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OFFSHORE PLATFORMS AND METHOD OF INSTALLING SAME

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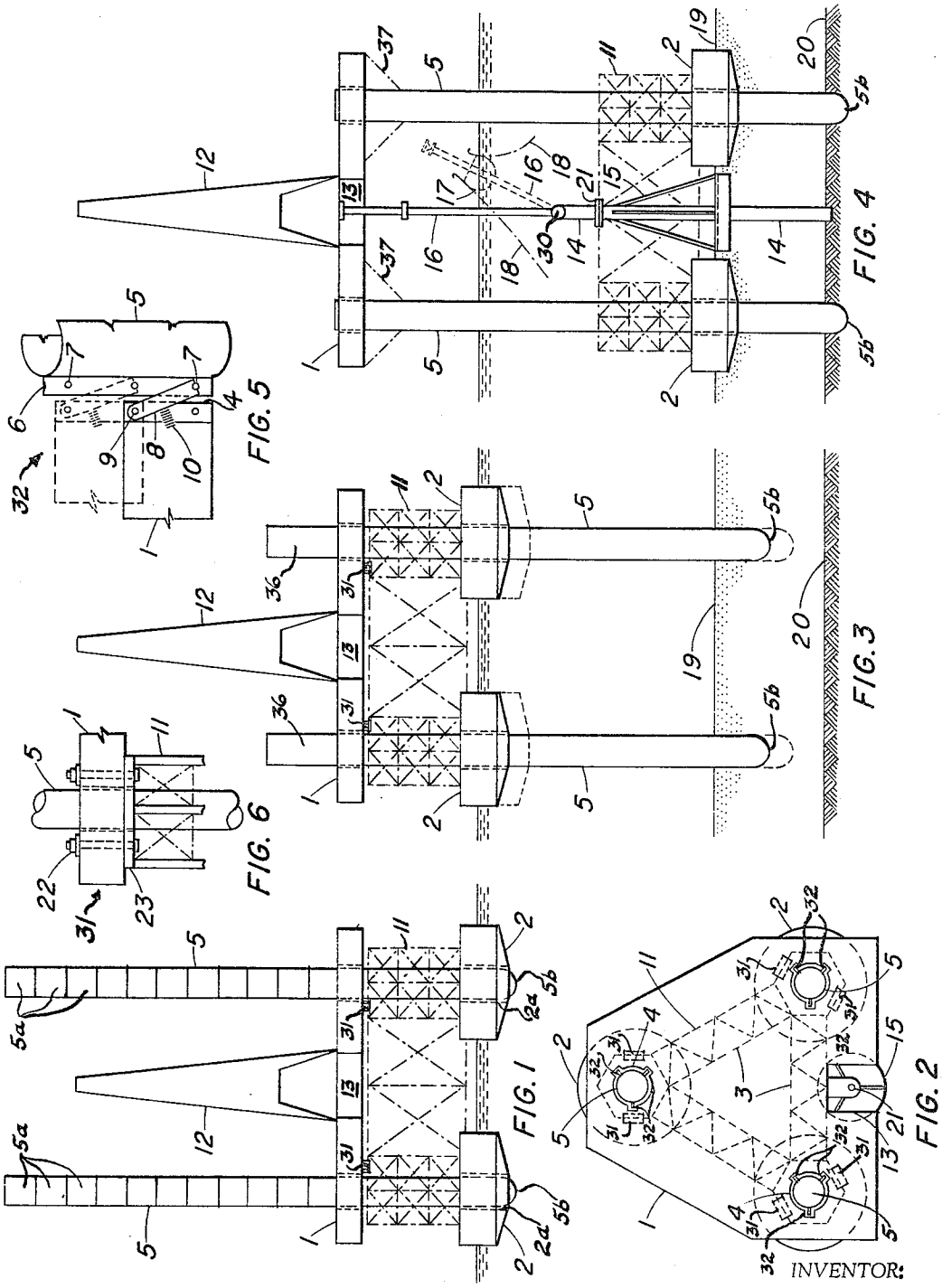


FIG. 4

FIG. 5

FIG. 3

FIG. 6

FIG. 1

FIG. 2

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OFFSHORE PLATFORMS AND METHOD OF INSTALLING SAME

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This application is a continuation-in-part of copending application Serial No. 680,119, filed August 26, 1957, now abandoned.

