

June 23, 1953

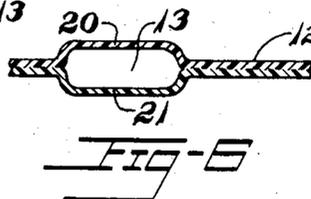
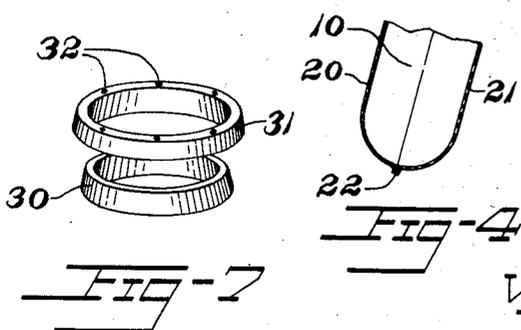
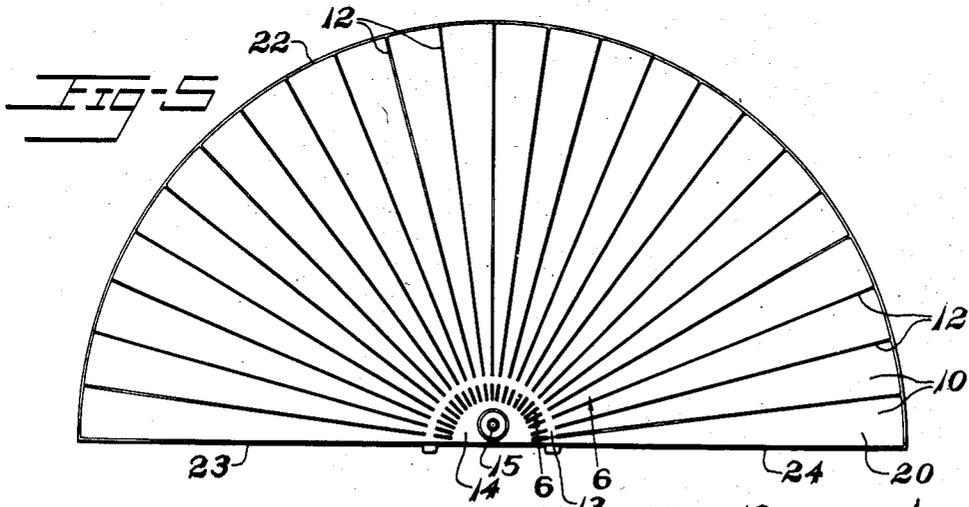
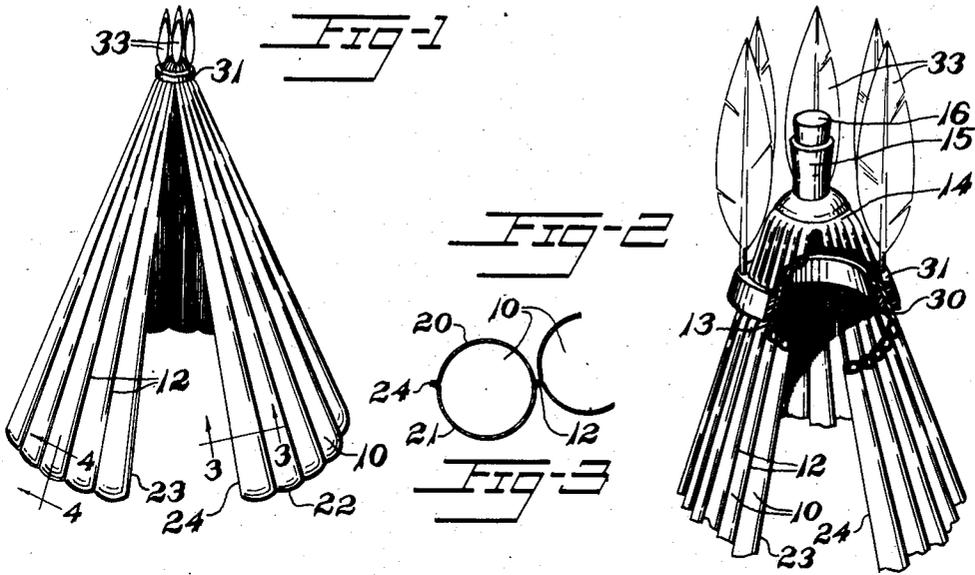
V. H. HASSELQUIST

