

July 23, 1968

V. W. SPRINGER
FLOATING SCAFFOLD

3,393,769

Filed Sept. 13, 1966

3 Sheets-Sheet 1

Fig. 2

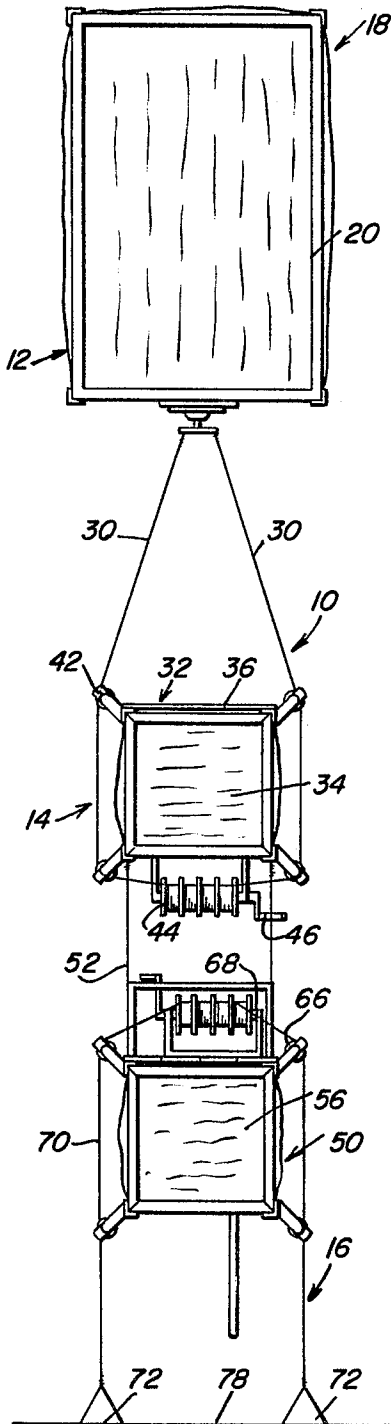


Fig. 1

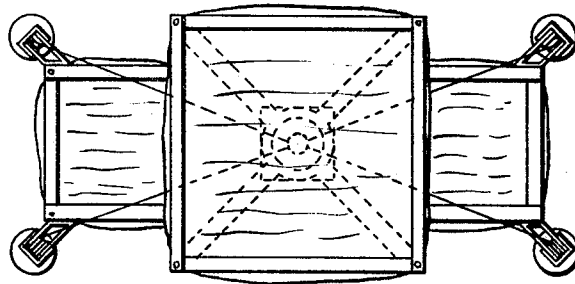


Fig. 5

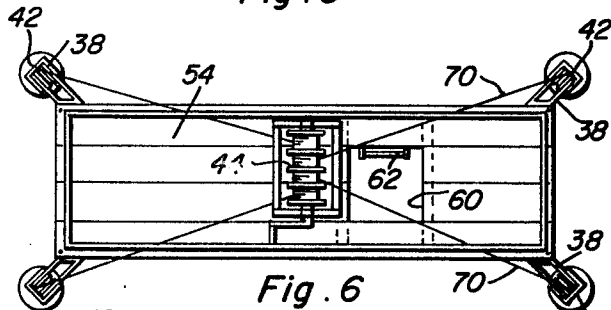
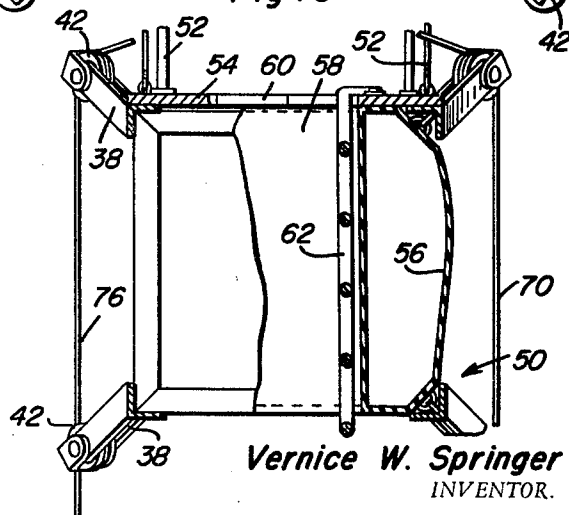


Fig. 6



Vernice W. Springer
INVENTOR.