This invention relates to relocatable offshore platforms as may be used to support apparatus for drilling oil wells beneath coastal waters. More particularly the invention relates to techniques for temporarily anchoring such platforms in a manner providing improved stability, and providing high load supporting capability and firm anchorage of the platform legs which typically extend downward to the ocean bed.

The invention is especially useful where the platform is to be situated in comparatively deep water over a bottom of soft mud or silt of considerable depth. For example, at some Mississippi River delta sites under which it is believed that oil is to be found, the water may be from 150 to 300 feet deep and the bottom of the sea consists essentially of alluvial soil or soft mud having a depth of from 75 to 150 feet overlying a sub-bottom of firm sand or the like. The mud layer has a load bearing capacity of only about 200 pounds per square foot, whereas the underlying sandy bottom has much greater load bearing capability. Moreover, the surface of the mud bottom, as well as that of the sub-bottom, may not always be level but may slope or be irregular.

Under these and other working conditions, those offshore platforms of the past which for their support rely upon broad based footing or sunken platforms or the like, which rest upon the surface of the ocean bottom, are inadequate. Their load carrying capability is limited, as a practical matter, by the total load supporting area as is provided by the footing or sunken platform, an unduly large area being required to support any substantial load where the soil pressure is only about 200 pounds per square foot. In addition, their general overall stability, and their ability to withstand high wave and wind pressures may be seriously impaired where the mud bottom surface is uneven, or where the mud bottom itself does not have uniform soil pressure throughout the support area.

Accordingly, the present invention contemplates a method and means for driving the legs of such a platform completely through the mud layer, and to firm but but releasable support within the sub-bottom, without the use of secondary pile driving equipment, and in a manner as will precondition the legs to withstand not only the intended platform load but also the very high and comparatively momentary-applied forces as are produced by other factors such as wave and wind action, ramming or the like. Heretofore it has not been understood how, without the use of secondary apparatus, an offshore platform of the temporary and relocatable type might be itself adapted and used to set its own legs in a manner achieving these results.

Briefly and generally describing the invention in its preferred form, the working platform, which is rigid and non-floatable, is supported by a tripod arrangement of three laterally spaced apart vertical legs or pylons, as they will be referred to herein. The pylons are hollow and have valves or the like to admit sea water for sinking them into their initial positions, and each pylon is mounted for slidable movement through the working platform independently of each other so that each may be separately driven to a common soil-bearing resistance value which may vary between the pylon locations. Of

course, in view of the great overall height of the pylons as will be required to attain the intended support depth, each pylon is formed by attachable sections of a uniform and convenient length. However, and for a purpose as will be described, the height of each pylon at virtually all times after the initial sinking operation and during the subsequent placement operation is maintained at about seventy-five feet above sea level.

In addition to the working platform and pylons, the offshore platform assembly includes three hollow and buoyant tanks, each in surrounding and unattached slidable relation with one of the respective pylons, which not only serve to float the assembly while being towed to the drill site but also become a part of the platform supporting structure after the pylons have been set, as will be seen. The three tanks are rigidly attached to each other in their laterally spaced apart relationship by a network of welded pipe adequate for the purpose. However, since it is desirable that the working platform be ultimately situated some fifty feet above sea level so as to avoid direct impacting of the highest waves thereon, the invention contemplates that the pipe framework will be disposed above the buoyant tanks, and will extend in height between the tanks and the working platform to support the latter at its desired fifty foot elevation both when he assembly is being towed to the site and subsequently during the pylon placement operation. Thus, the present invention eliminates the necessity for including hydraulic or other jacks to hoist the working platform to its ultimately desired height on the pylons.

