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Ray et al.

[11] **3,919,957**

[45] **Nov. 18, 1975**

[54] **FLOATING STRUCTURE AND METHOD OF RECOVERING ANCHORS THEREFOR**

[75] Inventors: **Donald R. Ray; James D. Bozeman,** both of Houston, Tex.

[73] Assignee: **The Offshore Company,** Houston, Tex.

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[52] **U.S. Cl.** ..... **114/.5 D;** 61/46.5

[51] **Int. Cl.²** **B63B 35/44**

[58] **Field of Search** ..... 9/8 P; 114/.5 D, .5 R, 114/121, 125, .5 F; 61/46, 46.5

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Primary Examiner—George E. A. Halvosa
Attorney, Agent, or Firm—Vinson, Elkins, Searls, Connally & Smith

[57] **ABSTRACT**

An improved floating structure suitable for use as a floating drilling platform having a tension mooring system of a plurality of anchors each with a depending skirt on its lower side, control passageways through the anchor to the area defined by the skirt, ballasting and deballasting means, and a plurality of cables connecting each anchor to the floating platform, tension monitoring and control devices associated with each cable to assure substantial equalization of tension in the cables, the anchor locking system to secure the anchors to the floating platform, the anchors having a total buoyancy to support the entire weight of the structure so that in transit a minimum structure is below the water, and a plurality of thrusters controlled to assist in accurate station keeping of the floating platform and in movements of the floating structure from and to moored location. The method of recovering the anchors which are connected to the floating platform having at least three legs by cables or chains which includes the steps of ballasting the floating platform to lower it in the water, tightening all of the cables or chains to a uniform tension, deballasting one of the legs of the platform to increase the tension in the connections to one of the anchors and thereby pull the anchor free of the bottom, similarly deballasting the platform to pull the other anchors free of the bottom, and lifting the anchors into engagement with the lower end of its platform leg.

21 Claims, 16 Drawing Figures

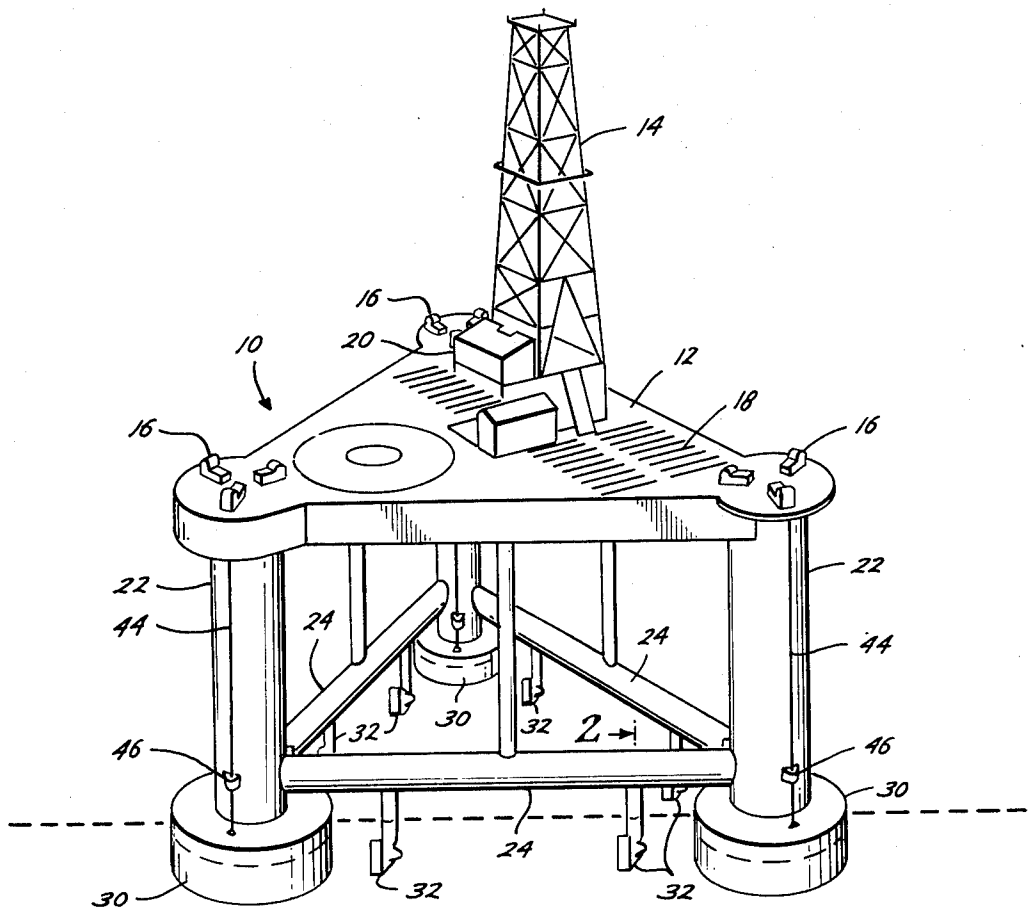
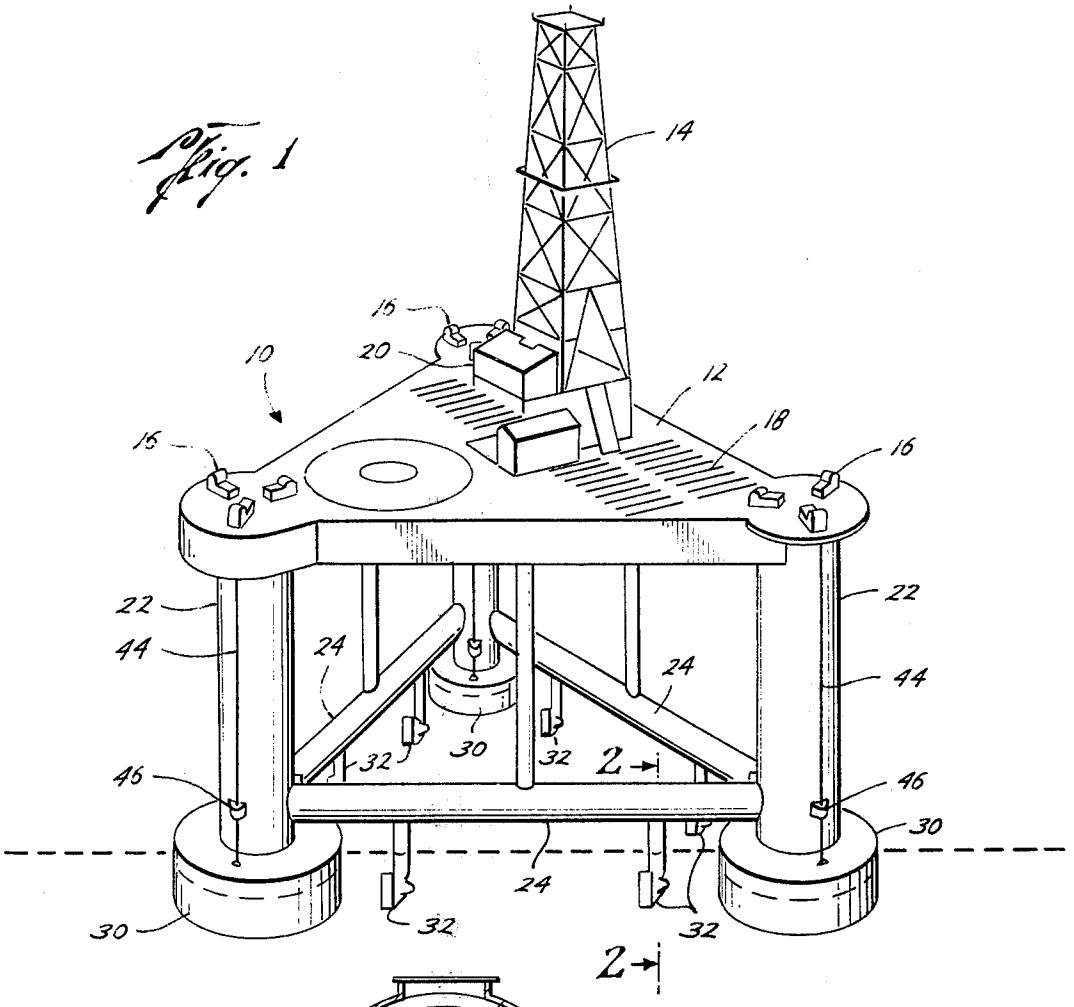


