

[54] **INFLATABLE DISPLAY**

[72] Inventor: **Paul E. Yost**, 1000 Tomar Lane, Sioux Falls, S. Dak. 57105

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[51] Int. Cl. .... **G09f 21/12**

[58] Field of Search .... **40/126, 106.3, 215**

[56] **References Cited**

**UNITED STATES PATENTS**

|           |        |              |             |
|-----------|--------|--------------|-------------|
| 1,893,149 | 1/1933 | Picco .....  | 40/215 X    |
| 2,348,250 | 5/1944 | Gardner..... | 40/106.3    |
| 2,498,270 | 2/1950 | Hawley ..... | 40/125 UX   |
| 2,551,596 | 5/1951 | Haglund..... | 273/105.3 X |

**FOREIGN PATENTS OR APPLICATIONS**

|           |        |             |        |
|-----------|--------|-------------|--------|
| 1,038,366 | 9/1953 | France..... | 40/215 |
|-----------|--------|-------------|--------|

*Primary Examiner*—Robert W. Michell

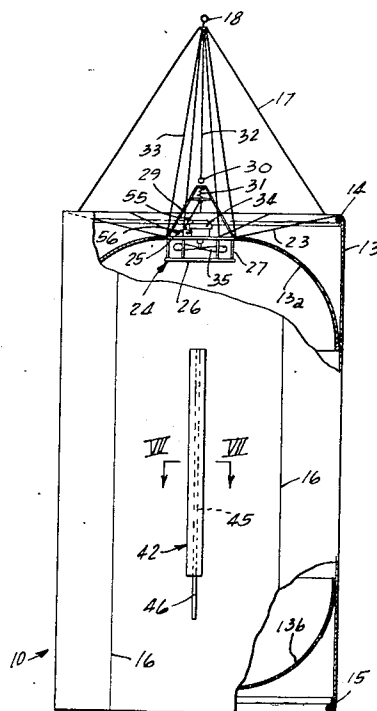
*Assistant Examiner*—Wenceslao J. Contreras

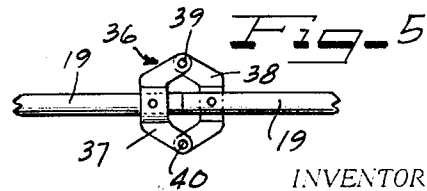
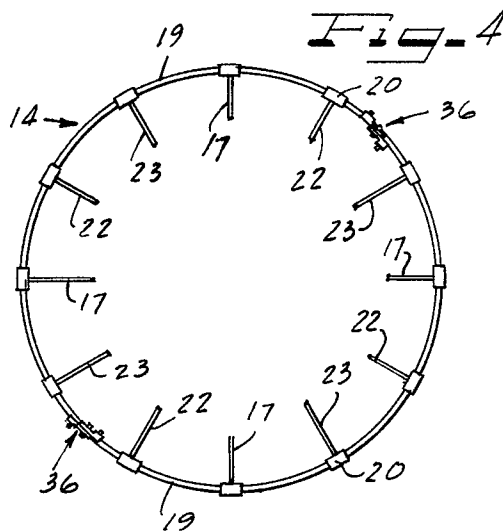
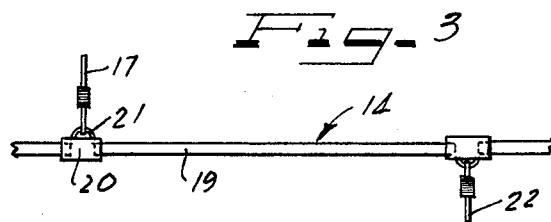
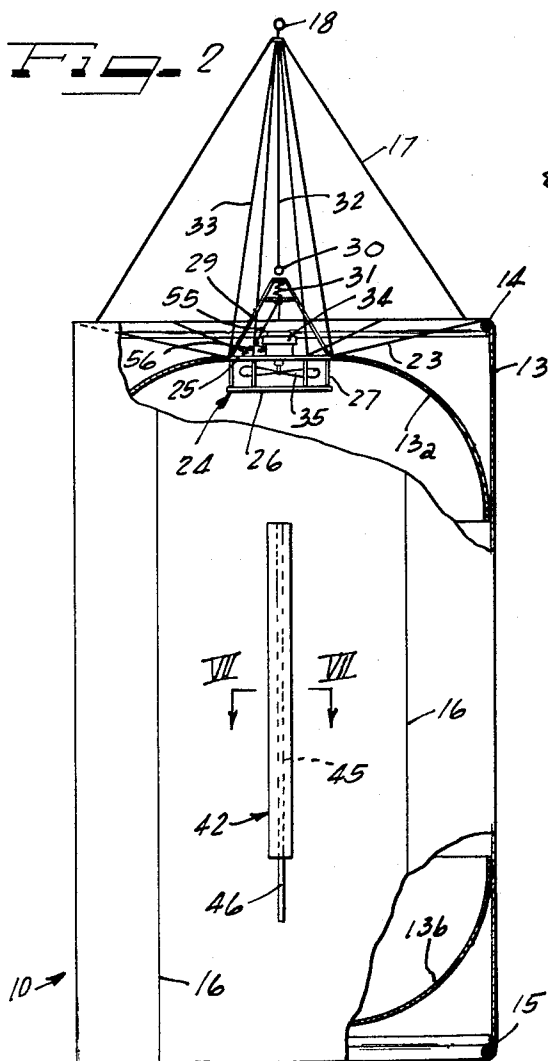
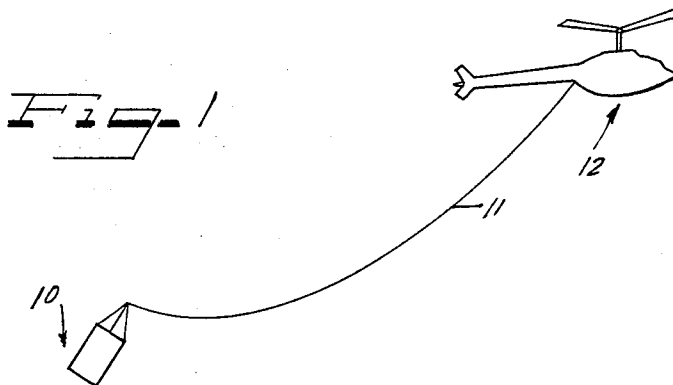
*Attorney*—Hill, Sherman, Meroni, Gross & Simpson