Rather than by a conventional pile driving or similar driving technique, the present invention contemplates a pressing of the pylons through the mud layer and into the sub-bottom until the desired high resistance value has been attained. The technique utilizes the total weight of the offshore platform assembly plus an additional weight of sea water for the purpose. Thus, after the pylons have been sunk to their initial positions against the ocean floor, the aforementioned overheights of the pylons are filled with additional sea water ballast so as to increase their respective effective weights (and also to increase their internal pressure to resist buckling or the like during the pressing operation), and the buoyant tank structure is attached to the working platform. The platform is attached to the pylons by separate ratchet and pawl arrangements at each pylon and sea water is alternately admitted to and pumped from the buoyant tanks to impose further pressing action on the pylons. That is, the sinking force of the tanks, which are at least partially filled with sea water, is ultimately transmitted to the pylons for a period of time to press them a desired unit distance downwardly. The force is then completely removed by expelling the water from the tanks and by the automatic detaching of the platform from the pylons as is effected by the ratchet and pawl arrangements. The tanks are thus refloated so as to retraverse the unit distance, whereupon the attaching of the platform to the pylons, and the filling and partial sinking of the tanks is repeated to press the pylons another unit distance. In view of the independent operation of the respective ratchets and pawls it is apparent that, except as limited by any bending moment established in the pylon, the total load of all of the tanks may be transmitted to only one pylon as may be found necessary at any stage of the pressing operation to achieve equal soil resistance at all of the pylons. It also becomes apparent that, by reason of the chain of attachments between the tanks and the pylons, the weight of the working platform itself, including that of all of the drilling and other equipment as may then be situated thereon, is also transmitted to the pylons. Thus, the sinking tanks pull the working platform downwardly the

aforementioned unit distance and, by the ratchet and pawl connections, the platform presses the pylons downwardly. As the tanks are alternately refloated, the ratchet and pawl arrangement permits the working platform to elevate itself with respect to the pylons as it is carried upwardly by the rising tanks. Of course, pylon sections are attached as necessary, and additional ballast water is pumped into the pylons as aforesaid, as the pressing operation proceeds.

The invention contemplates that, considering the total weight of the pylons and working platform (with its drilling and other equipment) as being the normal load to be supported, each pylon will be pressed to a depth whereat the soil resistance value is about three times that which it may be normally expected to support. That is, during the pylon pressing operation, each pylon will have sustained an overload of about two hundred percent. To make this excess support capability of the pylons available to resist wave and other momentary forces as aforesaid, the invention further contemplates that the placement load will be relieved to this extent after the pressing operation has been completed. This is accomplished by emptying the aforementioned excess ballast water from the pylon overheight and, in fact and if desired, by additionally emptying some of the normal ballast water from within the pylons to below sea level. In addition, the buoyant tanks and their connecting framework are disconnected from the working platform which then remains supported solely by the pylons, the tanks being filled with water and permitted to sink to the ocean floor.

By reason of their height and surrounding relationship with the pylons as the connected tanks lie on the ocean floor, it will be noted that the pylons are thereby laterally braced at or somewhat near their middle lengths, considering that the pylons extend considerably below the ocean bottom.

Each pylon has a plain and spherically shaped closed lower end, and is void of lateral protuberances such as tank type footings or the like. A spherical, rather than a flat or pointed lower end is believed to the more effective in the pressing operating by reason of both its shape and its inherent strength, and in the subsequent operation of lifting the pylons when the offshore platform assembly is to be towed to a new location.

To remove the offshore platform installation to a new location, the three sunken tanks are pumped free of the water which they contain so that they rise, sliding upwardly along the submerged length of the pylons, into contact with the working platform to support the same and relieve its weight from the pylons. The ratchet and pawl arrangements, by which the weight of the working platform was distributed to the respective pylons, are then disconnected so that, while still surrounding the same, the tanks and working platform are completely disconnected from the pylons. The pylons are then pumped free of their contained water so that their buoyancy will draw them upwardly out of their situation within the ocean bottom. The pylon sections are disconnected as the pylons rise, thereby additionally decreasing their weight. If necessary, the ratchet and pawl arrangements at each pylon may be of a reversible type so that the force of buoyancy of the buoyant tanks may be exerted on any or all of the pylons to overcome suction forces and otherwise assist in their upward removal.