BY *Alvin A. O'Brien*
and *Harvey B. Jackson*
Attorneys

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Fig. 3

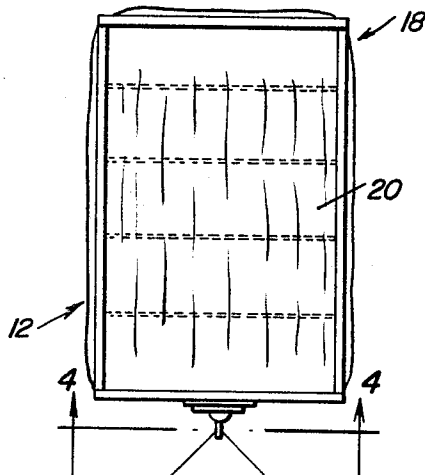
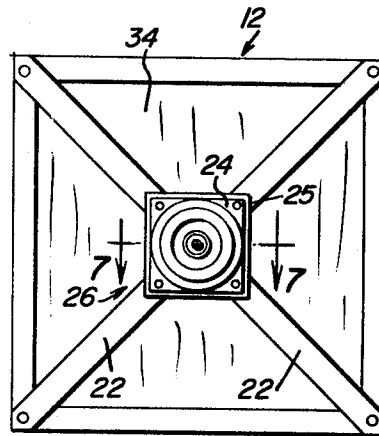
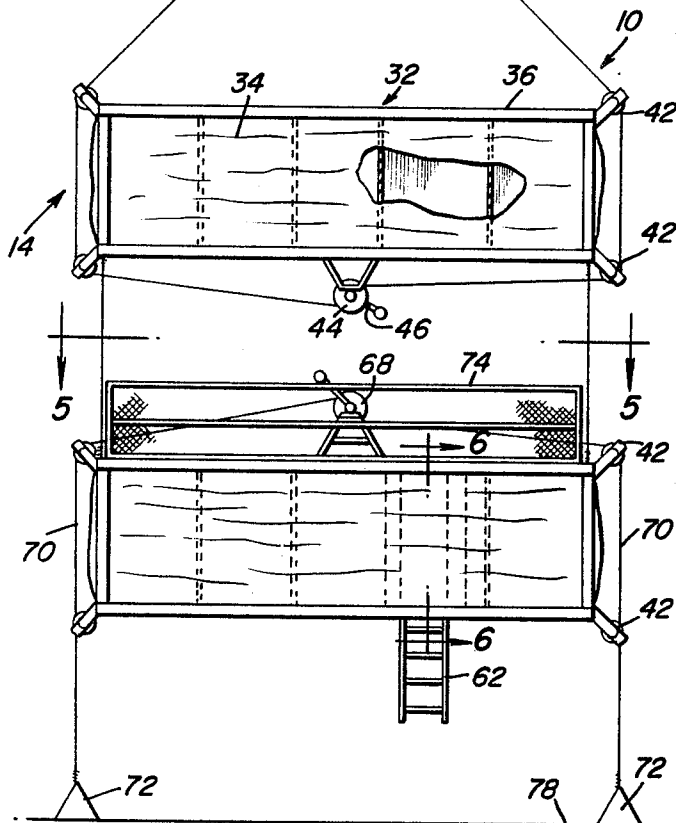


Fig. 4



Vernice W. Springer
INVENTOR.