[57] **ABSTRACT**

An inflatable display employs apparatus for continuously blowing air into a bag-like member on which may be carried a selected advertisement. The blower apparatus and the bag-like member may be connected to a frame structure at the upper end of the tube, the frame structure being adapted for connection to a tow line of an airborne vehicle. The shape of the member forms a part of the advertisement, such as a can, a bottle, or character and in one embodiment includes an inner liner spaced from the ends of the tube so that the ends of the tube may retain the definite selected shape thereof and are prevented from taking on a ballooning appearance. The liner balloons within the tube but does not change the exterior shape thereof. In another embodiment the blower apparatus is connected to a manifold for distributing a flow of air to a plurality of side-by-side connected open-ended tubes which form a three-dimensional display. As a static display the inflated member is anchored to the ground to prevent movements which may be effected by the wind.

**20 Claims, 15 Drawing Figures**





INVENTOR.

PAUL E. YOST

BY *Hill, Sherman, Meroni, Gaudin* ATTORNEYS

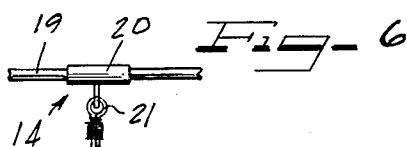


Fig- 8

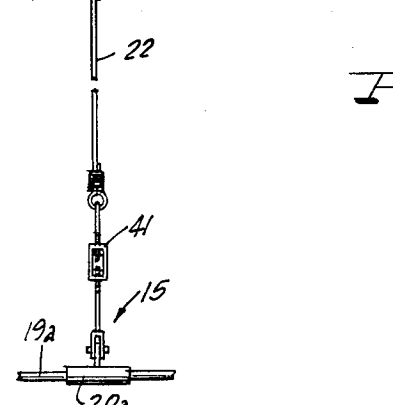
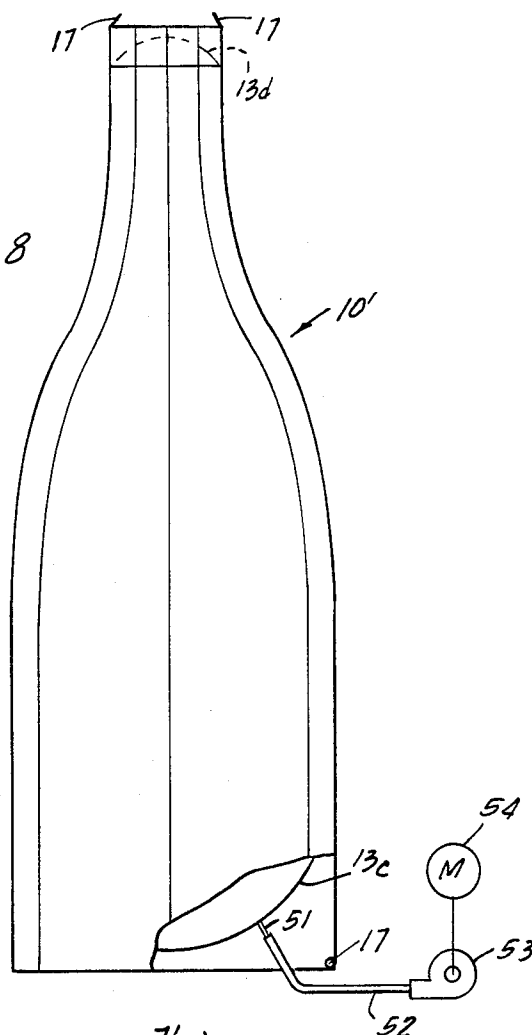