Fig. 1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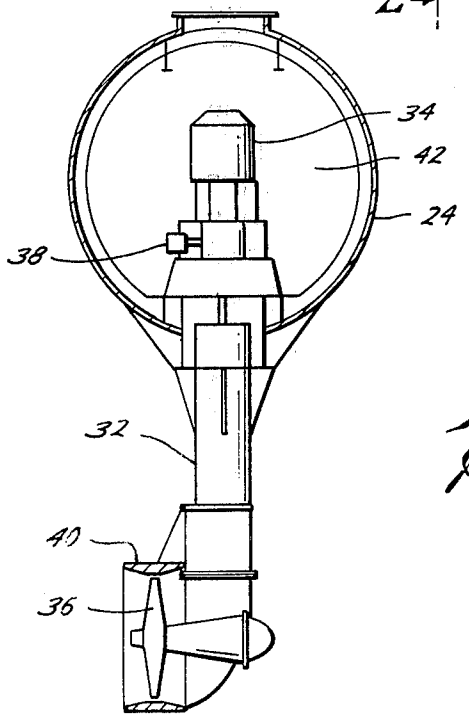
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Fig. 2

Fig. 3

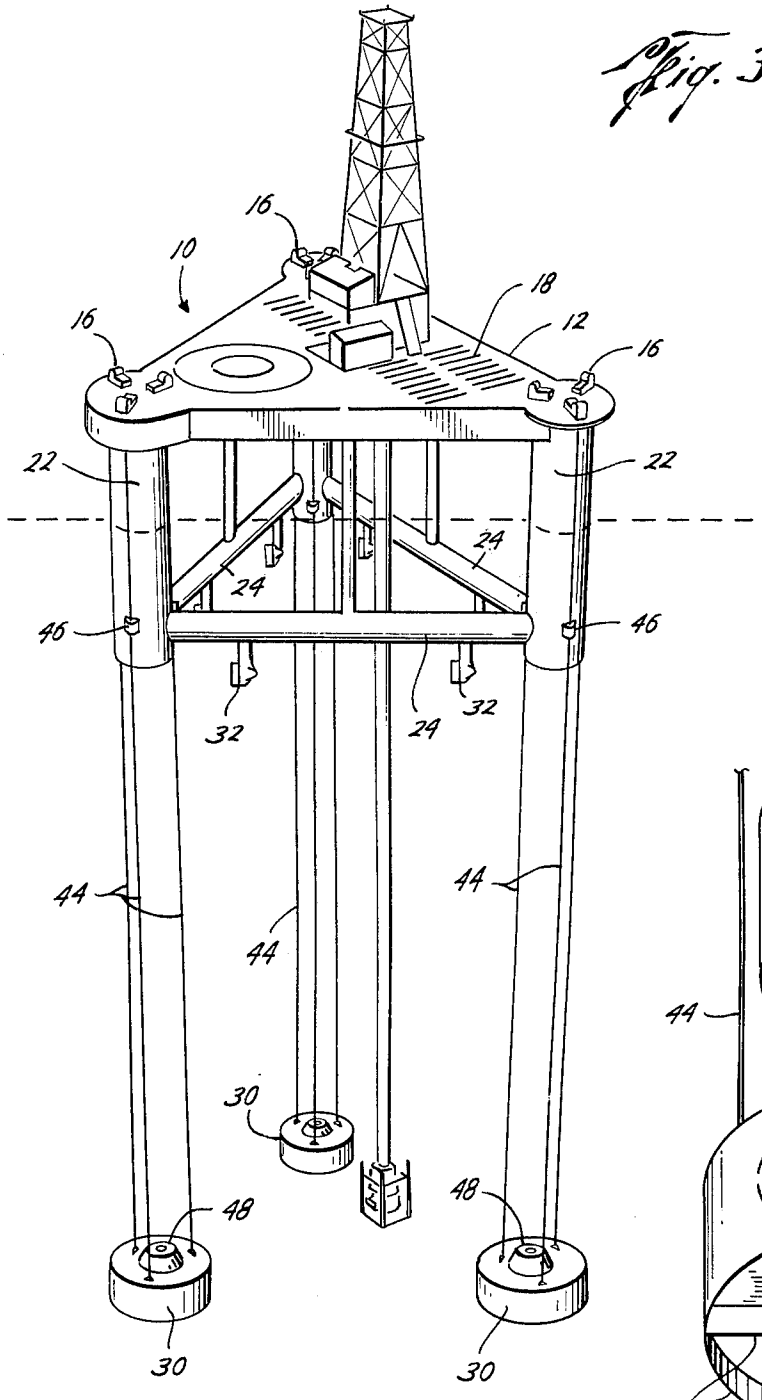
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Fig. 4

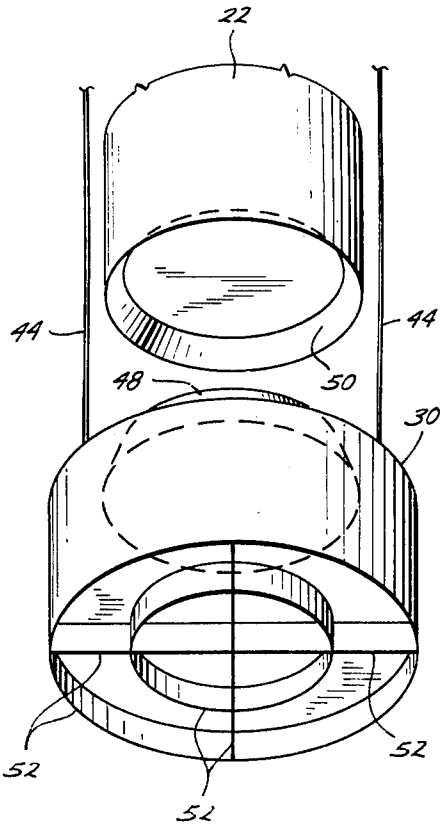
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Fig. 5