BY *Oliver A. O'Brien*
and *Harvey B. Jordan*
Attorneys

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3 Sheets-Sheet 3

Fig. 8

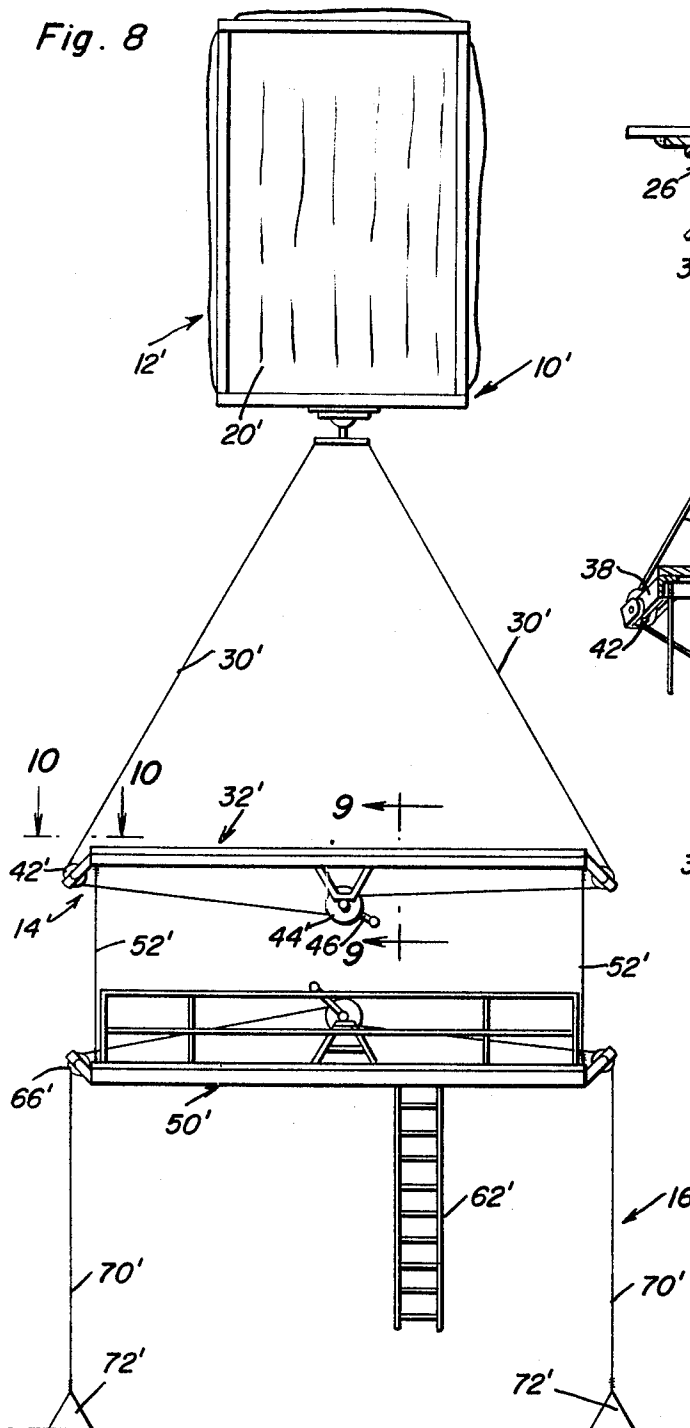


Fig. 7

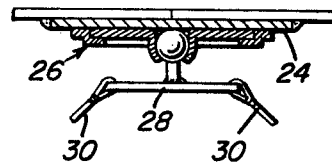


Fig. 9

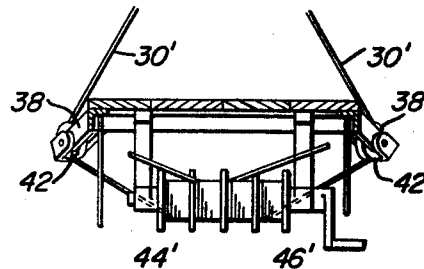
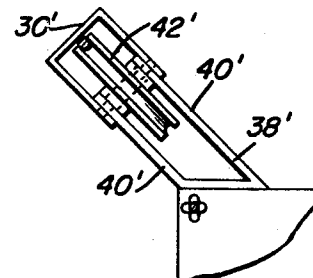


Fig. 10



Vernice W. Springer
INVENTOR.

BY *Clarence A. O'Brien*
and *Harvey E. Jordan*
Attorneys

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3,393,769

FLOATING SCAFFOLD

Vernice W. Springer, 305 E. 62nd St.,
Shreveport, La. 71106

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ABSTRACT OF THE DISCLOSURE

A scaffold structure including an upper lighter-than-air buoyancy assembly beneath which a workman supporting structure is suspended by means of a plurality of suspension lines, the workmen supporting structure including a plurality of tethering lines depending downwardly therefrom adapted to be anchored to the ground over which the workmen supporting structure is disposed. The workmen supporting structure includes upper and lower sections with the lower section suspended from the upper section and the suspension lines from the lighter-than-air buoyancy assembly are anchored to winding means carried by the upper section of the workmen supporting structure while the upper ends of the tethering lines are anchored to winding means carried by the lower section of the workmen supporting structure, the winding means carried by the upper and lower sections being operable by workmen disposed on the lower section.

