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[54] **INFLATABLE STRUCTURE**
1 Claim, 6 Drawing Figs.

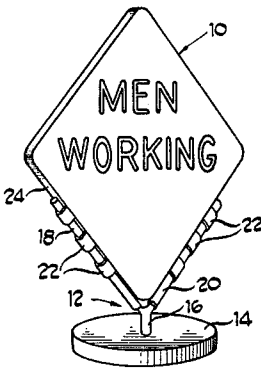
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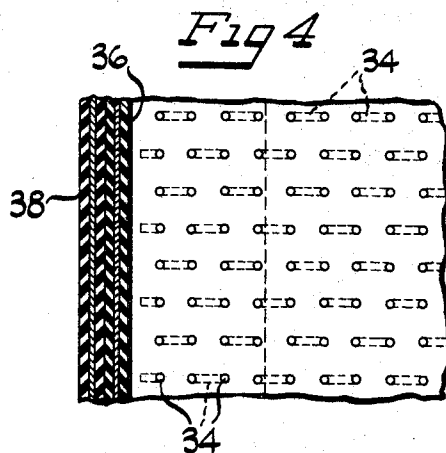
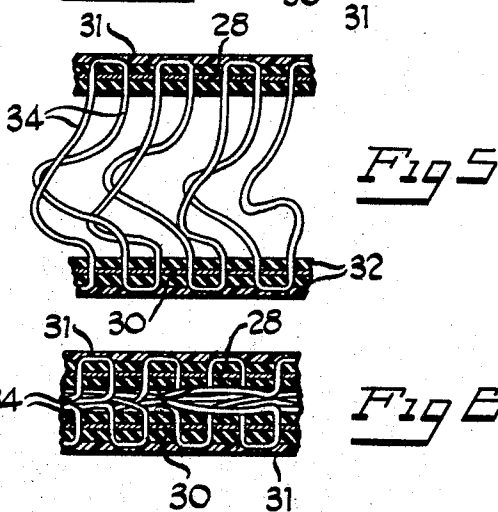
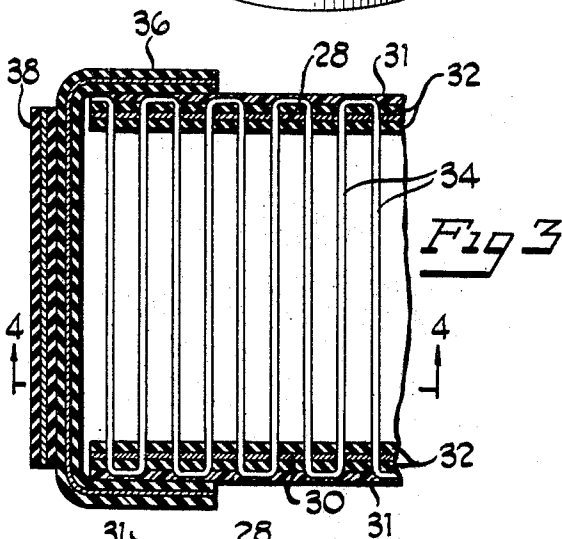
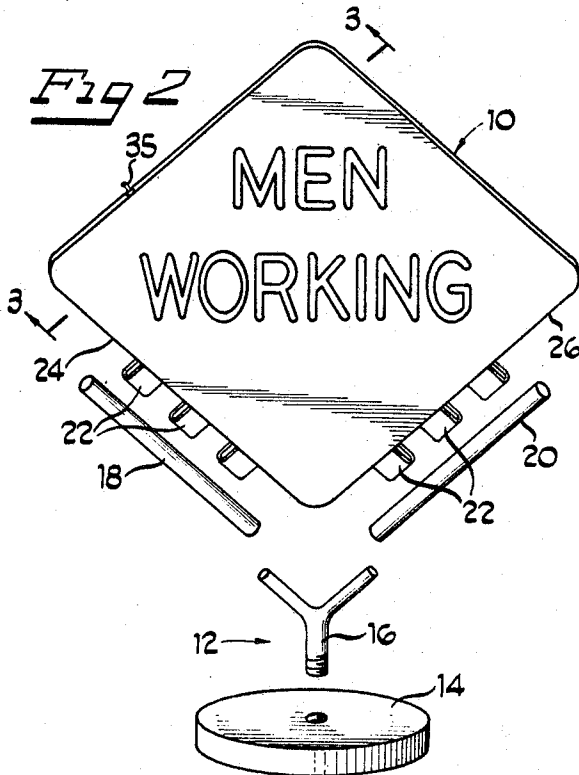
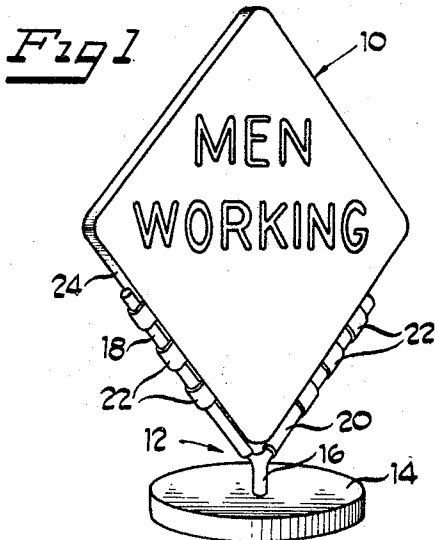
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ABSTRACT: An inflatable structure including fabric material formed to define a hollow body having a front and a back wall connected by a plurality of spaced apart threads of predetermined length extending between the walls to prevent ballooning upon inflation of the structure.