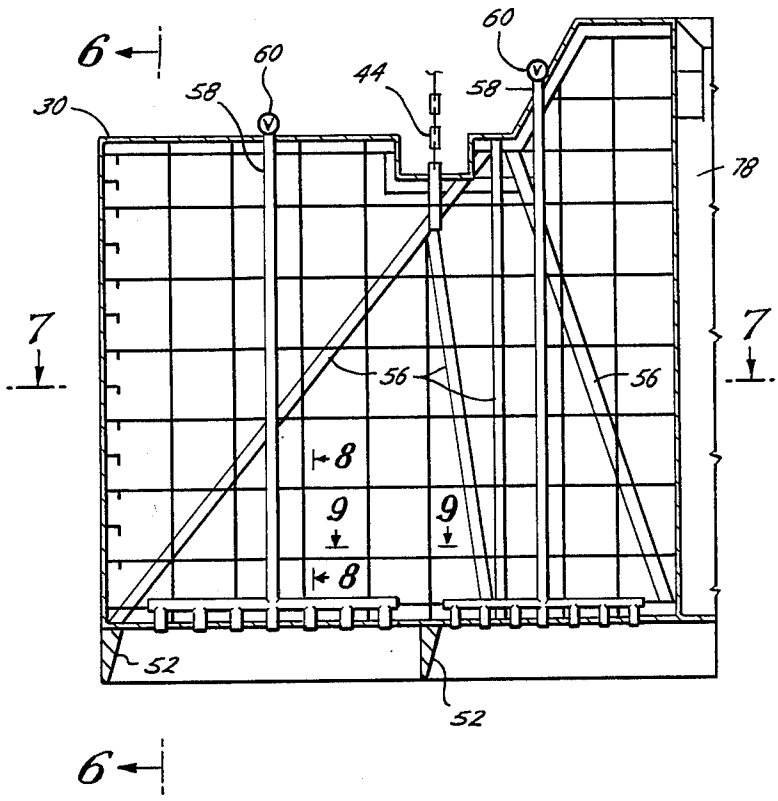


Fig. 6

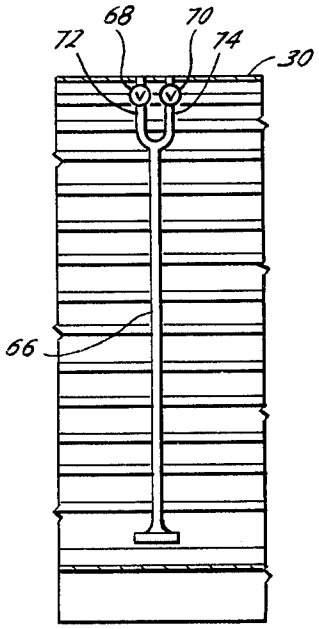


Fig. 8

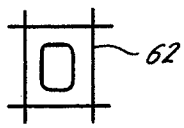


Fig. 9

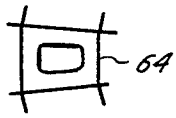
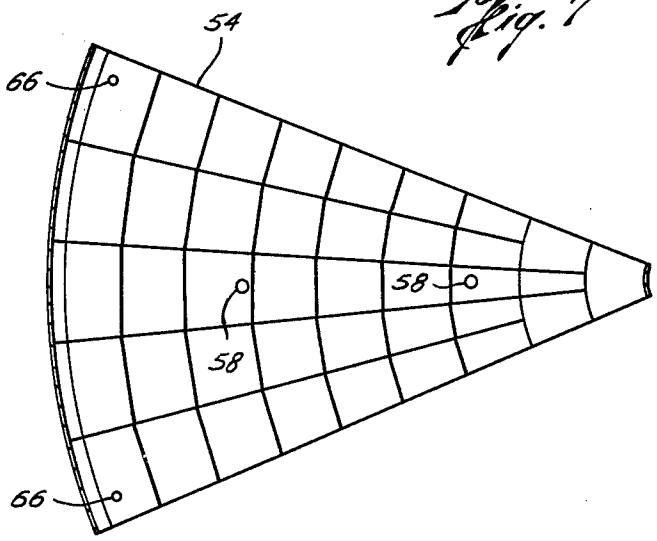