This invention relates to a novel and useful scaffold and more specifically to a scaffold for supporting workmen and which may be readily transported from one location to another. The scaffold of the instant invention includes an upper lighter-than-air buoyancy assembly from which a workmen supporting structure is suspended in a manner such that the workmen supporting structure may be adjusted in elevation relative to the buoyancy assembly.

The scaffold further includes tethering means in the form of a plurality of tethering lines having one set of corresponding ends secured to the workmen supporting structure and the other set of corresponding ends adapted to be anchored to the ground or supporting surface over which the structure is suspended by the lighter-than-air buoyancy assembly. Further, the workmen supporting structure includes winding means to which the adjacent ends of the tethering lines may be secured for simultaneous winding of the tethering lines thereon or unwinding of the tethering lines therefrom whereby the elevation of the workmen supporting structure relative to the remote ends of the tethering lines may be varied.

The lower ends of the tethering lines may have suitable weights secured thereto for tethering the scaffold in location and the weights may be such that they may be individually manually carried to another location. In addition, the weights may be assembled in a single location and lifted from the ground by means of conventional construction equipment of the mobile type such as a front loader and thereafter transported wherever desired, the floating scaffold automatically being transported to the new location above the anchoring weights as they are shifted from one location to another.

The workmen supporting structure of the scaffold includes upper and lower sections with the upper section being suspended from the air buoyancy assembly and the lower section suspended below the upper section and having the winding means supported thereon whereby the tethering lines are anchored at their upper ends to the lower section of the workmen supporting structure. Of course, the winding means carried by the lower section may be manually operated by workmen supported from the lower section and the upper section establishes a protective covering over workmen disposed on the lower

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section for protection against the elements and falling objects. Further, the upper section of the workmen supporting structure is suspended from the air buoyancy assembly by means of suspension lines extending therebetween and winding means is carried by the upper section and has the lower ends of the suspension lines operatively connected thereto in order that the elevation of the upper section and thus the workmen supporting structure may be varied relative to the air buoyancy assembly. Of course, the winding means of the upper section of the workmen supporting structure is disposed relative to the lower section of the workmen supporting structure in a manner such that the winding means for the upper section may be readily manually operated by workmen disposed on the lower section of the workmen supporting structure.

The suspension lines and tethering lines of the upper and lower sections are guidingly engaged by a plurality of guide means provided therefor carried by and spaced about the periphery of the corresponding workmen supporting structure section. In this manner, the workmen supporting sections may be maintained in a horizontally disposed position and yet be readily adjustable in elevation.

In addition to the floating scaffold utilizing a lighter-than-air buoyancy assembly for floating the workmen supporting structure above an anchoring surface, one or both sections of the workmen supporting structure may also include at least portions thereof which are lighter-than-air and which therefore will buoy up at least a portion of the weight of the corresponding section of the workmen supporting structure.

The main object of this invention is to provide a scaffolding constructed in a manner whereby it may be readily transported from one location to another on an individual job site.

Yet another object of this invention, in accordance with the immediately preceding object, is to provide a scaffolding which may be readily collapsed into an extremely compact state for transportation from one job site to another.

A further object of this invention is to provide a scaffolding of the floating type utilizing at least one portion thereof which is lighter-than-air and may be filled with a gas lighter-than-air supplied by a service vehicle provided for the scaffold and including air pump and gas storage means whereby the gas within the lighter-than-air buoyancy assembly thereof may be pumped therefrom and into storage chambers whenever it is desired to collapse the scaffold and transport the latter from one location to another, the service truck also being capable of carrying the non-inflatable portions of the scaffold during its transportation from one job site to another.

A final object of this invention to be specifically enumerated herein is to provide a floating scaffold in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble-free in operation.

These together with objections and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a top plan view of one embodiment of the floating scaffold;

FIGURE 2 is a side elevational view of the scaffold illustrated in FIGURE 1;

FIGURE 3 is a front elevational view of the scaffold illustrated in FIGURES 1 and 2 with parts of one of the

workmen supporting sections broken away to more clearly illustrate the internal structural details thereof;

FIGURE 4 is an enlarged horizontal sectional view taken substantially upon the plane indicated by the section line 4—4 of FIGURE 3;

FIGURE 5 is a horizontal sectional view taken substantially upon the plane indicated by the section line 5—5 of FIGURE 3;

FIGURE 6 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 6—6 of FIGURE 3;

FIGURE 7 is a fragmentary enlarged sectional view taken substantially upon the plane indicated by the section line 7—7 of FIGURE 4;

FIGURE 8 is a front elevational view of a modified form of floating scaffold;

FIGURE 9 is an enlarged transverse vertical sectional view taken substantially upon the plane indicated by the section line 9—9 of FIGURE 8; and

FIGURE 10 is an enlarged fragmentary horizontal sectional view taken substantially upon the plane indicated by the section line 10—10 of FIGURE 8.