2,642,883

WALL STRUCTURE

Filed Feb. 1, 1949

2 Sheets-Sheet 1



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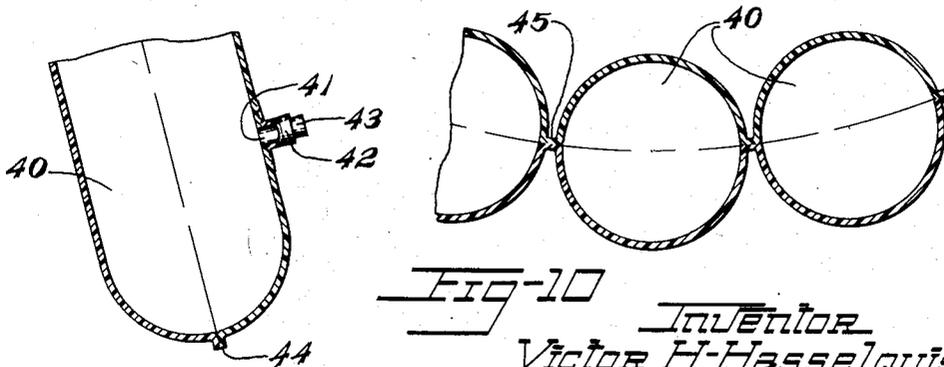
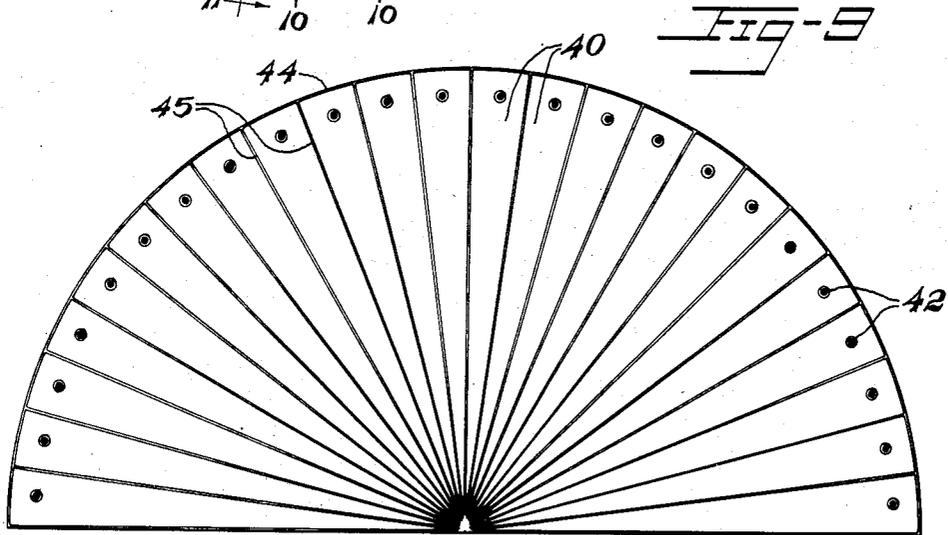
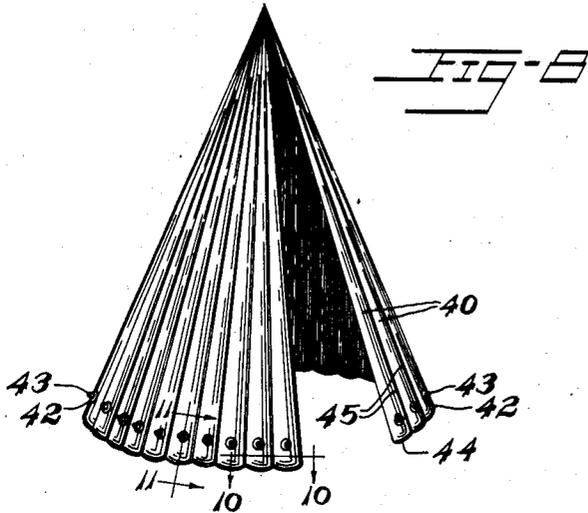