Fig. 7



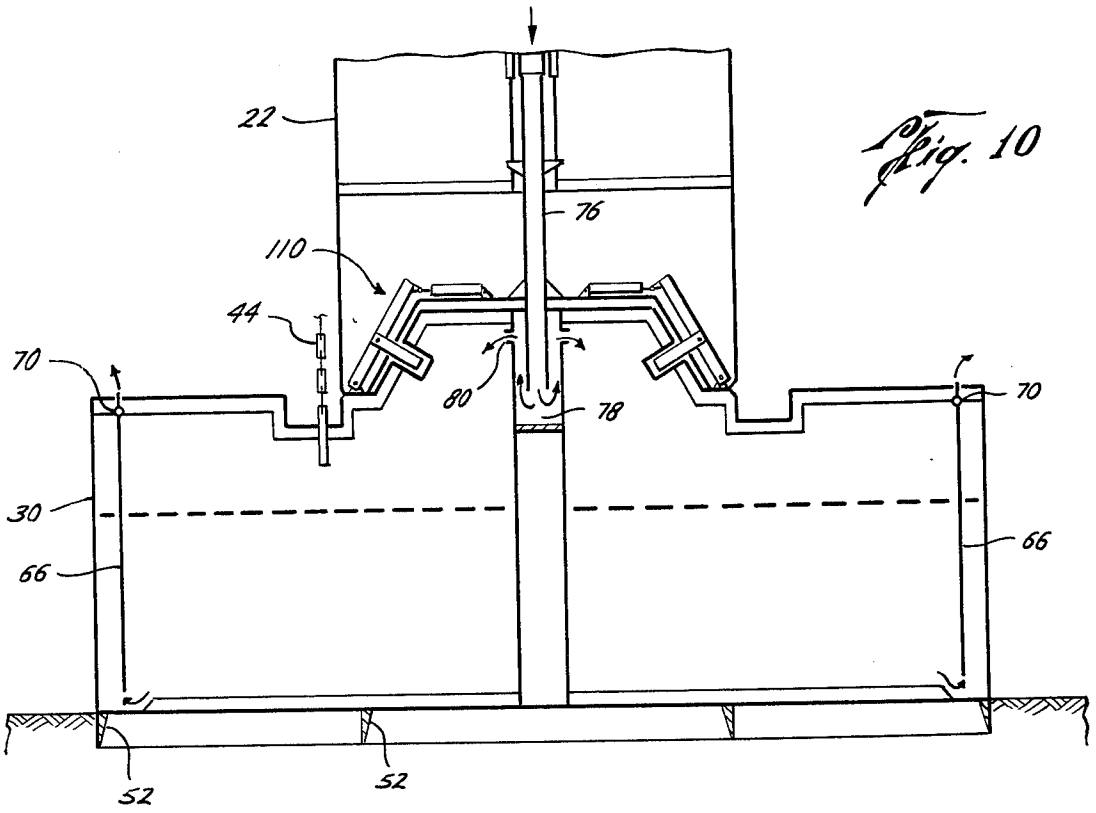

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Fig. 10

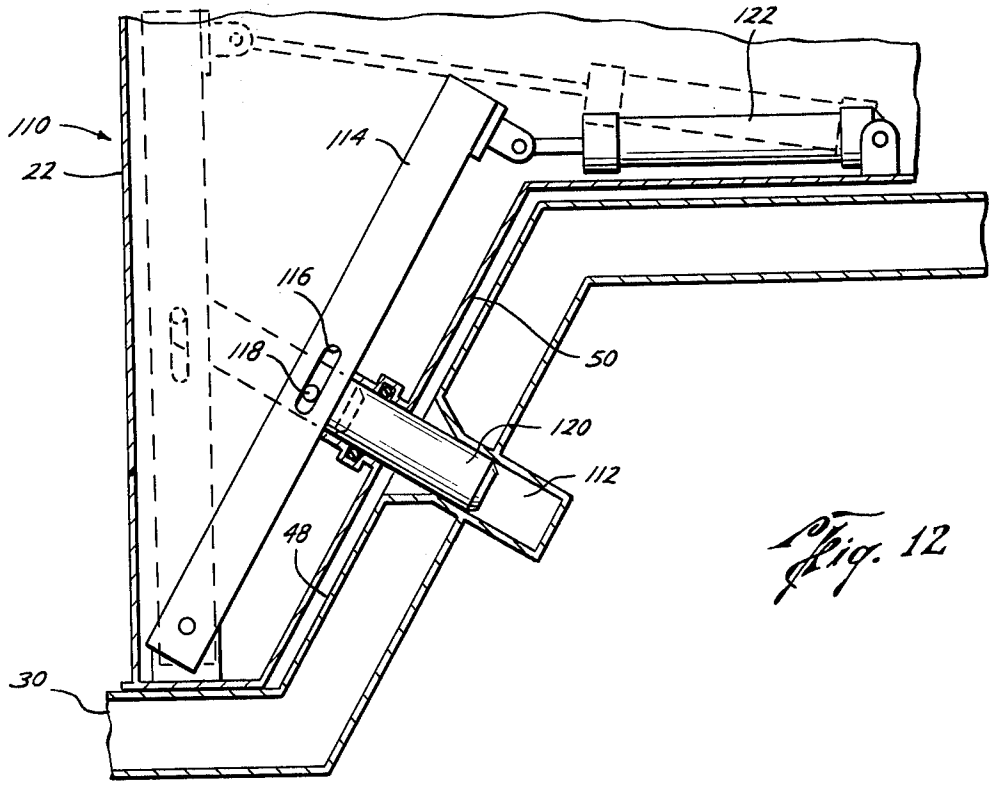
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Fig. 12

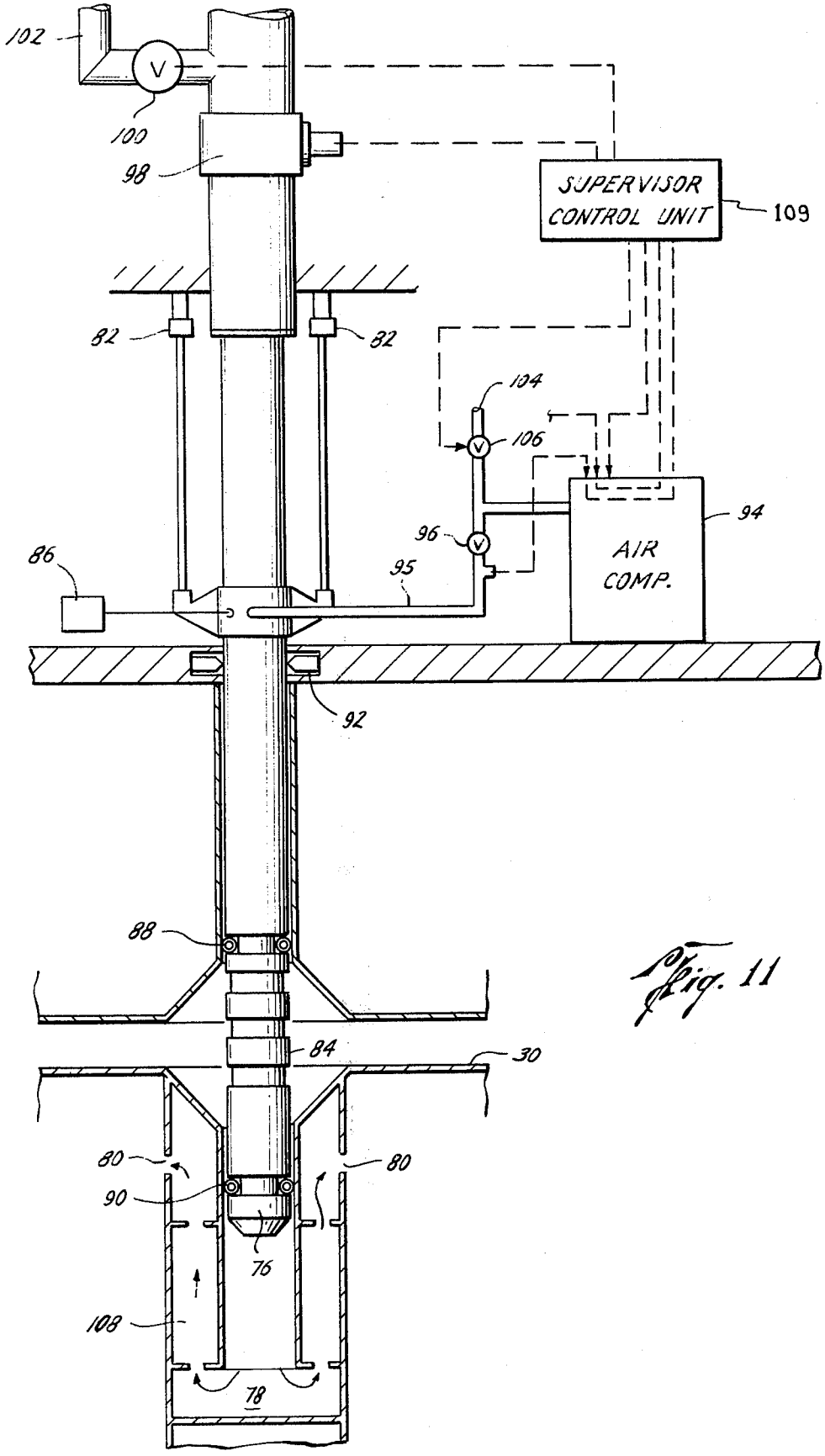
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Fig. 11

Fig. 13

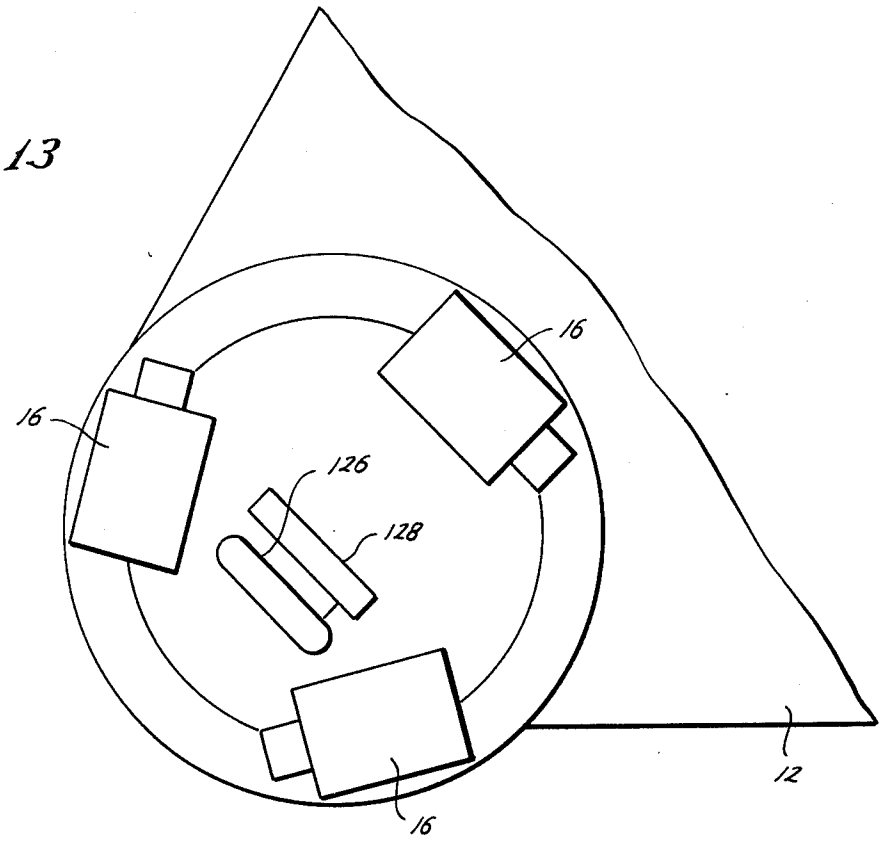
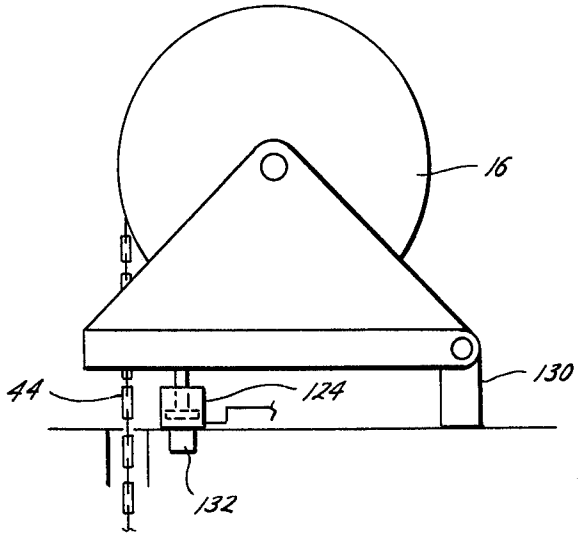