Fig- 7

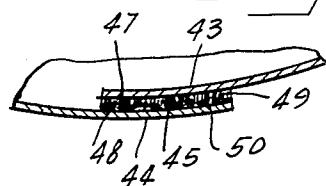


Fig- 9

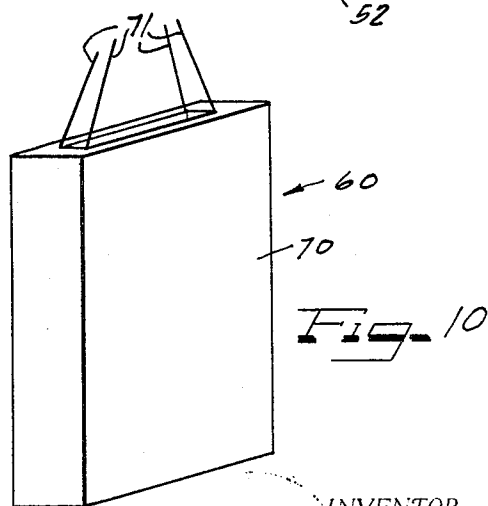
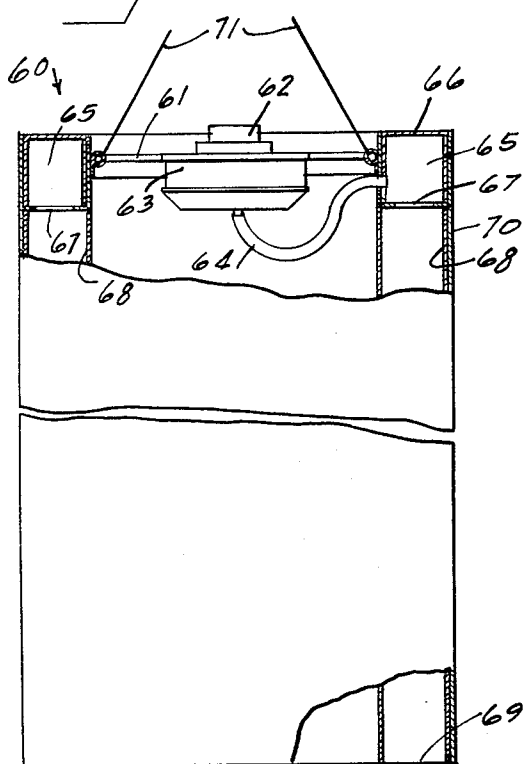


Fig- 10

INVENTOR.