These and other objects, features and advantages of the present invention will become more fully apparent from the following detailed description thereof, when taken together with the accompanying drawings in which:

FIGURE 1 is an elevational showing of an offshore platform assembly in accordance with the present invention as it would appear when floating, as while being towed to an offshore drilling site;

FIGURE 2 is a plan view of the offshore platform assembly to further illustrate its overall arrangement;

FIGURE 3 is an elevational showing of the platform assembly as it would appear during the pylon sinking and pressing operations or, alternatively, during the removal of the pylons from the ocean bottom;

FIGURE 4 is another elevational showing of the platform assembly as it would appear when fully installed and ready for its intended use;

FIGURE 5 is an enlarged and fragmentary showing of the details of the ratchet and pawl connection between the working platform and the pylons of the offshore platform assembly; and

FIGURE 6 is an enlarged and fragmentary showing of the details of the temporary connection between the working platform and the buoyant tank arrangement therebelow, as is also included in the offshore platform assembly of the present invention.

Referring to FIGURES 1–4 of the drawings, an offshore platform assembly in accordance with the invention includes a working platform **1** which is initially supported by the three buoyant tanks **2** and their associated attaching framework structure **11** when the assembly is in floating condition as illustrated by FIGURE 1, and which will be subsequently supported by the three pylons **5** when the assembly has been installed as illustrated by FIGURE 4.

The working platform **1** is of rigid and non-floatable construction for supporting an oil well drilling derrick as is generally indicated by reference numeral **12**. As indicated in FIGURES 2 and 4, the drilling derrick **12** is situated above a rectangular-shaped side cut **13** of the platform **1**, and supports a "Christmas tree" type drilling apparatus which includes a diagonal brace arrangement **15**, a vertical central pipe **14** having a pipe end extension **16** connected thereto by a universal joint **30** for pivotal movement as indicated by dotted lines in FIGURE 4. A spheric anchor buoy **17** is slidably mounted on the pipe end extension **16** for indicating the well location after the offshore platform assembly of the present invention has been removed. The buoy **17** is anchored to the ocean bottom, as indicated by anchor chains **18**, to prevent excessive strains on the pipe **14**.

The elongated and cylindrical pylons **5** are slideable with respect to the working platform **1** through the respective circular platform openings **4** in which they are mounted in suitable diameter conforming relation. However, and referring to FIGURE 2, at three equally spaced apart locations about the periphery of each pylon **5** and platform opening **4** there is a ratchet and pawl arrangement, generally indicated by reference numeral **32**, for transmitting the weight of the working platform **1** to the respective pylons **5** when the normal working load is wholly supported by the latter as indicated in FIGURE 4. The construction of each ratchet and pawl arrangement **32** is illustrated by FIGURE 5 wherein it is shown that a vertical ladder **6** having spaced apart rungs **7** is attached along the length of the pylon **5**, such being attached at each of the three peripherally spaced locations on the pylon as aforesaid. A pawl **8** is pivotally attached by a pivot shaft **9** to the working platform **1** at each of the corresponding locations at the circular platform opening **4**, each of the pawls **8** being biased by a spring **10** so that its lower end projects radially towards the center of the opening **4** and into engagement with the adjacent rung **7** of the pylon ladder **6**. As will later be more fully understood, during the pylon pressing operation the platform **1** and pylon **5** will concurrently move in downward direction, during which movement each of the pawls **8** will be in engagement with one of the rungs **7** as shown in FIGURE 5, and thereafter the platform **1** will be moved upwardly with respect to the pylon **5** in the manner indicated by dotted lines in the same figure for engagement with the next higher rung **7** as shown, during which subsequent upward movement of the platform the pawl **8** will be deflected and pivoted by the next higher rung so that the latter may become properly engaged by the pawl for a subsequent and concurrent downward movement of the platform and pylon.

After the drilling operation is completed and the pylons **5** are to be lifted from the ocean bottom **19**, **20**, all of the pawls **8** are pivoted, either manually or otherwise, against the bias of their respective springs **10**, and held out of engagement with any of the rungs **7** so as to permit the associated pylon to slide upwardly relative to the platform **1**. Should it be necessary to exert upward pull on the pylon as will be explained, the pawls **8** may either be inverted or otherwise be of a reversible type for engaging the underside of one of the rungs **7**, rather than the upperside as illustrated, whereby upward movement of the platform **1** will exert the requisite upward pull on the pylon **5**.