Fig. 14



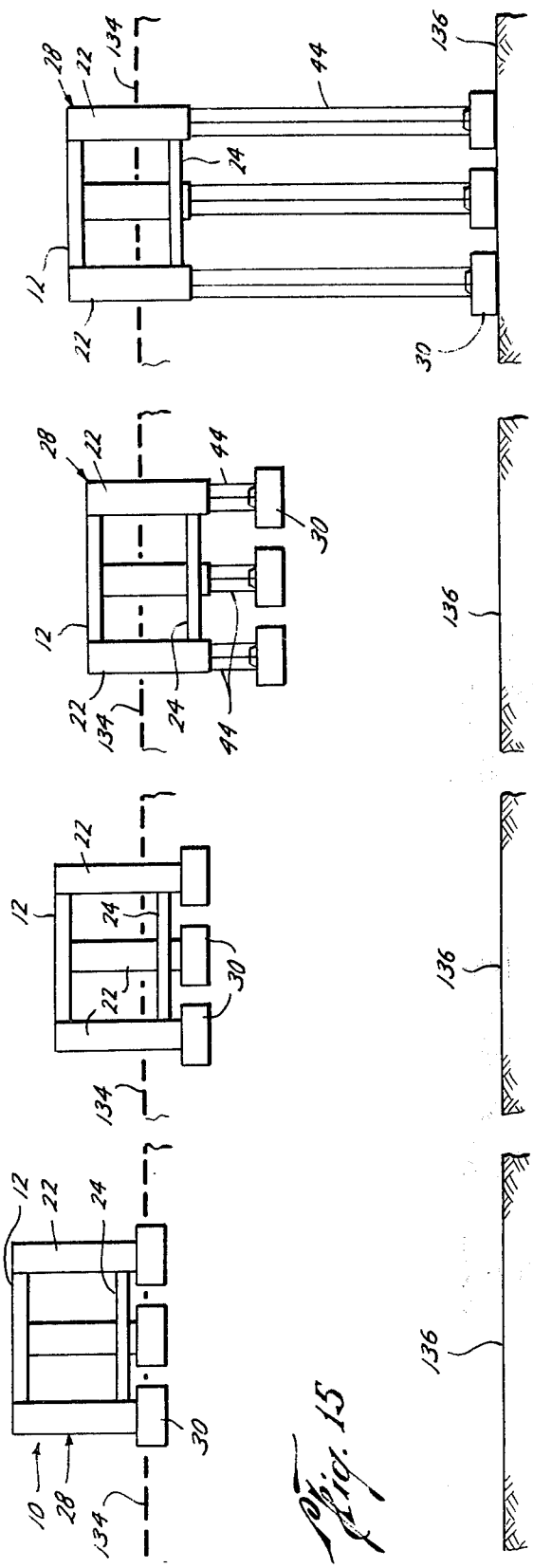


Fig. 15

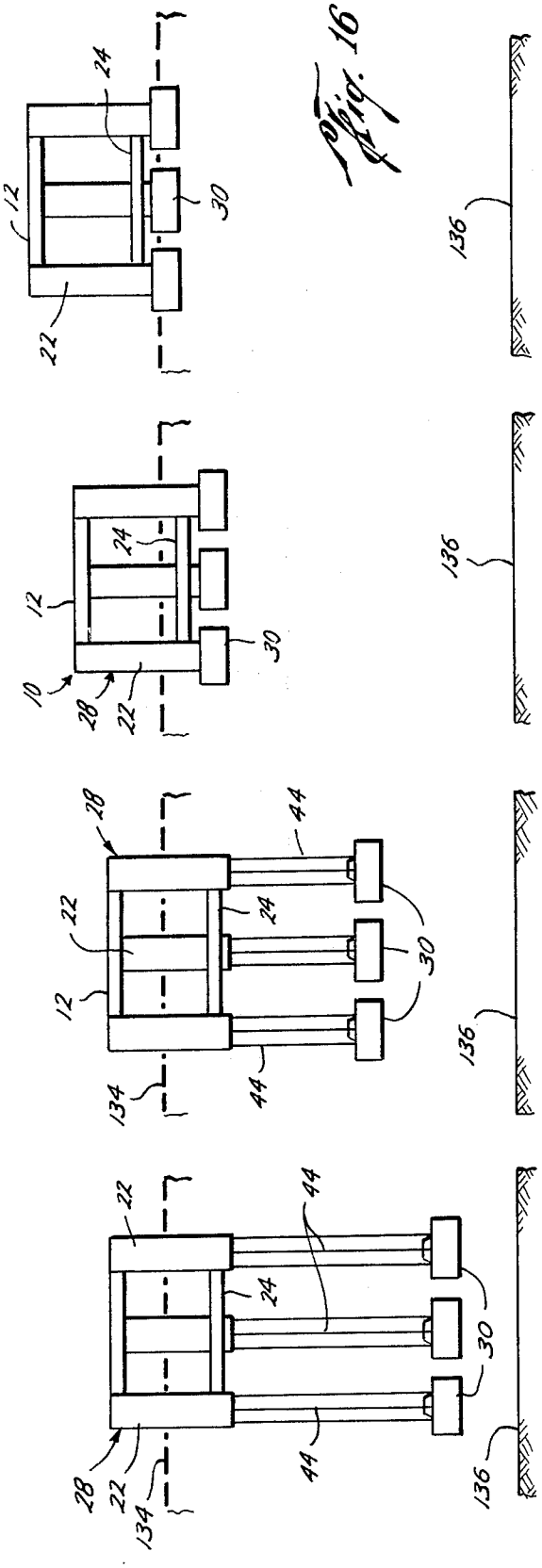


Fig. 16

FLOATING STRUCTURE AND METHOD OF RECOVERING ANCHORS THEREFOR

BACKGROUND OF THE PRESENT INVENTION

In the past a mooring system for a floating platform which relies on the tension in a plurality of connections from the floating platform to an anchor on the bottom has been suggested by the R. P. Knapp U.S. Pat. No. 3,154,039, the K. A. Blenkarn U.S. Pat. No. 3,648,638 and E. E. Horton U.S. Pat. No. 3,780,685.