PAUL E. YOST

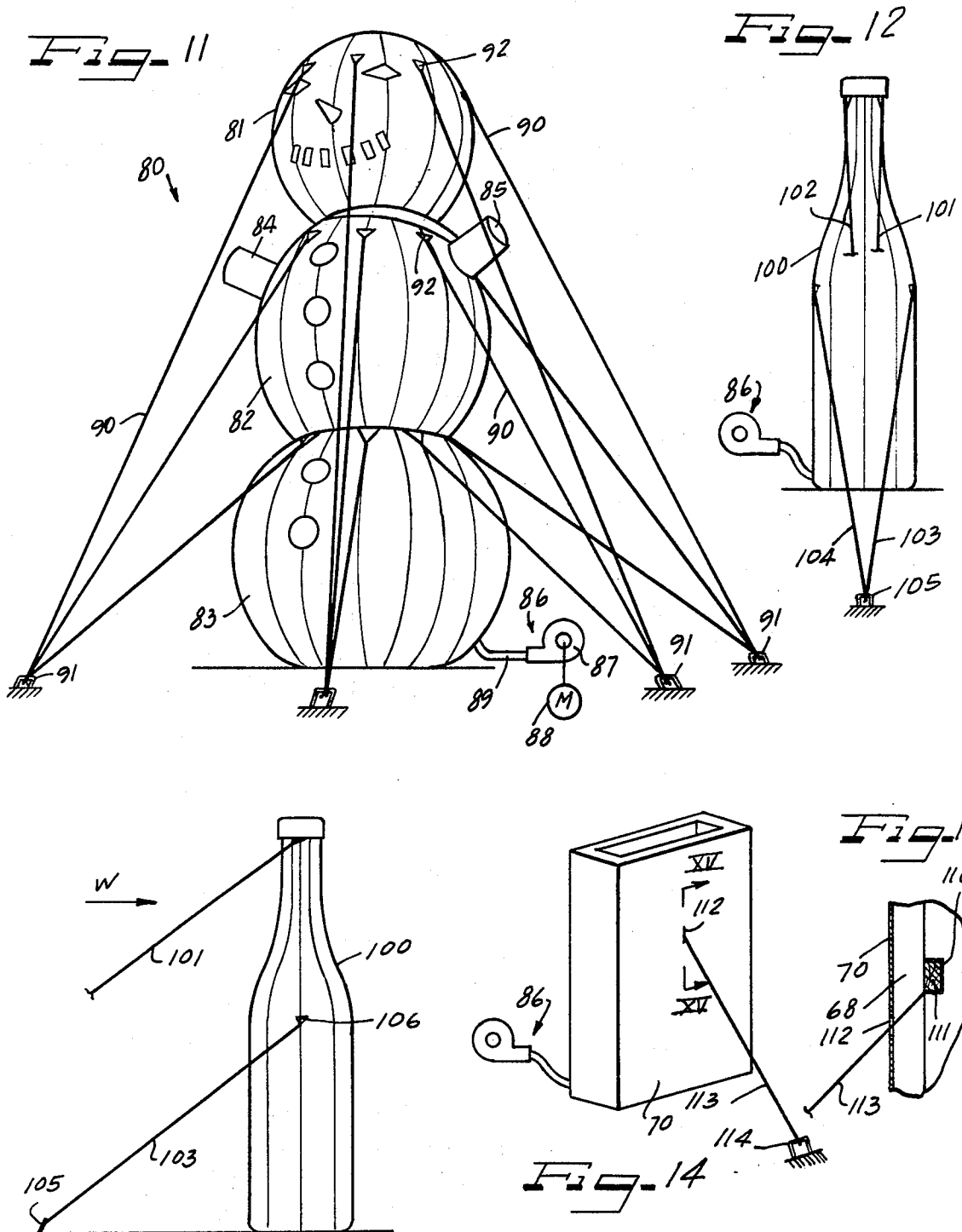


Fig. 13

INVENTOR.

PAUL E. YOST

BY *Will. Sherman, Meroni, Cross & Simpson* ATTORNEYS

## INFLATABLE DISPLAY

## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

This invention relates to inflatable displays and more particularly to displays which are being continuously inflated.

## 2. Description of the Prior Art

It is, of course, well known in the art to provide display signs and billboards, and to provide a banner in tow behind an airplane or other airborne vehicle. In addition, the art recognizes the use of balloons and dirigibles for carrying a display on the outer surface thereof.

Signs towed behind aircraft, for example, are limited to a certain extent to the amount of information which may be conveyed with respect to the sizes of lettering and altitude of flight while balloons are somewhat limited with respect to the number of observers. Dirigibles, particularly large dirigibles, may be utilized to combine the advantages of both airplane-towed signs and displays carried by balloons; that is, a large amount of information may be communicated to a large number of persons. However, the lack of a sufficient number of dirigibles renders this means of advertisement costly, or even unavailable.

It has been determined that a large amount of information may be communicated to an observer without the use of printed words if the observer is shown well-known shapes. Further, information may be communicated to the observer if the shapes are three-dimensional. Still more information may be conveyed to an observer by placing unique indicia, design, words or a combination thereof on a well known shape. For example, a manufacturer's name, initials, etc. on the shape of a can in which his product is normally sold, particularly coupled with the proper color relationships of the actual can, conveys a complete advertising message to an observer. Further, if such a display is constructed in gigantic proportions to the real item and placed adjacent a busy, well-traveled thoroughfare, or towed through the air, the display has a great attraction and provides an indelible message to a great number of observers.

## SUMMARY OF THE INVENTION

According to the invention, an inflatable three-dimensional display is provided; and the display is adapted to be towed by a line from an airborne vehicle. The display is preferred to be in the three-dimensional form of a recognizable character, or a container such as a can, bottle, box or other package.

In constructions of generally cylindrical configuration adapted for towing such as cans and bottles, the display apparatus comprises an elongate tube having a liner therein spaced from the ends of the tube. An upper frame structure is connected to the upper end of the tube and supports blower apparatus and cables for connecting the apparatus to a tow line. The blower apparatus is disposed in an opening of the liner to provide a continuous flow of air into the liner. The spacing of the liner from the ends provides for well defined ends which do not themselves balloon in that any ballooning affect due to the air pressure difference between the interior and the exterior of the liner occurs only at the liner and does not project past the ends of the tube. Therefore, the appearance of the flat ends are provided for the particular container depicted. Static displays, of course, do not require the inner liner as the supporting surface, the earth for examples, provides the desired flat appearance of the lower end of the tube.

