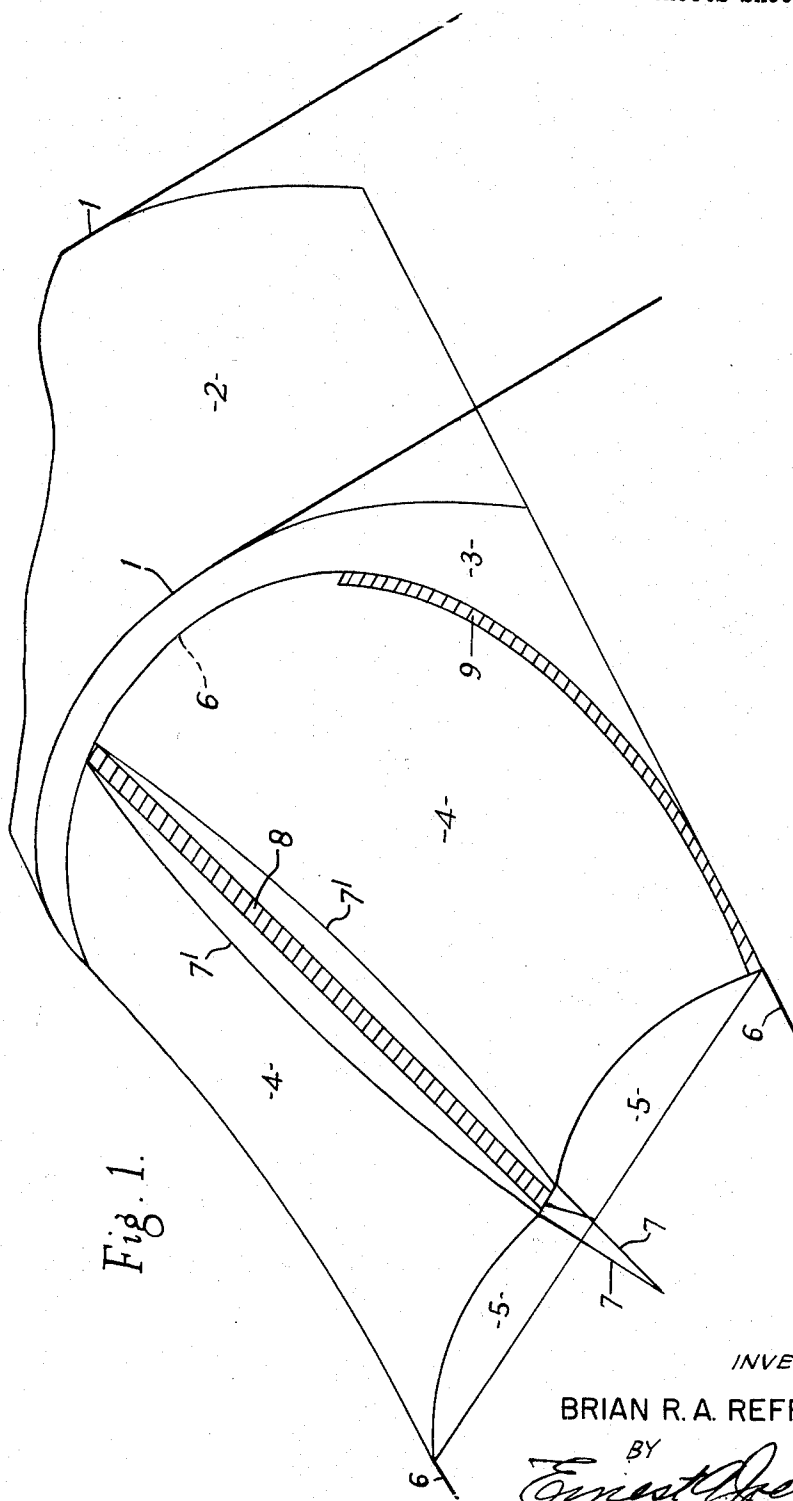
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INFLATABLE BUILDINGS AND LIKE STRUCTURES