FIG-11

FIG-10

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UNITED STATES PATENT OFFICE

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WALL STRUCTURE

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12 Claims. (Cl. 135-1)

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This invention relates to walled structures of limp pliable material and is especially useful in the construction of tents and other enclosures although features of the invention are also useful in other walled structures.

Limp, pliable sheet material such as polymerized vinyl chloride compositions is resistant to the effects of sunlight and being waterproof has been found desirable for use in the construction of tents and other walled structures exposed to the weather. Such structures have usually required supporting frames of stiff material which have added considerable weight and bulk to the structure and have involved difficulties in transportation of the structure.

It is an object of the present invention to provide a self-supporting wall structure, eliminating supporting frames.

Other objects are to provide a wall structure capable of being stiffened by inflation, to provide cooperation of stiffening in different portions of the walls, to provide a strong self-supporting structure, to provide for simultaneous inflation of all parts of the structure, to provide for sealing the inflation medium from portion to portion, and to provide bracing of one portion from another.

These and other objects will appear from the following description and the accompanying drawings.

Of the drawings,

Fig. 1 is a perspective view of a tent structure corresponding to and embodying the invention.

Fig. 2 is a similar view to a larger scale showing the top of the tent, portions being broken away and portions shown in section.

Fig. 3 is a sectional view, taken on line 3-3 of Fig. 1.

Fig. 4 is a sectional view, taken on line 4-4 of Fig. 1.

Fig. 5 is a plan view of the tent in uninflated condition.

Fig. 6 is a sectional view, taken on line 6-6 of Fig. 5.

Fig. 7 is a perspective view of the clamping or sealing rings.

Fig. 8 is a perspective view of a modified form of the invention.

Fig. 9 is a plan view of the uninflated tent.

Fig. 10 is a sectional view thereof taken on line 10-10 of Fig. 8.

Fig. 11 is a sectional view thereof, taken on line 11-11 of Fig. 8.

Referring to the drawings, and first to Figs. 1 to 7 thereof, these illustrate a walled-structure

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of limp pliable sheet material arranged to provide a shelter or tent of conical form, the wall of which comprises a series of connected inflatable elongate pockets 10 of conical shape having their larger ends at the base of the tent and their small ends at its peak. The pockets 10 are united to each other along line 12 at their opposite margins throughout their lengths except that the pockets are connected to each other near their smaller ends by a manifold 13 and also at their small ends to a pocket 14 having a tubular extension 15 for simultaneous inflation of the pockets. Union of the sheet material between the manifold 13 and the pocket 14 prevents distortion of the peak unduly under inflation. A plug 16 may be provided for closing the tubular extension and prevent return of the inflation medium.

The walls of the pockets are of flexible and pliable impervious sheet material capable of holding air under pressure and may be of soft rubber or other rubber-like material. Preferably the walls are of plasticized polymerized vinyl chloride or other pliable film material resistant to exposure to sunlight and oxidation.

In the manufacture of the tent, two sheets 20, 21 of the pliable film material are cut to the developed shape of the conical structure as shown in Fig. 5 and are superimposed and joined to each other about their arcuate margins 22 and radial margins 23-24 and also along radial lines to provide seams 12. While such seams may be made by cementing, they are preferably formed by heat seaming the film material along the desired lines by application of heat and pressure. The radial seams may be interrupted in the region of the manifold 13. One of the sheets of material has been perforated near the center of curvature and the tubular extension secured thereto about the perforation before the sheets are seamed to each other to provide for inflating the pockets.