SUMMARY

The present invention relates to an improved tension mooring system for a floating structure and includes a plurality of anchors having sufficient buoyancy when deballasted to support substantially all of the weight of the floating platform, the improved auxiliary thrusters for propulsion and station keeping, the chains connecting the anchors to the platform, the ballasting and deballasting system for the anchors, the anchor deballasting probe, the control of flow through the anchors to increase the holding force of the anchors, the cable tension monitoring and control system and the other details of improved structure and the improved method of recovering the anchors.

An object of the present invention is to provide an improved floating structure having a plurality of anchors in a tension mooring system wherein the structure has a minimum of drag resistance to movement through water while in transit to or from a mooring site.

Another object is to provide an improved tension moored floating structure having short term holding force greater than the anchor weight and wherein the anchors can be easily and quickly recovered from anchored position.

A further object is to provide a tension moored floating structure with a plurality of anchors connected to the floating platform with cables and wherein the tension in each of the cables is maintained in a substantially equalized tension condition.

Still another object is to provide an improved ballasting and deballasting system for a plurality of anchors connected by cables or chains to a floating platform in a tension mooring system for a floating structure.

A still further object is to provide an improved tension mooring system for a floating structure having capabilities of remaining moored by tension in wave conditions approaching 60 feet and which may readily be converted to a slack mooring system to withstand more severe sea conditions.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and advantages of the present invention are hereinafter more fully set forth and explained with respect to the drawings wherein:

FIG. 1 is a perspective view of the improved floating structure of the present invention in moving position and showing the water level on the lower portion of such floating structure.

FIG. 2 is a sectional view taken along line 2—2 in FIG. 1 and illustrating a typical thruster used with the improved floating structure.

FIG. 3 is another perspective view of the floating structure tension moored at a drilling site and showing the drilling at the bottom.

FIG. 4 is a partial perspective view of the bottom portion of a leg and the anchor therebelow.

FIG. 5 is a partial sectional view of the improved anchor of the present invention.

FIG. 6 is a partial sectional view of the anchor taken along line 6—6 in FIG. 5.

FIG. 7 is another partial sectional view of an anchor segment taken along line 7—7 in FIG. 5.

FIG. 8 is a partial sectional view taken along line 8—8 in FIG. 5 to illustrate the structure of the vertical bulkheads in the anchor.

FIG. 9 is a partial sectional view taken along line 9—9 in FIG. 5 to illustrate the structure of the horizontal bulkheads in the anchor.

FIG. 10 is a partial sectional view of the lower portion of a leg and its anchor to schematically illustrate the structure for locking, ballasting and deballasting of the anchor.

FIG. 11 is a schematic view illustrating the anchor ballasting and deballasting system.

FIG. 12 is a detailed sectional view illustrating the locking mechanism for securing the anchor to the lower end of its leg.

FIG. 13 is a plan view of the winching or recovery means for handling the means connecting the anchors to the floating structure.

FIG. 14 is an elevation view of one of the connecting means winches to illustrate the tension mooring and equalizing system.

FIG. 15 is a series of schematic views to illustrate the steps in setting of the anchors of the improved floating structure of the present invention.

FIG. 16 is a series of schematic views to illustrate the steps in releasing and recovering the anchors of the improved floating structure.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As can be seen from FIG. 1 the floating structure **10** of the present invention includes the deck **12** which is of a generally triangular shape and supports the derrick **14**, the winches **16**, the pipe racks **18** and the housing **20**. The legs **22** depend below the corners of the deck **12** and are connected near their lower ends by the horizontal members **24**. This assembly of components is hereinafter referred to as the floating platform **28**. In addition to the floating platform **28** the floating structure **10** also includes the anchors **30** which in the transit or moving position are secured to the lower end of the legs **22** as hereinafter more fully explained.

Each of the horizontal members **24** is adapted to have one or more thrusters **32** depending therefrom with a pair of thrusters **32** being shown in FIG. **2**. The thrusters **32** are provided to serve a station-keeping function to thereby assist the mooring system with maintaining the floating platform **28** over the drilling site and also to provide sufficient thrust for short moves of the floating structure **10** and a source of auxiliary thrust to assist towing vessels in moving the structure **10** over long distances. The thrusters **32** include the motor **34** which drives the shaft rotating the propeller **36** and the motor **38** is connected to rotate the propeller housing **40** to thereby control the direction of thrust. Both motors **34** and **38** are housed within the interior of a sealed compartment **42** within horizontal member **24** together with suitable gearing, bearings and other mechanisms for the operation of the thrusters **32**. With the thrusters **32** as shown, they may be controlled individually or in concert from a suitable control location (not shown) on the deck **12**.

As shown in FIG. 1 the anchors 30 are of sufficient size so that they develop enough buoyancy to support the floating platform 28 and possibly have a small amount of freeboard so that a minimum amount of structure (only the three anchors 30 which are cylindrical and therefore have a minimum drag) is in the water during moving of the floating structure 10. When the anchors 30 are on the bottom as shown in FIG. 3 the connecting means 44 between the anchors 30 and the floating platform 28 are all maintained in tension to provide the tension mooring of the floating platform 28 as hereinafter explained. Such connecting means 44 preferably includes at least 3 lengths of chain or other suitable connecting means connected to the upper end of the anchors 30 extending through the guides 46 and winches 16 and having their free ends stored in a chain compartment (not shown) within legs 22. The anchors 30 are generally cylindrical and have a central frustoconical projection 48 on the central portion of their upper surface which is adapted to be received within the recess 50 within the lower end of legs 22. The skirts 52 depend from the lower side of anchor 30 to engage within the soil on the bottom when the anchors are set to provide a degree of additional vertical and lateral holding power for the anchors.

The details of construction of the anchors 30 are shown in FIGS. 5 through 9. Each anchor is composed of a plurality of segments 54 such as shown in FIG. 7. Each of the segments 54 is complete within itself and is water tight so that the possible damage to an anchor 30 normally only damages one of the segments and not the whole anchor. This is particularly important so that the buoyancy of the anchor is not totally lost when the damage to the anchor is localized. The segmental configuration of the anchors 30 assures minimum damage by localizing the effect of damage. Each one of the segments 54 includes a plurality of structural members 56 as reinforcing and particularly to reinforce at the location to which the connecting means 44 connect to the anchors. As shown in both FIGS. 5 and 7 the vents 58 communicate completely through each anchor 30 to each section defined by the skirts 52. Each of the vents 58 is provided with the flow restriction 60 which control the flow into and from the skirted sections.

In the setting of the anchors on the bottom the vents 58 allow the water trapped by the skirts 52 to pass through the anchors 30 and thereby allow the anchors to move into complete engagement with the bottom wherein the skirts 52 are set into the bottom. Also, once the anchors 30 are set then upward forces on the anchors 30 greater than their weight will be resisted by the suction created in trying to move the anchors away from the bottom. The restrictions 60 are sized to limit flow through the vents 58 so that during the maximum period of waves expected to be encountered the suction forces are not released sufficiently to allow the anchors 30 to commence lifting from the bottom. This structure provides the anchors with a short-term holding force greater than the anchor weight and also reduces such short-term holding force to the anchor weight after a relatively short period of time which is preferred to be in the range from 15 to 30 minutes. Thus, the restrictions 60 allow a flow to fill the skirt volume within such longer period. This longer period allows recovery of the anchors in a reasonable period of time such as for example 2 to 3 hours.