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2 Sheets-Sheet 1



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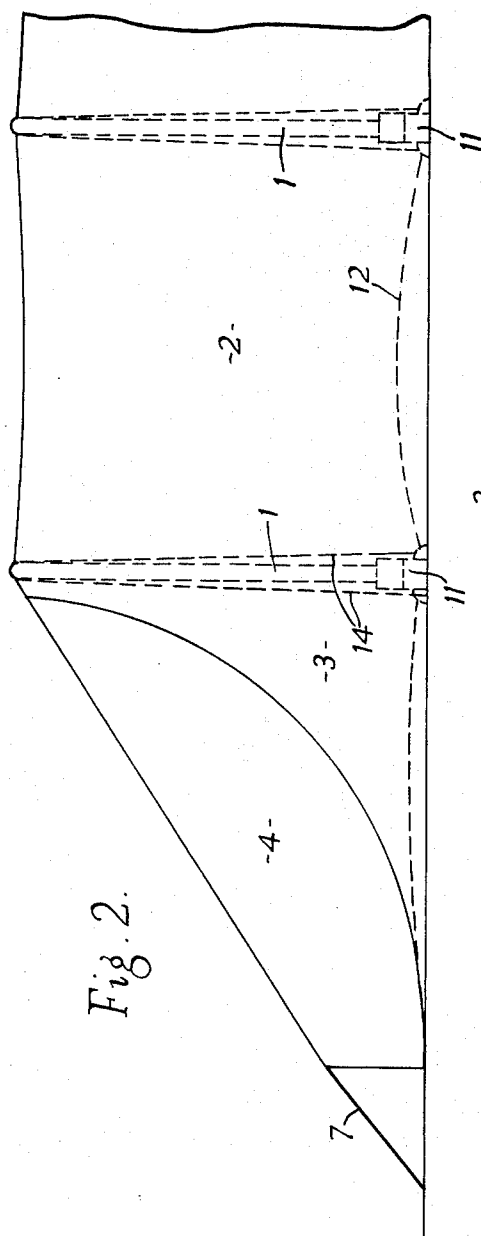


Fig. 2.

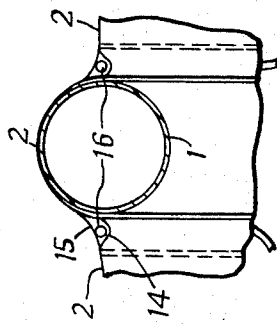


Fig. 3.

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INFLATABLE BUILDINGS AND LIKE STRUCTURES

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The present invention relates to inflatable buildings and in particular to inflatable buildings of the type having an arched framework formed of high-pressure inflatable hoses, which framework is covered by an outer skin of sheet material, usually textile fabric.

Inflatable buildings of this kind are used, amongst other purposes, as shelters for the personnel of the armed forces in cold climates and in particular as a protection against the wind.

In order to ensure the maximum utility of the building, it is necessary to be able to locate the skin on the framework to prevent it from moving in relation thereto, and it is also desirable to be able to tension the skin to moderate the flapping of the material as a result of wind pressures and also to permit strains to be relieved in selected areas, particularly in proximity to the edges of the skin, where tears are most easily started.

It has heretofore been the practice to sew the high pressure hoses into pockets in the outer skin. This arrangement has a number of disadvantages, a particular disadvantage being that it is impossible to replace a defective framework hose whilst the building is erected.

According to one aspect of the present invention the skin of an inflatable building of the present type is held against movement in a direction transverse to the arched framework hoses, i.e. against movement in the lengthwise direction of the building, by means of a pair of draw cords, held in a continuous pocket or series of loops, positioned close to each framework hose. These draw cords permit the outer skin to be tightened down on each side of the arched framework hoses and this is effective to hold the outer skin against movement in a direction transverse of such framework hoses.

Further aspects of the present invention relate to developments in the construction of inflatable buildings of the present type both with a view to improving the tensioning of the outer skin close to the framework hoses and also with a view to imposing tensions on the outer skin to relieve the strains in the skin at selected areas, particularly tension strains along the edges of the skin and along the sides of sliding clasp fasteners, which may be used at the edges of door and window flaps.