To provide for closing off the pockets from each other after inflation of the tent and thereby avoid collapse of the entire structure in case of puncture of a pocket, a pair of clamping rings 30, 31 are provided, ring 30 is tapered on its outer face and ring 31 is tapered on its inner face. After inflation of the walls of the tent, ring 30 may be placed within the tent near its peak at a position opposite the manifold 13 and ring 31 may be forced over the tent, the opposed tapered walls of the rings clamping the sheets 20, 21 against each other entirely about the rings over

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an area exceeding that of the manifold 13 and sealing the pockets from each other.

For decorative purposes, the ring 31 may be formed with cavities 32 for insertion of ornaments such as the feathers 33.

The entire article may be packed in a small space when deflated and when inflated requires no frame to support it as the pockets 10 assume a tubular shape, thereby stiffening the walls, and each stiffened pocket assists in bracing the others.

In the form of the invention shown in Figs. 8 to 11 inclusive, each tubular pocket 40 is of conical shape and is completely closed except for an inflation aperture 41 so that each pocket is sealed continuously against communication with the others. An inflation tube 42 is provided at each aperture and has a removable stopper 43 permitting individual inflation of the pockets. The walls of the tent are constructed of two sheets of impervious pliable material of the shape of the developed cone and are seamed to each other about their arcuate margins 44 and also along radiating lines 45 as with the structure of Fig. 1.

With either of the disclosed embodiments, inflation of the pockets stiffens the wall to such an extent as to prevent collapse of the wall and obviate the necessity of a supporting framework.

While the illustrated embodiments are tents of conical shape, it is to be understood that other types of enclosures having wall structures may be constructed in similar manner by seaming sheets of similar material to each other to provide elongate inflatable pockets to stiffen the structure.

Variations may be made without departing from the scope of the invention as it is defined by the following claims.

I claim:

1. A walled structure comprising a wall having a pair of pliable sheets, each sheet having the shape of a developed conical surface, said sheets being secured to each other along lines corresponding to straight elements of the cone and defining elongate pockets therebetween, means for inflating said pockets to stiffen said wall, and means for sealing said pockets when said wall is arranged in the shape of a conical enclosure, said means comprising a ring insertable within the conical enclosure near its apex, and clamping means adapted to clamp said wall to said ring.

2. A substantially conical walled structure having a base and an apex and comprising a plurality of limp pliable impervious sector-shaped sheets of material in superimposed relation, said superimposed sheets having an arcuate margin providing the base of said walled structure, said sheets being secured to each other about their margins and along spaced lines within their margins, said lines extending from the apex of the structure divergently toward its base and defining inflatable elongate pockets between the sheets, each pocket when inflated being thicker adjacent the base of the structure than toward the apex from one side of the wall structure to the opposite side, and means for inflating said pockets to stiffen the structure.

3. A substantially conical walled structure having a base and an apex and comprising a plurality of limp pliable impervious substantially semi-circular sheets of material in superimposed relation, said superimposed sheets having an arcuate margin providing the base of said walled structure, said sheets being secured to each other about their margins and along spaced lines with-

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in their margins, said lines extending from the apex of the structure divergently toward its base and defining inflatable elongate pockets between the sheets, each pocket when inflated being thicker adjacent the base of the structure than toward the apex from one side of the wall structure to the opposite side, said pockets communicating with each other adjacent the apex of the structure, and means at the apex of the structure for inflating the pockets.

4. A substantially conical walled structure having a base and an apex and comprising a wall having a plurality of limp pliable impervious sheets of material in superimposed relation, said sheets being secured to each other about their margins and along spaced lines within their margins, said lines extending from the apex of the structure toward its base and defining inflatable elongate pockets between the sheets, said pockets communicating with each other adjacent the apex of the structure, means at the apex of the structure for inflating the pockets, and means for sealing all of said pockets at a position near the apex of the structure, said sealing means comprising a pair of concentric nesting rings adapted to engage therebetween the material defining said pockets in clamping relation thereto.