Referring now more specifically to the drawings, the numeral 10 generally designates one embodiment of the scaffold of the instant invention. The scaffold 10 includes an upper lighter-than-air buoyancy assembly generally referred to by the reference numeral 12, a generally horizontally disposed workmen supporting structure generally referred to by the reference numeral 14 which is suspended beneath the assembly 12, and tethering means generally referred to by the reference numeral 16 operative to tether the scaffold 10 to a suitable surface or structure.

The lighter-than-air buoyancy assembly 12 includes a lightweight supporting and confining frame generally referred to by the reference numeral 18 and an inflatable flexible bag 20 provided with suitable gas inlet and outlet value means (not shown). The bag 20 is enclosed and confined within the light frame 18 and the latter includes crossed members 22 extending diagonally across the lower portion of the frame 18. The crossed members 22 have an anchoring plate 24 secured thereto in any convenient manner such as by welding 25 and the plate 24 has a swivel structure generally referred to by the reference numeral 26 secured thereto. The swivel structure 26 includes a swivelly supported mounting plate 28 to whose outer peripheral portions four suspension lines 30 are secured at their upper ends.

The workmen supporting structure 14 includes a support frame generally referred to by the reference numeral 32 in which an inflatable bag 34 similar to the bag 20 is enclosed. The frame 32 is of lightweight construction and includes an imperforate upper wall 36 for protection of the bag 34.

The four corners of the upper portion of the frame 32 as well as the four corners of the lower portion of the frame 32 are provided with bifurcated mounts 38 between whose furcations 40 suitable guide pulleys 42 are journaled. Still further, the underside of the frame 32 has a winding member 44 journaled therefrom. The winding member 34, in addition to having four separate winding sections thereon, is provided with a suitable hand operable crank 46 and also suitable lock means (not shown) for maintaining the winding member 44 against rotation.

The suspension lines 30 extend downwardly from the mounting plate 28 and pass about corresponding pairs of guide pulleys 42 and then to the corresponding winding portions or sections of the winding member 44 whereby the effective length of the suspension lines 30 may be readily simultaneously varied as desired upon rotation of the winding member 44.

The workmen supporting structure 14 additionally includes a lower support frame generally referred to by the reference numeral 50 and which is suspended beneath the frame 32 by means of suspension wires 52 extending be-

tween corresponding corner portions of the lower and upper portions of the frame 32 and 50, respectively. The frame 50 is substantially identical to the frame 32 except that it is provided with a workmen supporting flooring 54 in lieu of a top wall or panel such as panel 36 and an air bag 56 is contained within the lightweight frame 50 and has a vertically extending passage 58 defined therethrough with which an opening 60 formed in the flooring 54 is registered. A ladder assembly 62 extends through the passage 58 and may be utilized by workmen to gain access to the flooring 54 from beneath the frame 50, the frame 32 and 50 comprising upper and lower sections, respectively, of the workmen supporting structure 14.

The frame 50 includes guide pulleys 66 which are similar to the guide pulleys 42 and a winding member 68, supported from the flooring 54, similar to the winding member 44. The tethering means or assembly 16 includes four tethering lines 70 having their upper ends suitably connected to appropriate sections of the winding member 68 and passed over corresponding pairs of the guide pulleys 66. The lower ends of the tethering lines 70 have suitable weights 72 secured thereto and each of the weights, if desired, may be of such a weight so as to enable each to be individually manually transported from one location to another when the scaffold 10 is erected as illustrated in FIGURES 2 and 3 of the drawings.

The frame 50 includes a railing structure 74 which extends around the upper marginal portions of the frame 50 and thereby encloses an area above the flooring 54 for safety of any workmen which may be supported from the flooring. Further, the winding members 44 and 68 are each manually actuatable by a workman disposed on the flooring 54. Accordingly, a workman supported from the workmen supporting structure 14 may readily raise and lower the latter relative to the lighter-than-air buoyancy assembly 12 and the supporting surface 78 such as the ground on which the weights 72 rest.