The pylons **5** themselves are of hollow tubular construction, being formed of attachable ring-shaped sections **5***a* of convenient unit length as indicated only in FIGURE 1, any number thereof being used as required to form the total length of the pylon **5**. The lowermost section has a spherical shaped closed end as indicated by reference numeral **5***b*. Each pylon has a uniform diameter of 20 feet throughout its length, and it is believed that the spherical shape at the lower end thereof is best for ease of penetration of, and withdrawal from the ocean bottom, and for resistance to crushing forces as may be encountered.

Referring now to the buoyant tanks **2**, each has heavy weight and is of hollow, totally enclosed and circular construction so as to be floatable. Each tank **2** has a central, cylindrically shaped opening **2***a* (FIGURE 1) therethrough for slidable passage of one of the pylons **5**. Considering the diameter of each pylon to be 20 feet, each tank **2** should have an outside diameter of about 80 feet and overall height of about 28 feet. All of the tanks **2** are rigidly attached together by a welded pipe superstructure or framework **11**, and it will be noted that this truss-like framework has considerable height to support the platform **1** some 50 feet above sea level when the offshore platform assembly is in floated condition as illustrated in FIGURE 1. Thus, the platform **1** is at all times supported at an elevation high enough to avoid impact by even giant waves, of some 30 to 40 feet in height, as might be experienced during hurricane weather.

At a number of spaced apart locations along its upper end, the framework **11** is bolted to the platform **1** in a detachable arrangement, as generally indicated by reference numeral **31**, the details of each such attachment being illustrated in FIGURE 6. As shown in the latter figure, the releasable attachment includes a plate **23** which is rigidly secured to the framework **11**, and to which the platform **1** is releasably attached, as by bolts **22**.

Both the hollow pylons **5** and the hollow tanks **2** are provided with suitable valve openings (not shown) and suitable water pumping or compressed air connections (not shown) which are operable from the platform **1** to either admit sea water thereinto, or empty the sea water therefrom as desired at the hereinafter described appropriate times.

Before describing the self-installing and self-removal operations of the offshore platform assembly, it should be noted that at least during the pylon pressing operation each pylon should include sufficient pylon sections **5***a* to provide an overheight, generally indicated by reference numeral **36** (FIGURE 3), for containing additional ballast water to a height of about 75 feet above sea level for a purpose to be described.

Referring now to the operation of the offshore platform assembly whereby each of the pylons **5** is pressed through the mud layer **19** and into the firm sub-bottom **20** of the ocean floor, the assembly is towed to the drill site in its floating condition as shown in FIGURE 1. Although the illustration shows the lower ends **5***b* of the pylons **5** as then being substantially within the cylindrical openings **2***a* of the respective tanks **2**, it is preferable to permit the pylons to project some 30 feet below the tank bottoms when the assembly is being towed over

deep water. At this time the platform **1** is preferably attached by the releasable attachments **31** to the tank framework **11**, although it need not be since the platform **1** is in any event now wholly supported by the framework **11**. The pylons **5** are held in their raised positions with respect to the working platform **1** by any suitable means, such as by inverting the pawls **8** (FIGURE 5) as previously described.

When the platform assembly has arrived over the site, the pylons **5** are released so that they may slide by gravity downwardly through the respective platform openings **4** and tank openings **2***a* within which they are situated, and sea water is admitted to the interior of each pylon by opening suitable valves (not shown) thereof, so that each pylon sinks to rest at its lower end **5***b* against the mud bottom **19** of the ocean floor. Of course, during the pylon sinking operation, additional pylon sections **5***a* are attached as needed, and to provide the aforementioned pylon overheight **36**. By their weight the pylons press themselves into the mud bottom **19** until refusal sets up. At this stage in the pylon setting operation, the previously referred to additional water ballast is pumped into each pylon to a height of about 75 feet above sea level, so that the weight of this ballast water will be an additional force tending to press the pylon downwardly into the ocean bottom. Of course, upon addition of such ballast water, each pylon will descend a further distance at this stage of the operation.