5. A substantially conical walled structure having a base and an apex and comprising a plurality of limp pliable impervious substantially semi-circular sheets of plastic material in superimposed relation, said superimposed sheets having an arcuate margin providing the base of said walled structure, said sheets being adhered to each other about their margins and along diverging spaced lines within their margins, said lines extending from positions near the apex of the structure to its base and defining therebetween inflatable conical pockets connected to each other near the apex of the structure, the pocket when inflated being thicker adjacent the base than toward the apex from one side of the wall structure to the opposite side, and means for inflating said pockets to stiffen the structure for self-support.

6. A substantially conical walled structure having a base and an apex and comprising a plurality of limp pliable impervious substantially semi-circular sheets of plastic material in superimposed relation, said superimposed sheets having an arcuate margin providing the base of said walled structure, said sheets being adhered to each other about their margins and along diverging spaced lines within their margins, said lines extending from positions near the apex of the structure to its base and defining therebetween inflatable conical pockets connected to each other near the apex of the structure, the pocket when inflated being thicker adjacent the base from one side of the wall structure to the opposite side than toward the apex, one of said sheets having an inflation tube at said apex for inflating said pockets to stiffen the structure for self support.

7. A substantially conical walled structure comprising a plurality of limp pliable impervious sheets of plastic material in superimposed relation, said sheets being adhered to each other about their margins and along diverging spaced lines within their margins, said lines extending from positions near the apex of the structure to its base and defining therebetween inflatable conical pockets connected to each other near the apex of the structure, one of said sheets having an inflation tube at said apex for inflating said pockets to stiffen the structure for self support, and means for sealing said pockets from each

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other, said sealing means comprising a pair of concentric nested rings adapted to engage opposite surfaces of the wall near the apex of the structure in clamping relation thereto.

8. A walled structure comprising a plurality of tubular passages disposed side by side, the walls of which passages are of pliable sheet material united along lines which extend convergently relative to each other between the passages toward a common position on the structure, manifold means at said position for inflating said passages together, and means at said position for closing said passages against communication one with another.

9. A walled structure comprising a plurality of tubular passages disposed side by side, the walls of which passages are of pliable sheet material united along lines which extend convergently relative to each other between the passages toward a common position on the structure, a manifold passage extending transversely of said structure at said position of convergence, and means for closing said tubular passages against communication one with another.

10. A walled structure comprising a plurality of elongated inflatable tubular pockets formed of flexible sheet material, each pocket having a large end and a relatively smaller end and when inflated being wider adjacent said large end than at said smaller end, the several pockets being connected together side to side with all of the large ends of said pockets defining one margin of the walled structure and all of the smaller ends of the pockets directed toward another margin of the walled structure, and means for inflating the pockets.

11. A walled structure comprising a pair of superimposed sheets each the shape of a circular sector, the sheets being united together around

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their peripheral margins and also by a plurality of seams of equal width which extend radially of the sector-shaped sheets, each radial seam extending from the arcuate margin of the sheets to a portion adjacent the radial center of said arcuate margin of the sheets to define a plurality of inflatable pockets between the sheets, the structure being adapted to form a conical enclosure having said portion as the apex of the enclosure by flexing along said radial seams when the pockets are inflated.

12. A walled structure comprising a wall having a pair of superimposed pliable sheets each having a curved margin and a rectilinear margin chordwise thereof, said sheets being united to each other along their curved and rectilinear margins and along spaced-apart lines extending from their curved margin toward one position on the rectilinear margin thereof to define a series of inflatable pockets between said sheets, each pocket being large adjacent said curved margin and being progressively smaller along the length of said pocket to said position on the rectilinear margin, and means at said position connecting said pockets to one another for simultaneous inflation of said pockets.

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