The interior of the anchors 30 is a honeycomb structure including a plurality of horizontal and vertical panels 62 and 64 respectively. Each of the panels is provided with an aperture through its central portion as shown in FIGS. 8 and 9 so that all parts of each segment 54 are in communication with each other for the ready ballasting and deballasting of each segment 54.

Ballasting of the anchor segments 54 is accomplished by causing the anchors 30 to be lowered into the water until their upper surface is awash. Thereafter water floods through the line 66 which has the check valves set in the branches 72 and 74. One of these check valves is set to allow water to flow inwardly during ballasting and the other is set to allow water to flow outwardly during deballasting. The lower end of line 66 extends downwardly into the lower portion of its anchor segment 54. Air within the anchor segment 54 discharges through the deballasting system hereinafter described.

The deballasting of anchors 30 is accomplished through the nozzle 76 which is adapted to engage within the central opening 78 in anchor 30 and to discharge air therein. The air flowing into such central opening 78 flows upwardly as shown by the arrows and into the water-tight segments 54 through the ports 80. The pressure of the air forces the water out through lines 66 and the check valves 70 until substantially all of the water is forced out of the anchor segments 54. The nozzle 76 as best shown in FIG. 11 is extendible and retractable responsive to the double acting actuators 82. The nozzle 76 includes the flexible section 84 which allows for slight misalignment with the recess 78. The pump 86 supplies air to pressurize the seals 88 and 90 to assure that the nozzle 76 is sealed within its recess in leg 22 and within the recess 78 in anchors 30. The scrubber seals 92 are provided to scrape the exterior of the nozzle 76 and assure that the sea water does not rise higher within the leg 22. The compressor 94 is connected into nozzle 76 by line 95 which is under the control of valve 96. The valve 98 is positioned within the line communicating with the interior of nozzle 76 from above and valve 100 is positioned within line 102 which communicates from the interior of nozzle 76 above valve 98 to the ballast tank (not shown) in leg 22. When valve 98 is open and valve 100 is closed, the nozzle 76 and the anchor 30 are vented to atmosphere. The output of compressor 94 also communicates with line 104 which is under control of valve 106 and may be connected to any other device in the system which is to utilize the compressed air output from compressor 94 such as the actuators 82. The supervisor control unit 109 controls the operation of valves 96, 98, 100 and 106 and compressor 94 to thereby control the initial ballasting and the deballasting operations as hereinafter described and such other operations as may be desired.

When ballasting is to be commenced valves 98 and 100 are opened so that water may flow through line 102 and downwardly through nozzle 76 into the interior of anchors 30. When sufficient water has been delivered to cause the anchor to be lowered so that the upper end of line 66 is submerged then flows into the upper end of line 66 continues until each of the segments 54 are fully ballasted. The deballasting proceeds as soon as the anchors 30 are raised up into engagement with the lower end of the legs 22. The nozzle 76 is then extended into the recess 78 and the seals 88 and 90 are set. With valves 98, 100 and 106 closed and compressor 94 operating, air under pressure is delivered through nozzle 76 and flows in the direction of the

arrows in FIG. 11 downwardly in recess 78, upwardly around the annulus 108 and into each segment 54 through the ports 80. The air collects in the upper portion of the segments 54 and forces the water to flow through line 66 and to be discharged from segment 54. The flow of air through nozzle 76 is continued until the desired deballasting of anchor 30 has been completed.

When it is desired that the anchors 30 be retained against the lower end of their leg 22 they are held in such position by the locking means 110 which is illustrated in FIGS. 10 and 12. The sides of projections 48 define the locking recesses 112. The arm 114 is pivotally mounted within leg 22 as shown and has a slot 116 therein which receives a pin 118. Pin 118 is secured to the locking piston 120. The locking means 110 is actuated by the actuator 122 which is connected to pivot the arm 114 from the unlocked vertical position shown in dashed lines to the angled locked position shown in solid lines in FIG. 12 and to return the arm to the unlocked position. As shown in FIG. 10 a plurality of such locking means 110 are used to assure uniform locking of the anchors 30 to the legs 22.

Besides ballasting and deballasting, a suitable control means is provided to control the movement of the anchors 30 with respect to the floating platform 28, such as the winches 16. Since the strain on each of the chains of the connecting means 44 is desired to be equalized at all times a pivotal mounting of each of the winches 16 is provided as best shown in FIG. 14 and an actuator 124. Actuating fluid is supplied to actuators 124 from the pressure accumulator 126 which is maintained with a supply of actuating fluid from the compressor 128. Each of the winches 16 are pivotally mounted to the leg 130 with the actuator 124 positioned under the winch 16 at a point substantially displaced from leg 130. The load cell 132 is positioned under the actuator 124 to provide an indication of the tension in the connecting means 44. Since each of the actuators 124 is connected to the accumulator 126, the forces on the winches 16 are equalized. Also, the readings provided by the load cells 132 can be used to read directly as the load supported on each of the chains.

As shown in the drawings each anchor 30 is connected with three connecting means, mooring lines, or chains 44 and a winch 16 or other suitable retrieving means is provided for each of the anchor connecting means 44. The three chains are connected so that they are equally spaced around and from the anchor center of gravity. The use of three of such chains 44 with two of them positioned on the outside of each leg and one on the inside of each leg as shown assures that the loading of the connecting means is always shared by at least two of the chains and thus preventing the whole of the anchor loading from being exerted on a single chain. While this three chain system is shown as the preferred form other systems may be used. In using the three chains, the monotoring and load equalization between the chains to each anchor are minimized and a minimum number of mechanical systems are used in anchor deployment and recovery thereby providing a more reliable system than would be available with a greater number of connecting means.

The sequence of operations in setting the mooring system of the present invention is shown in the schematic views of FIG. 15 and the sequence of operations in recovering the anchors preparatory to moving the floating structure 10 are shown in the schematic views of FIG. 16. As previously mentioned the floating structure 10 is supported for movement with the anchors 30 supporting the floating platform 28 above the surface 134 of the water to minimize the force necessary for movement. When the floating structure 10 is in its desired location, such as a drilling site, the anchors 30 are ballasted to cause the floating structure 10 to move to the second position with the horizontal members 24 below the surface 134. In this position the upper surface of each of anchors 30 is below surface 134 and the remainder of the ballasting of the anchors 30 is accomplished automatically through the line 66 as hereinbefore explained. With the anchors 30 ballasted, the connecting means 44 to each of the anchors 30 are paid out to lower the anchors on to the bottom 136. After the anchors 30 have reached the bottom 136 they are allowed to complete their settling of the skirts 52 into the bottom 136. This is possible since the water trapped by the skirts flows through the vents 58. The connecting means 44 are then adjusted by the winches 16 or by adjusting the ballast in legs 22 or both so that all of the elements of the connecting means to each of the anchors 30 are under substantially the same preselected tension. The amount of tension is preselected to retain the floating platform 28 in a position within a distance of approximately 5 percent of the depth of the water from the position directly over the drilling site. The thrusters 32 are also used for station-keeping, i.e., maintaining the floating platform 28 within a very short distance of its desired position over the drilling site. The tension selection is determined by considering the maximum wave, current and wind conditions expected to be encountered at the moored site. It should be noted that if such conditions are going to be exceeded, as by an especially severe storm, the drilling operation may be interrupted, the usual blowout preventors set and then the connecting means 44 paid out to allow the floating platform 28 to be slack moored and thereby increase the holding power of the mooring system and assure that the wellhead equipment is not damaged and the location of the anchors 30 on the bottom 136 is preserved.