The ratchet and pawl arrangements **32** between each pylon **5** and the platform **1** are then engaged in the manner illustrated by FIGURE 5 and, if not already so attached, the platform **1** is attached to the tank framework **11** by the releasable attachments illustrated in FIGURE 6.

Sea water is then admitted to the tanks **2** either by pumping of through valves (not shown) in each of them, causing them to be rendered less buoyant. Thus, all of the pylons are pressed downwardly under a force equal to the total weight of the tanks **2** and their incidental superstructure framework **11**, and by the full weight of the platform **1** including all of its equipment load, and also by the weight of the pylons themselves and the referred to overheight of ballast water therein. This pressing weight is maintained for a period of time until the platform assembly, including the pylons **5**, has sunken a preselected unit distance, preferably 12 feet, which is equal to the vertical height between adjacent rungs **7** of the ratchet and pawl arrangements **32** of the pylons. Upon achieving such depth, the water is pumped out of the tanks **2** to render them fully floatable so that they rise, traversing the same unit distance in upward direction and lifting the platform **1** with respect to the pylons **5** which remain stationary in view of the automatic releasing of the attachment between the platform and pylons as is effected by the ratchet and pawl arrangements **32**. When the tanks **2** have achieved their normal floating elevation, the pawls **8** will engage the respective of the next higher rungs **7** of the ladders **6**, whereupon water is again admitted to the tanks **2** to repeat the pressing operation by applying their weight, together with the weight of the platform **1**, to the pylons **5**.

By repeated alternate partial flooding and emptying of the three buoyant tanks **2** between a freeboard of from 2 feet to 14 feet, the pylons **5** are depressed 12 feet at a time until their ends **5***b* meet soil pressure resistance equal to the total pressing weight. At this stage, it may be that the resistance encountered by any one or two of the pylons may be considerably less than that as has been encountered by the remaining pylon or pylons. In these circumstances, it is desirable to press the remaining pylons to the same resistance value. To do so, the ratchet and pawl arrangements **32** at the pylon or pylons which have encountered the greater resistance are disconnected, and the alternate partial flooding and emptying of the three buoyant tanks **2** is continued so as to

exert virtually the total weight of the tank structure and platform on only one or perhaps two of the pylons so as to press it, or them, further into the sub-bottom **20** until acceptable resistance is encountered. The extent to which all of the tank and platform weight may be transmitted to only one or two pylons is determined by the acceptable bending moment as may be established in the pylon or pylons. However, substantial additional weight may be so transmitted by, for example, completely flooding the tank or tanks which are associated with the pylons which are to be pressed further, thereby providing additional sea water ballast weight corresponding to any extent of projection of such tank or tanks above sea level, and only partially flooding the remaining tank or tanks in the same or varying degree. It becomes apparent that such pressing weight might also be applied to each of the pylons **5** in sequence at this stage of the operation to insure that each of the pylons have reached a depth of penetration in the sub-bottom **20** whereat the soil resistance force is a maximum.

When penetrating the mud layer **19**, the pylon pressing operation proceeds rather rapidly at a rate of about 1 foot per minute since, considering a conventional oil drilling platform structure as has been described, the available pylon placing pressure is on the order of some 15,000 pounds per square foot through mud soil which is capable of supporting pressures of only about 200 pounds per square foot. The operation proceeds more slowly when the pylons are penetrating the sub-bottom **20** which has much greater soil pressure.

In this manner, each pylon may be pressed to refusal by a force (equal to the total weight of the tanks **2** and tank framework **11**, the platform **1**, the pylons **5** themselves, and the weight of the pylon ballast water, as aforesaid) totaling three times the anticipated normal or working load as will subsequently be exerted thereon by the platform **1**. To make this overload capacity of the pylons available to resist the forces of waves and the like during normal drilling operations, the loading of the pylons must be relieved to the same extent.