The upper and lower sections 32 and 50 of the workmen supporting structure 14 may be fully or only partially floated or buoyed up by means of the lighter-than-air gas disposed within the bags 34 and 56. Of course, the desired combined buoyancy of the bags 20, 34 and 56 will be determined by the weight of the entire scaffolding 10 and the weight of the workmen or equipment which may be supported from the workmen supporting structure 14.

With attention directed now more specifically to FIGURES 8—10 of the drawings there may be seen a scaffold generally referred to by the reference numeral 10' and which includes component parts corresponding to similar components of the scaffold 10 and which have therefore been given corresponding reference numerals in the prime series.

The major difference between the scaffolds 10 and 10' is that the workmen supporting structure 14' does not include any lighter-than-air portions. Instead, the frame 32 is replaced by an even lighter frame 32' and the frame 50 has been replaced by a frame 50' which is also lighter than the frame 50. Further, inasmuch as the frames 32' and 50' are not of any great vertical height, the frame 32' includes only four guide pulleys 42' corresponding to the guide pulleys 42 and the frame 50' includes only four guide pulleys 66' corresponding to the pulleys 66. In addition, since the frame 50' may be readily mounted from the side, the ladder 62' may be secured to one edge portion of the frame 50' instead of extending through a vertically disposed passage formed through the frame 50'.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equiva-

lents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A floating scaffold comprising an upper lighter-than-air buoyancy assembly, a generally horizontally disposed workman supporting structure of a given plan shape, suspension lines suspending said structure beneath said assembly a spaced distance therebelow, a plurality of tethering lines having one set of corresponding ends thereof anchored to said structure and engaged with peripherally spaced portions thereof, the other set of corresponding ends of said tethering lines being adapted to be anchored to the ground over which said structure is suspended by said assembly, said structure including mean operative from said workman supporting structure to vary the effective length of said suspension lines and said tethering lines.

2. A floating scaffold comprising an upper lighter-than-air buoyancy assembly, a generally horizontally disposed workman supporting structure of a given plan shape, suspension means suspending said structure beneath said assembly a spaced distance therebelow, tethering means including a plurality of tethering lines having one set of corresponding ends thereof anchored to said structure and engaged with peripherally spaced portions thereof, the other set of corresponding ends of said tethering lines being adapted to be anchored to the ground over which said structure is suspended by said assembly, said structure including generally horizontal upper and lower sections, said suspension means suspending said upper section from said assembly, said lower section being suspended from said upper section in vertically spaced relation thereto, said suspension means including means operative to vary the vertical distance between said upper section and said assembly, said tethering lines having said one set of corresponding ends anchored to said lower section, said tethering means including means operative to vary the effective length of said tethering lines from said other set of corresponding ends thereof to said lower section.

3. The combination of claim 2 wherein at least one of said upper and lower sections includes lighter-than-air portions operative to at least partially buoy up the weight of said one section.

4. The combination of claim 2 wherein said upper and lower sections each includes a lighter-than-air portion operative to at least partially buoy up the weight of the corresponding section.

5. The combination of claim 1 wherein the last-mentioned means includes tethering line winding means, said one set of ends of said tethering lines being secured to said winding means for winding thereon.

6. A floating scaffold comprising an upper lighter-than-air buoyancy assembly, a generally horizontally disposed workman supporting structure of a given plan shape, suspension means suspending said structure beneath said assembly a spaced distance therebelow, tethering means including a plurality of tethering lines having one set of corresponding ends thereof anchored to said structure and engaged with peripherally spaced portions thereof, the other set of corresponding ends of said tethering lines being adapted to be anchored to the ground over which said structure is suspended by said assembly, said structure including tethering winding means, said one set of ends of said tethering lines being secured to said tethering winding means for winding thereon, a plurality of tethering guide means carried by spaced peripheral portions of said structure, said tethering winding means being disposed inwardly of an area bound by said tethering guide means, said tethering lines, intermediate said tethering winding means and said other set of ends thereof, being guidingly engaged by the corresponding guide means for longitudinal shifting of said tethering lines relative to said tethering guide means upon winding on and un-

winding said tethering lines from said tethering winding means.

7. The combination of claim 1 wherein said suspension means includes a plurality of suspension lines having one set of corresponding ends thereof anchored to said assembly and the other set of ends anchored to said structure.