According to another aspect of the invention the strain along an edge of the fabric skin may be relieved by providing on a draw cord guide, either a sleeve or series of loops, close to the edge, the draw cord guide being slightly bowed away from the edge, so that when a draw cord in the guide is tightened up, it relieves strain in the skin, in a direction parallel to its own length, particularly in the area between the edge of the skin and the draw cord guide. It is found to be particularly advantageous to provide a slight hump in the middle of the stitch line, which joins the sleeve guide to the outer skin on the inner side of the curve of the draw cord guide, so that the tension force set up as a result of tensioning the draw cord and acting in a direction substantially perpendicular to the draw cord is to a considerable extent concentrated to an area near the middle of the edge, because the draw cord will only exert a tensioning effect in the skin where it is pressing against the inner side of the curved guide and the hump in the stitch line will hold the draw cord out of contact with such edge for a considerable distance on both sides of the hump.

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The principle of this aspect of this invention may be used to relieve the strain along the side edges of the skin, which are positioned close to the ground between the parallel transverse arched hoses, which form the frame of the building. By relieving the strain along the edges of the skin extending between adjacent frame hoses, the edges remain much straighter in use and therefore form a better seal with the ground. At the same time the draw cords in their curved guides have the effect of producing a transverse tension in the fabric skin in the area between adjacent frame hoses and this has the effect of decreasing the flapping of the skin.

It will be appreciated that the middle section of an inflatable building of the present class is comprised of a skin supported by a series of parallel hoses, inflated to a high pressure and thus caused to assume an arched configuration, usually substantially semi-circular.

To obtain the largest ground coverage in relation to the size of the framework, the ends of the building are made sloping and it is desirable to provide door openings in such sloping ends, whilst at the same time being able to maintain adequate tension in the end of the building to prevent excessive flapping when the building is shut down to afford protection against the wind.

The same principle of controlling the tension in selected areas of the skin by using draw cords in curved guideways is applied to the construction of the ends of the structure for the above indicated purpose.

Reference is hereinafter made to the accompanying drawings, in which:

FIGURE 1 is a perspective view of one end of an inflatable building,

FIGURE 2 is a similar side view, and

FIGURE 3 is a detail of the draw cords in the skin close to a framework hose.

In FIGURE 1 the position of two arched frame hoses is indicated at 1 and the skin 2 is tensioned transversely by means of draw cords positioned in guides in the skin close to the arched hoses and along the bottom edge of the skin, as already described.

The end of the building is composed of a panel 3, which in effect forms a simple continuation of the skin 2. Into the panel 3 is set a pair of sloping end panels 4, which are respectively connected to small vertical end panels 5.

The panel 3 is maintained suitably tensioned by means of a draw cord 6, which is positioned in a guide sleeve, which follows round the curved edge of the panel 3 at its junction with the sloping end panels 4. The ends of the draw cord 6 are secured to suitable anchorages, such as spikes, driven into the ground and thus the draw cord 6 contributes to the longitudinal stability of the building.

Draw cords 7 are positioned in slightly curved guide sleeves 7' near the adjacent edges of the panels 4 and, when tightened, serve to tension the panels 4 transversely and to provide longitudinal stability for the building. The tightening up of the draw cords 7 takes transverse tension off a sliding clasp fastener 8, which joins the two panels 4, so that this does not become damaged by wind forces and furthermore may readily be opened or closed, because of the lack of transverse tension on it.

Further sliding clasp fasteners 9 (only one shown) are provided at the junction between the panels 3 and 4, and it will be seen that by opening one or all of the sliding clasp fasteners 8 and 9, the panels 4 may be folded back to form a variety of end openings. It will be appreciated that it is necessary to release the appropriate draw cord 7 before a panel 4 can be folded back from the line along which the panels 4 are normally connected to each other.

As is usual with inflatable buildings of the present type the ends of the high pressure hoses are held in shoes 11, which are spiked to the earth or held in position in any

other suitable manner, so as to hold the hoses 1, which may be inflated to a pressure as high as 100 lbs./square inch, in their arched condition. Tensions along the edges of the panels 2 and 3 adjacent to the ground may reach high instantaneous values because of the tendency of such edges to flap, unless steps are taken to reduce the build up of tensions along such edges. If the panels 2 are tensioned transversely of the building it has the effect of making the edges of the panel 2 quite slack. To achieve this result curved guides 12 are provided in the skin for draw cords, which are tightened up and secured to suitable anchorages, which may be the shoes 11 themselves or spikes driven into the ground close to the feet.