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INFLATABLE STRUCTURE

BACKGROUND OF THE INVENTION

This invention relates to an inflatable structure and more particularly to an inflatable structure for use as a highway warning device or similar form of danger or warning sign.

Conventional forms of barricades, signal supports, warning devices and the like generally are of a rigid construction, being formed of wood, metal or a heavy, durable plastic. While these devices are generally satisfactory for the intended purpose, they often are damaged or upset so that they cannot be seen nor can the indicia thereon be read.

In addition, these signs present a serious safety hazard in that they are often struck by passing automobiles and cause damage. In many cases they may be propelled by a striking vehicle causing damage to other property or causing bodily injury.

As a result, the industry has attempted to devise an inflatable sign which is stable and which eliminates the potential damage to person and property. Many have been devised, however, most have been generally unsatisfactory for one reason or another, and have not been accepted by the people responsible for their purchase and use.

Accordingly, it is an object of the present invention to provide an improved inflatable structure particularly suitable for use as a highway warning device or similar form of danger or warning sign.

SUMMARY OF THE INVENTION

Generally, the inflatable structure of the present invention is fabricated by sewing together sheets of a flexible material in a fashion such that air can be contained therein, while at the same time a rigid or semi-rigid surface, is provided thereon which is relatively flat.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the embodiments hereinafter described, and the scope of the invention will be indicated in claim.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an inflated structure exemplary of the present invention;

FIG. 2 is an exploded perspective view of the structure of FIG. 1;

FIG. 3 is a sectional view, taken generally along lines 3—3 of FIG. 2, enlarged to illustrate the threads sewn into the coated fabric;

FIG. 4 is a sectional view, taken along lines 4—4 of FIG. 3, illustrating the arrangement of the threads;

FIG. 5 is a partial sectional view, taken generally along the lines 3—3 of FIG. 2, illustrating the threads when the structure is only partially inflated; and

FIG. 6 is a partial sectional view like FIG. 5, illustrating the threads when the structure is deflated.

DETAILED DESCRIPTION

Referring now to the drawing, in FIGS. 1 and 2 there is shown an inflated structure 10 which is in the form of a road sign or the like and which illustrates the principles of the present invention. The structure of sign 10 is affixed to the mounting 12 so as to be held in a vertically disposed position. The illustrated sign 10 is generally square-shaped, however, it will be apparent from the description below that the signs can be of numerous other shapes and configurations such as rectangular, triangular, circular and the like.

As can be best seen in FIG. 2, the mounting 12 has a base 14 having sufficient weight to vertically support the sign 10. The base 14 may be circular, as illustrated, or any other suitable shape. Affixed to the base 14 is a Y 16 which is adapted to receive the ends of two Y extensions 18 and 20. The Y extensions 18 and 20, in turn, are adapted to slidably extend through straps 22 affixed to the edges 24 and 26 of the sign 10, to support the sign. A mounting for the sign like the mounting 12 is preferably used, for reasons set forth more fully below, however, other types of mounting also can be used to vertically or otherwise support the sign 10. Furthermore, an open pocket or the like can be provided on the edges such as the edges 24 and 26 of the sign 10 instead of the straps 22, for receiving a portion such as the Y extensions of the mounting to support the sign, if desired.

The sign 10 is fabricated of two sheets of fabric 28 and 30, preferably nylon or Dacron, which are pre-cut to a desired shape and are coated with an uncured, resilient, heat-sealable material 32 such as neoprene rubber. The two fabric sheets 28 and 30 are sewn together preferably using nylon or Dacron thread 34. Approximately 100 stitches or threads per square inch or more are used, and these threads are made a particular consistent length so that a predetermined spacing preferably approximately one inch is provided between the fabric sheets 28 and 30, as generally illustrated in FIGS. 3 and 4.