Being flexible, the display apparatus may be easily folded for storage after use; however, a quick deflation of such a display is highly desirable so that air may be removed therefrom for storage. The invention therefore features apparatus for quickly deflating the structure which comprises a "tear" strand or rope disposed between overlapping releasably engaged gusset portions of the tube. If the display is airborne, upon landing the rope is pulled to tear open the side of the tube by disengaging the aforementioned gusset portions.

Airborne constructions which are to convey the appearance of a box or other rectangular parallelopiped, such as a cigarette package or a cereal box, employ a frame for suspending the display apparatus from a tow line and for carrying a blower. The inflatable portion of the structure, whether static or airborne, comprises a plurality of hollow tubes arranged side-by-side and covered with a material to provide the outer surface of the package. The blower apparatus is connected to a manifold which serves to continuously supply each of the tubes with a flow of air to maintain a pressure therein that is slightly greater than that of the surrounding air.

## BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features and advantages of the invention, its organization, construction and operation will be best understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a pictorial representation of display apparatus utilized in accordance with the principles of the present invention showing display apparatus being towed in flight by a helicopter;

FIG. 2 illustrates an embodiment of the invention showing in a side elevation with fragmentary sections display apparatus for representing a can-type cylindrical package;

FIGS. 3, 4, 5 and 6 are details of frame and cabling construction which may be employed in practicing the invention;

FIG. 7 is a sectional view taken along the line VII—VII of FIG. 2 illustrates apparatus which may be employed for providing a tear strip according to the invention;

FIG. 8 is an elevational view of display apparatus constructed in accordance with the invention, showing in a fragmentary section thereof the provision of apparatus for pre-flight inflation to aid in launching of the display apparatus;

FIG. 9 is an elevational view of another embodiment of the invention shown partially in fragmentary sections to illustrate the utilization of a plurality of tubes to form a display package and apparatus for supplying fluid flow to the plurality of tubes;

FIG. 10 is a pictorial illustration of the display apparatus of FIG. 9.

FIG. 11 is a pictorial representation of a static display of a well-known character;

FIGS. 12 and 13 are elevational views of a static display of a well-known bottle form specifically illustrating anchoring techniques;

FIG. 14 is a view of the box-like display of FIG. 9 anchored as a static display; and

FIG. 15 is a sectional view taken along the line XV—XV of FIG. 14 particularly illustrating apparatus for anchoring the display.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the drawings, there is generally shown a display apparatus 10 for connection to a tow line 11 of an airborne vehicle, the helicopter 12.

The display apparatus 10 generally comprises a flexible tube 13 having one end thereof connected to a frame 14 and the other end thereof connected to a frame 15. Extending the length of the tube 13 are a plurality of gussets, indicated at 16, formed of overlapping portions of the tube 13 and including therebetween cables 22 which connect frames 14 and 15.

A second plurality of cables 17 connect the upper frame 14 to an eye 18 which is provided to connect the display apparatus 10 to the tow line 11.

The upper frame 14 comprises a plurality of arcuate members 19 coupled together by coupling members 20 which receive the ends of the arcuate members 19. Each of the coupling members 20 includes a loop 21 secured thereto for connecting cables 17 and 22 to the upper frame 14.

A plurality of other cables 23 connect the frame 14 to a frame 24 at an upper ring-shaped member 25 thereof. The frame 24 further comprises a lower ring-shaped member 26

and a plurality of spacing members 27 which connect members 25 and 26.

A plurality of rigid straps 29 connect the ring member 25 to a spring-loaded eye-bolt 30 having a spring 31 surrounding its shank 28. A cable 32 connects the eye bolt 30 to the eye 18 to provide a resilient suspension for the frame 24. A plurality of other cables 33 suspend the ring member 25 from the eye 18.

A prime mover, preferably a motor such as used on lawnmowers, is mounted on the frame 24 and rotatably carries and powers a fan element 35 for continuously blowing air into the tube 13.

The immense size of the tube 13 would require a tremendous amount of air flow to provide a sufficient pressure, for example 1.5-3.5 inches of water, to maintain its cylindrical appearance without some form of air capture being provided. Therefore, sections 13a and 13b are connected to the inner surface of the tube 13 to form a lining therein which defines a continuously leaking air chamber. Either the lining 13a, 13b or the tube 13, or both, may include porous material for providing continuous fluid communication between the air chamber and the exterior of the display apparatus. The gussets forming the display are sewn together. Attention is invited that the sections 13a and 13b are disposed so as to lie inwardly of the ends of the tube 13 when the display apparatus is fully inflated so as to prevent a ballooning appearance at the bottom and top of the apparatus which would destroy the intended effect to display a can or similar container. Ballooning does occur, but only within the tube 13 at the sections 13a and 13b. 4 ounce nylon has proven advantageous for inflation and may be coated with a rubber base coating, urethane, or the like.