The tensioning of the skin over the arched framework hoses 1 to hold the skin against movement in the longitudinal direction of the building is effected by means of draw cords in guides 14, these draw cords being also preferably anchored to the shoes 11, which are provided with integral eyes or the like for the purpose. Referring to FIGURE 3 it will be seen that the guides 14 are formed by sewing fabric straps 15 to the panels 2 to form tubular guides 16, within which the draw cords may be pulled tight. This has the effect of tightening down the skin over the hoses 1, so that it effectively lies in a shallow trough in the skin as shown in FIGURE 3. It also has the effect of tensioning the panels 2 in the longitudinal direction of the building. Thus the combined effect of the draw cords in the guides 12 and 14, when tightened up, is to stress the panels 2 in directions at right angles and thus to hold the skin from excessive flapping under wind pressures and to hold the skin against movement in relation to the framework hoses.

I claim:

1. An inflatable building comprising first and second arched inflatable hoses spaced from each other, a sheet of material extending over said hoses to form the outer skin of the building and having an unsupported section spanning the space between said hoses, first and second draw cord guide means secured to said sheet closely adjacent each side of said first hose, third and fourth draw cord guide means secured to said sheet closely adjacent each side of said second hose, draw cords positioned in each of said draw cord guide means so that the tensioning of said draw cords after said hoses are inflated draws said sheet down over and partially around and outwardly of the inner surface of said hoses to hold said sheet against movement in a direction transverse to the hoses and to tension said spanning sheet portion in the direction transverse to said hoses.

2. An inflatable building according to claim 1 wherein said spanning section of said sheet has an edge adjacent one end of said hoses, fifth draw cord guide means are secured to said sheet along an arcuate path lying adjacent said edge at said hoses and curving away from said edge between said hoses, and a draw cord is positioned in said fifth guide means so that the tensioning of the last mentioned draw cord places tension on said sheet portion in a direction parallel to said hoses whereby the spanning sheet portion may be tensioned in two directions simultaneously.

3. An inflatable building comprising an arched framework formed of a plurality of inflatable hoses adapted to withstand high internal pressure, a sheet of material extending over said framework to form the outer skin of the building, draw cords closely adjacent each side of at least one of said hoses and in parallel relation thereto, means slidably securing said draw cords to said sheet so that tensioning of said draw cords draws said sheet down over said hose to hold said sheet against movement in a direction transverse to said hose, at least one sliding clasp fastener in said sheet to provide an opening therein and having first and second ends, curved

draw cord guide means extending from adjacent said first end of said fastener to adjacent said second end of said fastener along an arcuate path curving away from said fastener between said ends, and a draw cord positioned in said last mentioned guide means so that tensioning thereof protects said fastener from tension strain acting thereon.

4. An inflatable building comprising an arched framework formed of a plurality of inflatable hoses spaced at intervals and substantially parallel to each other; a skin covering said framework to define an enclosed space under said framework; draw cord means for holding said skin against movement transversely of said hoses forming said framework; said skin including a central section covering said framework, a sloping horseshoe shaped end panel assembly having a curved inner end adjacent said central section and having an outer end facing away from said central section, and an intermediate section forming a continuation of said central section interconnecting said central section and said end panel assembly; first draw cord guide means provided adjacent the line of connection of said end panel assembly and said intermediate section, a first draw cord extending from anchors external of said building through said guide means so that tensioning of said draw cord produces tension in said intermediate section of said skin closure means providing a longitudinally extending opening in said end panel assembly, second and third draw cord guide means on either side of said opening extending from adjacent said outer end of said panel assembly to adjacent said inner end of said panel assembly along arcuate paths curving away from said opening between said ends of said end panel assembly, and second and third draw cords extending from anchors external of said building through said second and third guide means respectively so that tensioning thereof tensions said end panel assembly while protecting said closure means from the effects of the tension strain in said end panel assembly.

5. An inflatable building comprising an arched framework formed of a plurality of inflatable hoses adapted to withstand high internal pressure, a sheet of material extending over said framework to form the outer skin of the building, closure means providing an elongated opening in said sheet having first and second ends, first and second curved draw cord guide means extending from adjacent said first end of said opening to adjacent said second end of said opening along arcuate paths on either side of said opening and curving away from said opening between said ends, and draw cord means positioned in said guide means so that tensioning thereof protects said closure means from the effects of tension strain in said sheet transverse of said opening.

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