After the two fabric sheets 28 and 30 are sewn together in the manner described above, the neoprene rubber or other similar resilient, heat-sealable material is cured. Curing the same after the fabric sheets have been sewn together will seal the holes made by the sewing needle so that air can be contained therein.

A coating or film 31 preferably is affixed to the outer surface of the fabric portions 28 and 30 to improve their ability to absorb ultraviolet light and for use with fluorescent pigments. The coating or film can be, for example, fluorescent vinyl fabric or "Scotchlite" (registered trademark) film.

The edges of the sign 10 thereafter are reinforced by vulcanizing two strips of fabric 36 and 38 each of which is likewise coated with a resilient, heat-sealable material such as neoprene rubber about them. As can be best seen in FIG. 3, these strips 36 and 38 are affixed to the edges in a laminated fashion. That is, the first strip 36 is overlapped on each of the two coated fabric sheets and the second strip 38 is run lengthwise along the edges, atop the strip 36, as illustrated.

The straps 22, or an open pocket or other similar receiving means, next are sewn and then vulcanized to the edges 24 and 26 of the sign 10. The straps are sewn to the coated fabric strips 36 and 38 and reinforced in some suitable fashion, as by, for example, affixing in overlapping fashion small patches (not shown) of coated fabric over them, before vulcanizing.

The stitches or threads 34 are loose, as illustrated in FIGS. 5 and 6 wherein the sign 10 is shown partly inflated and deflated, respectively, until the sign is inflated. When inflated the threads become taut and keep the coated fabric sheets 28 and 30 from ballooning so that the sign 10 is straight and presents a semi-rigid or rigid surface or surfaces. Pressures of up to approximately 25 psi can be tolerated, however, pressures of 2 to 6 psi generally is all that is required to inflate the sign 10, for most applications. With the lower pressures, the sign 10 is flexible while the higher pressures make it more rigid. A valve such as the valve 35 is affixed to the sign 10, for both inflating and deflating it.

The sign 10 can be inflated in any suitable fashion, for example, using air tanks, air compressors, hand pumps, carbon dioxide (CO₂) tanks and the like. Carbon dioxide tanks which operate in the conventional method of pulling a lever which causes a punch to pierce a lead plug in the neck of the tank to release the carbon dioxide can be advantageously provided for use by law enforcement agencies, the military, civilian defense groups and emergency crews.

As indicated above, when a low pressure of 2 to 6 psi is used in the sign 10, it is flexible. Therefore, the sign will merely bend or fold, rather than topple over, when it is used in a

strong wind. The resilient coating on the fabric sheets **28** and **30** will cause a quick return from its bent or folded position so that it is generally disposed in an upright position. If the winds are exceptionally strong or violent, the Y extensions **18** and **20** are inserted only within the lowermost one of the straps **22** on the respective sides of the sign. The straps **22** control the bending or folding of the sign and, when the Y extensions **18** and **20** are inserted in only the lowermost ones of them, stability of the sign **10** is retained since strong impacts will merely cause it to fold, in some extreme cases, to an almost doubled-up position. These factors also permit signs of greater surface to be used since they are far more stable than conventional signs.

The sign **10** can also be made in any color and, furthermore, can be reflectorized by setting reflectorized beads, fluorescent pigments and the like in the coating thereon or by using reflectorized buttons or fluorescent pigment on the indicia applied thereto. Additionally, the construction of the inflatable portion of the sign, that is, the portion **10** may be utilized in numerous other applications such as air mattresses, cushioning devices, life rafts, or the like.

From the above description it is apparent that the signs **10** are easily assembled and inflated on the site. When deflated, they require a minimum amount of space for storage and/or transportation. Accordingly, they are far more compact than conventional signs and most inflatable signs. Furthermore, there is little, if any, danger of them destroying other property or injuring people.

It will thus be seen that the objects set forth above, among

those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above article without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claim is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

I claim:

1. A method of constructing an inflatable sign consisting of fabric sheet material comprising the steps of placing at least two fabric sheets in superimposed relation to each other to form a front and back surface of a predetermined configuration and an air impervious connecting fabric sheet disposed along the edge portions of said two fabric sheets to define a hollow body therebetween:

applying a coating of curable heat sealable material on said front and back surfaces;

stitching threads of a predetermined length between said front and back surfaces whereby said stitches determine the thickness between said surfaces; and

applying heat to said front and back surfaces to cure said heat sealable compositions applied thereto to seal said stitching from the air and thereby make it possible for the inflatable structure to retain air.

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