Referring specifically to FIGS. 3, 4, 5 and 6, it can be seen that the frame 14 comprises a plurality of arcuate members 19 connected together by coupling members 20 to define the circular cross-section of the display apparatus 10. It will further be appreciated that the frame 14 has connected thereto three separate series of cables 17, 22 and 23. Cables 22 lie within the gussets 16 and connect the frame 14 and the frame 15; cables 17 connect the frame 14 to the eye 18; and cables 23 connect the frame 14 to the ring member 25 of the frame 24. The frame 15 is similarly constructed from a plurality of arcuate members 19a and coupling members 20a; however, the frame 15 does not carry any cables other than cables 32 connected thereto. All of the cables mentioned above may be provided with means for adjusting the links thereof, as required; such a turn buckle 41 being shown in connection with the cable 22 and the lower frame 15 in FIG. 6. However, a turn buckle will generally not be required in connection with a gusset cable 22 but is more apt to be required in connection with cables 17, 23 and 32, but not being shown with respect to those cables for reasons of clarity in the drawings.

In constructions where a gravity feed-type prime mover, such as mentioned above, is employed a cable 55 is connected to the shank 28 of the eye bolt 30, passed through a resilient link 56 which is secured to the frame 24 and connected to the motor 34. The cable 55 transmits the tension on cable 32 to the motor 34 as a means of maintaining the motor, and particularly its gas tank, in a generally horizontal position for gravity operated fluid flow.

The flexibility of the tube 13 and the sections 13a and 13b is advantageous for storage of the display apparatus upon deflation thereof; however, upon landing, even after motor 34 ceases to operate, a tremendous amount of air is maintained in the chamber defined by the inner lining. The display apparatus is therefore provided with a tear strip 42 for opening the side of the tube 13 and permitting rapid deflation of the chamber. The tear strip 42 comprises a pair of overlapping gusset portions 43 and 44 having disposed therebetween a strand or rope 45 with an end 46 hanging freely from the tear strip to be grasped by the hand of an operator. The portions 43 and 44 have disposed thereon releasably engaging cloth zipper material in cooperating pairs 47, 48 and 49, 50 such as is commonly sold under the mark "Velcro." As the lower end of the display apparatus nears or touches the ground, an operator

pulls the end 46 of rope 45 to tear open the tube 13 by disengaging the cooperating portions 47-50. Tube 13 may then be folded as it is lowered.

In addition to the fabric of the display apparatus being folded, the frame 14 and the frame 15 are also provided with apparatus for folding at diametrically opposed portions by means of hinge apparatus 36. The hinge apparatus 36 comprises a pair of C-shaped members 37 and 38. One pair of legs of each member 37 and 38 is pivotally connected by a pin 39 while the other pair of legs is releasably connected by a pin 40. Therefore, removal of the pin 40 permits the frame to be folded into a semi-circular form. This is true for both the upper and lower frames.

Before a display apparatus of the type described herein is connected to a helicopter for towing and before the prime mover 34 is operable, it is sometimes advantageous to lift the display apparatus into a fully extended condition and preinflate or partially inflate the tube. This is of particular advantage where elongate tubes are used, such as illustrated in FIG. 8 to depict a bottle-type structure. In FIG. 8 the display apparatus may have substantially identical construction as previously illustrated and discussed and is generally indicated by the reference numeral 10'. The display apparatus includes cables 17 for adapting the display to be connected to a tow line and an inner liner referenced 13c and 13d illustrated in an inflated and ballooned condition.

The section 13c includes an opening or intake nozzle 51 therein for connection to a discharge tube 52 which is in communication with a blower 53. The blower 53 is operated by a prime mover, illustrated herein as motor 54. As the display apparatus 10' is lifted to an extended length the blower 53 is operating to preinflate the apparatus.

Referring now to FIGS. 9 and 10 display apparatus 60 is illustrated as having the shape of a rectangular parallelepiped and generally comprises a frame 61, a motor 62 mounted on the frame and a plurality of side-by-side tubes 68. The frame 61 may be connected to a pole line by means of the cables 71.

The tubes 68 are connected side-by-side to form the generally rectangular shape of the apparatus 60 and may in themselves be rectangular in cross-section. Further, the tubes 68 may be covered by an outer sheet or film 70 to carry the indicia of the display.

The blower apparatus includes a motor 62 having a closed fan chamber 63 for feeding an outlet conduit 64 which is in communication with a manifold 65 connected to the upper end of each of the tubes 68. The blower apparatus therefore provides a fluid flow through the manifold to feed each of the tubes 68 by way of their respective openings 67 into the manifold to provide a fluid flow through the tubes and out the open bottom ends 69 thereof. The passage of air through the tubes 68 causes a higher pressure, for example 5 inches of water, within the tubes than on the exterior thereof to effect an inflating action and cause the apparatus to maintain the appearance of a rectangular parallelepiped. In this form of construction, the display apparatus may be advantageously utilized to advertise products which normally appear in rectangular boxes or packages, and an axial fan is used to obtain the greater required air pressure.