8. A floating scaffold comprising an upper lighter-than-air buoyancy assembly, a generally horizontally disposed workman supporting structure of a given plan shape, suspension means suspending said structure beneath said assembly a spaced distance therebelow, tethering means including a plurality of tethering lines having one set of corresponding ends thereof anchored to said structure and engaged with peripherally spaced portions thereof, the other set of corresponding ends of said tethering lines being adapted to be anchored to the ground over which said structure is suspended by said assembly, said suspension means including a plurality of suspension lines having one set of corresponding ends thereof anchored to said assembly and the other set of ends anchored to said structure, said structure including a plurality of suspension guide means carried by spaced peripheral portions of said structure, suspension winding means, said one set of ends of said suspension lines being secured to said winding means for simultaneous winding thereon and unwinding therefrom; said suspension lines, intermediate said suspending winding means and the other set of ends thereof, being guidingly engaged with said suspension guide means for longitudinal shifting of said suspension lines relative to said suspension guide means upon winding on and unwinding said suspension lines from said suspension winding means.

9. The combination of claim 8 wherein said structure including tethering winding means, said one set of ends of said tethering lines being secured to said tethering winding means for winding thereon, a plurality of tethering guide means carried by spaced peripheral portions of said structure, said tethering winding means being disposed inwardly of an area bound by said tethering guide means, said tethering lines, intermediate said tethering winding means and said other set of ends thereof, being guidingly engaged by the corresponding guide means for longitudinal shifting of said tethering lines relative to said tethering guide means upon winding on and unwinding said tethering lines from said tethering winding means.

10. The combination of claim 9 wherein said structure includes upper and lower sections, said lower section being suspended beneath said upper section with the latter comprising a shield for the former, said tethering winding and guide means being carried by said lower section and said suspension winding and guide means being carried by said upper section.

11. The combination of claim 10 wherein said tethering and suspension winding means are positioned relative to said sections so as to be adapted to be hand operable by a person supported on said lower section beneath said upper section.

12. The combination of claim 11 wherein at least one of said upper and lower sections includes lighter-than-air portions operative to at least partially buoy up the weight of said one section.

13. The combination of claim 12 wherein said upper and lower sections each includes a lighter-than-air portion operative to at least partially buoy up the weight of the corresponding section.

14. The combination of claim 1 wherein said suspension means is connected to said lighter-than-air buoyancy assembly for rotation of said buoyancy assembly about vertical axis relative to said suspension means.

15. The combination of claim 2 wherein said upper and lower sections each includes a lighter-than-air portion operative to at least partially buoy up the weight of the corresponding section, said upper and lower sections each including a collapsible lightweight frame enclosing a predetermined area and an inflatable bag held re-

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movably captive within said area by said collapsible frame.

16. A scaffold comprising an upper assembly supported in elevated position, a generally horizontally disposed workman supporting structure of a given plan shape, suspension means suspending said structure beneath said assembly a spaced distance therebelow, tethering means including a plurality of tethering lines having one set of corresponding ends thereof anchored to said structure and engaged with peripherally spaced portions thereof, the other set of corresponding ends of said tethering lines being adapted to be anchored to the ground over which said structure is suspended by said assembly, said structure including tethering winding means, said one set of ends of said tethering lines being secured to said tethering winding means for winding thereon, a plurality of tethering guide means carried by spaced peripheral portions of said structure, said tethering winding means being disposed inwardly of an area bound by said tethering guide means, said tethering lines, intermediate said tethering winding means and said other set of ends thereof, being guidingly engaged by the corresponding guide means for longitudinal shifting of said tethering lines relative to said tethering guide means upon winding on and unwinding said tethering lines from said tethering winding means.

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17. The combination of claim 1 wherein the last-mentioned means includes a first suspension line winding means and second tethering line winding means carried by said workman supporting structure.

18. The combination of claim 17 wherein said workman supporting structure includes upper and lower sections, said suspension lines suspending said upper section from said assembly, said lower section being suspended from said upper section in vertically spaced relation thereto, said one set of ends of said tethering lines being anchored to said section winding means and the lower ends of said suspension lines being anchored to said first winding means, said first and second winding means being carried by said upper and lower sections, respectively, and being operable by a workman supported from said lower section.

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REINALDO P. MACHADO, *Primary Examiner*.