When it is desired to move the floating structure to a new location, the anchors 30 must be recovered from the bottom 136. This is accomplished by first ballasting the floating platform 28 to a lower position in the water as shown in the first view of FIG. 16. When this is accomplished the connecting means are winched up to take care of the different position of the floating platform 28 and to set the desired tension therein. Then the leg 22 of the first anchor 30 to be pulled off the bottom is deballasted until sufficient force is exerted on the connecting means 44 to pull the anchor 30 free of the bottom 136 responsive to the flow of water through the vents 58. Such force is exerted on the anchor 30 over a period of time to allow the suction caused by the skirts 52 to be relieved by flow through the vents 58. The restriction is sized so that such flow takes place during a period longer than half the longest wave period expected. This deballasting of the legs 22 is continued in rotation until all of the anchors 30 are raised above the bottom 136. With all of the anchors 30 released from the bottom the winches 16 raise them into engagement with the lower end of the legs 22, the locking means 10 is set and then each of the anchors 30 is deballasted by use of its deballasting nozzle 76 as previously explained.

In the preferred form of the present invention, the platform 28 is preferred to have a net reserve buoyancy

in the range from being equal to the total anchor and connecting means weight to three times such weight. With such reserve buoyancy the anchor recovery is readily accomplished as hereinbefore described.

From the foregoing it can be seen that the improved floating structure of the present invention includes a plurality of anchors in a tension mooring system with such anchors having sufficient buoyancy so that the floating structure has minimum drag when moved through the water, the anchors have a greater holding power during short periods of time than their combined weight, the structure includes a means for maintaining the connections to the anchors in approximately equalized tension, and the structure is capable of both tension mooring and slack mooring when exposed to conditions of current and wind dictating each type of mooring system.

What is claimed is:

1. A floating structure comprising
a platform having a deck and at least three vertical hollow legs depending below said deck and horizontal members extending between the lower ends of said legs,
at least three anchors, each anchor being adapted to be positioned under one of said legs,
means for ballasting and deballasting each of said legs,
means for connecting said anchors to said platform,
means for ballasting and deballasting each of said anchors, and
said anchors when deballasted exerting sufficient buoyancy force to support substantially all of said platform above water with only the anchors creating drag resisting movement of the structure in the water,
said platform having sufficient buoyancy to exert a tension on the anchor connecting means for each anchor at least equal to the weight of said anchor,
said anchors being movable downward from said legs for engagement with the bottom and having said connecting means extending from said anchors to said legs as a plurality of parallel tension lines without any non-parallel lines,
said anchor deballasting means being associated with said legs and operative only when said anchor is in close spaced relationship to the lower end of its leg.

2. A floating structure according to claim **1** wherein said anchors each include
a plurality of watertight segments.

3. A floating structure according to claim **1** including means associated with said anchors for increasing the short term holding force to a force greater than the anchor weight and reducing said short term holding force to the anchor weight in a relatively short period of time.

4. A floating structure according to claim **1** including
a skirt depending below the bottom of each anchor, and
a restricted flow passageway through each anchor to provide controlled relief of the vacuum created under each anchor and within said skirt by continued lifting on the anchors.

5. A floating structure according to claim **4** wherein said restricted flow passageway is sized to allow substantially complete relief of the vacuum created under each anchor and within said skirt by continuous exertion of a force exceeding the anchor weight in a period of less than 30 minutes.

6. A floating structure according to claim **1,** wherein said anchor connecting means for each anchor includes
three mooring lines extending from said platform to said anchor,
said mooring lines being positioned parallel to said legs and spaced substantially equally around said legs with one of said mooring lines on each anchor being on the side of the leg facing the remainder of the structure,
said lines all being connected to said anchor at points equally spaced around and equidistant from the center of gravity of said anchor.

7. A floating structure according to claim **6,** including
a plurality of winches mounted on said platform,
said winches being connected to and adapted to pay out and retrieve said mooring lines with each winch connected to only one line and each line having a winch connected thereto, and
means for equalizing the tension in each of the mooring lines of each leg.

8. A floating structure according to claim **7** wherein said tension equalizing means includes
each of said winches being movably mounted,
an actuator connected to each of said winches, and
means supplying actuating fluid to each of said actuators to exert a preselected force on said winches whereby the preselected tension is developed in each of said mooring lines.

9. A floating structure according to claim **8** including means associated with said winches for sensing the tension in its mooring lines.

10. A floating structure according to claim **1** including
means for releasably locking said anchors to the lower ends of said legs.

11. A floating structure according to claim **10** wherein said locking means includes
a plurality of axially movable locking pins positioned in each leg at an angle to the axis of said leg,
said anchor defining a plurality of recesses in alignment with each of said pins, and
means for moving said pins into said recesses and retaining said pins within said recesses to secure each of said anchors to its respective leg.

12. A floating structure according to claim **1,** including
a plurality of thrusters mounted on said platform and adapted to extend into the water with the structure floating on said anchors.

13. A floating structure according to claim **12,** including
means for orienting each of said thrusters to direct their thrust individually whereby said thrusters assist in the towing of said structure and in station keeping when said structure is moored.

14. A floating structure according to claim **1** wherein said anchors include
a plurality of compartments, and
a line extending vertically through each of said compartments being open at its lower end to the interior of the compartment and extending through the upper surface of the anchor and being open thereabove at its upper end.

15. A floating structure according to claim **1** including
a nozzle positioned within each of said legs,
each of said anchors defining a deballasting chamber which when said anchors are held against the lower end of said legs is in alignment with said nozzle and so

that said nozzle communicates with the interior of said anchor,

means for moving said nozzles into communication with its respective deballasting chamber, and

means for supplying air to said nozzles to deballast said anchors.

16. A floating structure according to claim **15** wherein

said nozzle includes a flexible section allowing said nozzle to connect with said deballasting chamber even when slightly misaligned therewith.

17. A floating structure according to claim **15,** including

means for communicating from said nozzle to atmosphere and to ballast in said leg, and

means controlling flow through said communication means whereby water may be directed into said anchor, said anchor may be in communication with said atmosphere and both said communications may be closed.

18. A floating structure according to claim **15,** wherein

said air supply means is an air compressor connected to said nozzle.

19. A floating structure according to claim **15** wherein

said nozzle moving means includes at least one double acting actuator to extend and retract said nozzle.

20. A floating structure comprising

a platform having a deck and three vertical hollow legs depending below said deck,

three cylindrical anchors, one for each leg,

three mooring lines for each leg,

each of said legs being connected to its anchor by said mooring lines,

said mooring lines being positioned parallel to said legs and spaced equally around said legs with one of said mooring lines being on the side of said legs facing the remainder of the structure,

means for releasably securing said anchors to the lower end of said legs,

means for ballasting and deballasting each of said legs,

means for ballasting and deballasting each of said anchors,

means for paying out and retrieving each of said mooring lines and for applying a preselected tension to said mooring lines, and

means for equalizing the tension in said mooring lines.

21. The method of recovering anchors in a vertical mooring system in which three anchors are ballasted and resting on the bottom of the body of water and connected by mooring lines to a floating platform on the surface of the water wherein the floating platform has a ballastable leg associated with each anchor including the steps of

ballasting the floating platform to lower it in the water,

tightening all of the mooring lines connecting the anchors to the floating platform to a uniform preselected tension,

deballasting a portion of the platform to increase the tension in the connections to one of the anchors to thereby pull the anchor free of the bottom,

deballasting other portions of the platform to pull the other anchors free of the bottom individually, and

lifting the anchors upwardly through the water into engagement with the lower end of their respective platform legs.

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