Referring now to FIG. 11, there is illustrated generally at reference 80 a stationary or static display formed in the shape of a well-known or easily recognizable character. The display comprises a plurality of shaped inflatable portions 81-85 connected in fluid communication with each other and with an inflation apparatus 86. The inflation apparatus 86 includes a blower 87 which is driven by a motor 88 to supply a flow of air through a tube 89 which is connected to the display portion 83. The inflation apparatus 86 has been constructed in one form by utilizing a 1 1/2 foot diameter axial type blower fan driven by a one horse motor.

The display is secured against the deleterious effects of the wind at selected points by a plurality of guy lines or strands 90 which are connected to the ground by anchors 91 and to the display by fanshaped means 92 which are sewn to the material

which forms the display. The fan-shaped means includes a plurality of layers of fabric and webbing and the guy lines 90 and the fan-shaped means 92 extend tangentially to the surface of the display so that tension is applied along the fabric of the display and peeling forces are prevented. This type of connection is advantageously employed where the curvature of the shaped display and the room available for guide lines are suitable. Referring to FIGS. 12 and 13, a tall display 100 in the shape of a bottle is shown in order to illustrate anchoring techniques where spherical surfaces, such as in FIG. 11, are not involved. Here, anchoring in only one direction against the force of the wind W is illustrated for convenience and clarity. A plurality of pairs of guide lines 101, 102 and 103, 104 are connected to respective anchors, such as anchor 105. At selected elevation points each of the pairs of guy lines, for example lines 103 and 104 are connected to opposite sides of the display 100 by connecting means 106 which may also be fan-shaped. The tension in the oppositely disposed guy lines has a horizontal component which places the material in tension and further provides a horizontal component directed oppositely to the direction of the force of the wind. There is also, of course, a vertical component, but the vertical component is maintained as small as possible in that the tension in the line is maintained at a minimum value in that such tension only has necessary to combat the effects of the wind is utilized, and the angle of connection is made as near to the horizontal as practically possible under the particular conditions at the installation site.

Referring to FIGS. 14 and 15, the package of FIGS. 9 and 10 is illustrated as it would be utilized for a stationary or static display. Here, a rigid member is secured within the hollow interior of the display for receiving anchoring connections. In the particular embodiment illustrated, at least one rigid member is received and supported in a corresponding sleeve 110 which is secured to the tubes 68 in the space formed by the array of tubes. A guy line 113 is connected to the rigid member 111 and extends between adjacent tubes 68 and through a slit 112 in the outer layer of material 70 for connection to an anchor 114. As many anchors and guy lines as necessary may be utilized with a corresponding number of slits 112 although only a single such anchoring connection is illustrated in FIG. 14.

FIGS. 12 and 14 diagrammatically illustrate the utilization of inflation apparatus 86 such as employed in FIG. 11, rather than the airborne type blower apparatus employed above for similar displays in order that the weight of the inflating equipment is removed from the top of a stationary display and so that such apparatus is more easily maintained. It is preferred that continuous duty electric motors be employed in the stationary displays in that little or no maintenance is required and the display may be continuously inflated over extended periods of time.

Generally, there has been described inflatable three-dimensional display apparatus for static display or adapted to be towed by a line from an airborne vehicle and capable of presenting a three dimensional message. Further, the apparatus includes means for compensating for ballooning of the inflated structures so that the structures may take on the desired appearance of a can, bottle, box, etc. In addition, apparatus has been provided for quick deflation of the display apparatus and apparatus for folding the display apparatus for storage.

It has further been discussed that it may be advantageous to preinflate or partially inflate display apparatus of the kind described herein prior to flight, and means for providing this inflation and its connection to the display apparatus where set forth.

As a static display the constructions are anchored to the ground against the force of the wind by guy lines or strands which are connected to the display either to the surface or internally of the display. Connections to the surface are effected at angles such that the material is placed in tension having horizontal component opposite to the direction of wind force.

Internal connection to a display is provided through slits in the outer cover for passing a guy line connected to an internal rigid member.

Many changes and modifications may be made in the invention by one skilled in the art without departing from the spirit and scope of the invention, and it is to be understood that I wish to include within the patent warranted hereon all such changes and modifications which may reasonably and properly be included within the scope of the appended claims.

What I claim is:

1. Display apparatus to be towed by a line from an airborne vehicle, comprising:

a flexible tube of selected length for carrying a display thereon, said tube including two ends;

means for suspending said tube from the tow line;

lining means forming an air chamber within said tube between and spaced away from said two ends and including fluid communication means for placing said air chamber in continuous communication with the atmosphere for continuous air leakage;

means forming an opening through said lining means to the air chamber;

inflation means mounted in said opening in said lining means operable to continuously inflate said continuously leaking lining means.

2. Display apparatus according to claim 1, wherein said means for suspending said tube from the tow line comprises:

a first frame connected to a first of said ends of said tube and having the same peripheral shape as said first end;

means for connecting said first frame to the tow line;

a second frame connected to a second of said ends of said tube and having the same peripheral shape as said second end; and

a plurality of gussets in said tube spaced about the periphery thereof and extending between said frames, each of said gussets including means connected to said frames.

3. Display apparatus according to claim 1, wherein said means for suspending said tube from the tow line comprises:

a frame having the same peripheral shape as one of said ends of said tube, and connected thereto, and means for connecting said frame to the tow line.

4. Display apparatus according to claim 3, comprising means connected to the other of said ends of said tube for weighing and holding said other end below said lining means during flight.

5. Display apparatus according to claim 4, wherein each of said frames includes a pair of hinges disposed diametrically thereacross for folding said frames for storage.

6. Display apparatus according to claim 5, wherein each of said hinges includes a pair of generally C-shaped members each having a first leg and a second leg, means pivotally connecting said first legs, and means for releasably latching said second legs.

7. Display apparatus according to claim 1, wherein said tube includes means for quickly opening said tube for fast deflation thereof.

8. Display apparatus according to claim 7, wherein said quick opening means includes first and second overlapping portions of said tube, means releasably connecting said overlapping portions, and a strand disposed between said first and second portions and having a portion extending to the exterior of said tube, said portion to be pulled by hand to effect a stripping open of said overlapping portions.

9. Display apparatus according to claim 1, wherein said inflation means includes a fan device for blowing air into the chamber and a prime mover for operating said fan device.

10. Display apparatus according to claim 1, wherein said lining means includes a lower end and means defining an opening in said lower end adapted for coupling to a preflight inflation supply.

11. Display apparatus to be towed by a line from an airborne vehicle, comprising

- a flexible structure for being towed through the air having flexible side walls including at least one flexible surface facing toward the direction of flight, said structure including at least one air passageway therein in communication with the atmosphere, power driven blower means connected to said structure for blowing air through said passageway to create a greater than atmospheric pressure therein, and tow line means for connecting said structure and air blowing means to a tow line from an aircraft, said tow line located so that said surface of said structure faces the direction of flight, said blower having a capacity to inflate the flexible structure with sufficient pressure to prevent collapse of the side walls and to prevent collapse of said surface facing in the direction of flight due to air resistance against said surface.
12. Display apparatus to be towed by a line from an air-borne vehicle, comprising
- a flexible structure including at least one air passageway therein in communication with the atmosphere, means connected to said structure for blowing air through said passageway to create a greater than atmospheric pressure therein, and means for connecting said structure and air blowing means to the tow line,
- a plurality of air passageways in communication with the atmosphere, and
- a manifold connecting said plurality of passageways in communication with said air blowing means.
13. Display apparatus according to claim 12, wherein said frame includes hinge means for folding said frame for storage.
14. Display apparatus according to claim 12, wherein said frame includes a first section connected to one end of said flexible structure, and a second section connected to the other end of said flexible structure.
15. Display apparatus according to claim 12, wherein said

flexible structure includes an inner liner having at least a portion thereof formed of porous material for continuous leakage of air.

16. Display apparatus according to claim 12, wherein said air-blowing means includes a prime mover having a gravity-feed type fuel system, and said apparatus further comprises means for rigging said prime mover toward a predetermined orientation during flight to permit gravity fuel feed.

17. Display apparatus comprising: an inflatable member shaped as a replica of an object to be displayed, power driven blower means connected in fluid communication with said inflatable member continuously filling the member with air creating an inflating pressure within said member,

- a plurality of elongate tubes disposed adjacent one another to form said inflatable member, a rigid member secured to said tubes within said inflatable member, and guying strands for connection to the ground connected to said rigid member and extending between adjacent ones of said tubes.

18. Display apparatus according to claim 17, comprising: a an outer layer of material covering said tubes to provide a surface for carrying a display thereon,

- a1. said layer of material having slits therein for passing said guying strands therethrough.

19. Display apparatus according to claim 17, comprising a. a sleeve secured to said tubes for receiving and securing said rigid member.

20. Display apparatus according to claim 17, comprising:

- a. an outer layer of material covering said tubes,

- a1. said layer of material having slits therein, and

- a2. said guying strands extending through respective ones of said slits; and

- b. a sleeve secured to said tubes for receiving and supporting said rigid member.

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