Accordingly, after all of the pylons have been set as aforesaid, the tanks **2** are again raised so as to position the platform **1** at the ultimately desired working platform elevation, and all of the ratchet and pawl arrangements **32** are engaged so as to distribute the platform weight evenly between all of the pylons **5**. Additional lateral bracing **37** (FIGURE 4) may be attached between the platform and the pylons, if desirable. All of the bolt attachments **31** are then released, and the tanks **2** are again flooded so that they sink downwardly along the pylons to rest against the mud bottom **19** as shown in FIGURE 4. The aforesaid additional ballast water is emptied from the pylons **5** to relieve their loading to this extent and, if desired, some of the remaining ballast water may be pumped from within the pylons to further and commensurately relieve their preloaded condition.

The offshore platform assembly is now ready to serve its purpose as an oil well drilling platform, and it will be noted from FIGURE 4 that the framework **11**, at a location below the platform side cut **13**, has a bracket **21** attached and adapted for receiving the lower portion of the Christmas tree pipe **41** which passes therethrough.

When drilling operations have been completed, the platform assembly is removed from the drill site by first emptying the water from the tanks **2** to cause their travel, under buoyant influence, upwardly along the pylons **5** and to their floating condition in supporting engagement with the platform **1**. The ratchet and pawl arrangements **32** are disconnected by pivoting the pawls **8** against the bias of their springs **10** and holding the same out of engagement with the pylon members **6**. By pump means (not shown), the pylons are emptied of the water which they contain, whereupon they will rise by buoyancy out of their embedded relation with the ocean bottom **19**, **20**. In this connection, and assuming that the pylons are submerged a distance of 300 feet, the buoyant pressure exerted on each pylon is equal to about 9 tons per square foot of pylon area, or a total buoyant force of some 2800 tons on each pylon whose diameter is 20 feet, which force is ordinarily sufficient to raise the pylon out of the ocean bottom. Of course, and as previously mentioned, the ratchet and pawl arrangements **32** may be reversed, and an additional lifting force imparted by the buoyant tanks **2** might also be utilized to remove the pylons.

As an example of the extent to which the pylons may be preloaded using the present invention, it is considered that the weight of the platform **1**, together with the derrick **12** and other drilling and auxiliary equipment as may be placed thereon, totals some 2400 tons. The weight of the three tanks **2**, including their attaching framework **11**, totals about 1500 tons. Each of the three pylons itself weighs about 300 tons, and the additional ballast water in each pylon (75 feet in height as aforesaid) adds some 700 tons to the weight of each pylon. As regards the additional weight provided by 75 feet of additional ballast water in each pylon, the 20 foot diameter pylon has an area of about 314 square feet, and salt water weigh 64 pounds per cubic foot. The total additional load exerted by the 75 feet of ballast water is therefore equal to $314 \times 75 \times 64$, or 1,500,000 pounds, i.e. about 700 tons per pylon. Thus, the total pressing load as may be applied to each pylon is about 2300 tons, or a pressure of about 7 tons per square foot, when all of the pylons are being simultaneously pressed into the ocean bottom. Of course, each pylon may be overloaded independently of the others up to about 4900 tons. When the tanks **2** have been detached from the platform **1** and lie sunken on the ocean floor as shown in FIGURE 4, and after the additional ballast water has been emptied from each of the pylons, and considering that the platform **1** is attached and that each pylon has been additionally partially dewatered, the total stationary load exerted by each pylon on the ocean bottom is reduced to about 1100 tons, or 3½ tons per square foot. It is therefore apparent that an overload margin of from 1200 to 3800 tons is available at each pylon to resist wave and wind action, unexpected ramming, or the like.

Thus, an offshore platform assembly and a technique for installing and removing the same has been described which achieves all of the objects of the invention.

What is claimed is:

1. The method of increasing the available load-resisting capability of a plurality of vertical pylons of an offshore platform assembly wherein the lower ends of the pylons are embedded in the bearing soil beneath a seaway or the like in which the platform assembly is situated, said platform assembly including a horizontal platform disposed at a preselected elevation a substantial distance above sea level and fixedly but releasably attached to each of said pylons substantially adjacent the respective upper ends thereof whereby said platform is supported by said pylons and may be detached and thereby rendered capable of vertically slidable movement with respect to all of said pylons, said pylons being substantially free-standing and unobstructed along their respective lengths extending below said platform, said method comprising the steps of fixedly attaching to said platform a plurality of heavy but floatable tanks corresponding in number to said plurality of pylons, said tanks being then in floating condition below said platform and respectively in substantially surrounding but unattached relation with respect to each of said pylons, all of said tanks being rigidly attached together, then rendering all of said tanks less buoyant for a period of time whereby the weight of said tanks together with the weight of said platform is exerted on all of said pylons and whereby said tanks and said platform and said pylons move downwardly a preselected distance during said time period to press said lower ends of the pylons said preselected distance into said soil, then detaching said platform from all of said pylons and render-

ing all of said tanks more buoyant whereby said tanks and platform move upwardly substantially said preselected distance with respect to said pylons, thereafter repeating for as many times as desired the aforesaid steps of attaching said platform adjacent said upper ends of the pylons, rendering said tanks less buoyant for a period of time, and detaching said platform from said pylons and rendering said tanks more buoyant, and, after the last said step of rendering said tanks more buoyant, fixedly attaching said platform to all of said pylons at said preselected elevation of the platform, thereafter detaching all of said tanks from said platform whereby the latter is supported solely by all of said pylons, and then sinking all of said tanks to rest upon said bearing soil while maintaining their said attached together relationship and their said substantially surrounding and unattached relation with the respective of said pylons.

2. The method according to claim 1 wherein, after said tanks are attached to said platform and while said platform is situated substantially at its said preselected elevation but prior to the final step of fixedly attaching said platform to all of said pylons, said platform is attached to a fewer number of said plurality of pylons while maintaining said detached relationship of said platform with respect to the remainder of said plurality of pylons, then all of said tanks are rendered less buoyant for a period of time whereby substantially the weight of all of said tanks together with the weight of said portion is exerted only on said fewer number of pylons to press the lower ends of said fewer number of pylons a distance into said soil, and thereafter said platform is detached from said fewer number of pylons and all of said tanks are rendered more buoyant whereby said tanks and said platform move upwardly to again dispose said platform substantially at its said preselected elevation.

3. An offshore platform assembly comprising a horizontally disposed working platform, a plurality of spaced apart and vertically disposed elongated hollow pylons each mounted for vertical slidable movement through said platform, releasable connection means between said platform and each of the respective of said pylons, said releasable connection means at each pylon being engageable and disengageable independently of any other whereby each pylon is independently slidable with respect to said platform, a plurality of heavy but floatable hollow and enclosed tanks corresponding in number and respectively surrounding each of said plurality of pylons, the buoyancy capacity of said tanks being adequate to floatably support said assembly, said tanks being disposed below said platform and in unattached and substantially slidable relation with respect to its associated pylon, a tank superstructure framework rigidly attaching said tanks together and projecting upwardly from said tanks to support said platform at a preselected elevation a substantial distance above the normal waterline of said tanks when floatably supporting said assembly, second releasable connection means between said tank superstructure framework and said platform, said second releasable connection means when released providing complete detachment of said superstructure from said platform and being operable independently of any of the first said releasable connection means between said platform and the respective of said pylons, means for introducing and expelling water into and out from each of said tanks, and means for introducing and expelling water into and out from each of said pylons, said pylons being unobstructed along their respective lengths extending below said platform whereby said tanks and superstructure framework are freely slidable with respect to all of said pylons between said platform and substantially the lower ends of said pylons.

4. An offshore platform assembly comprising a horizontally disposed and non-floatable working platform, pylon support means consisting of three triangularly spaced apart and vertically disposed elongated hollow pylons each mounted for vertical slidable movement through said platform, each said pylon being hollow throughout substantially its entire length and having a downwardly protruding and spherically shaped closed lower end, ratchet and pawl connection means between said platform and the respective of said pylons for holding said platform and the respective of said pylons in substantially fixed relation with respect to each other, said ratchet and pawl means at each pylon being engageable and disengageable independently of any other, and each said ratchet and pawl means when engaged permitting free upward movement of said platform with respect to its associated pylon but preventing upward movement of its said associated pylon with respect to said platform and, when disengaged, permitting upward movement of its said associated pylon with respect to said platform, three heavy but floatable hollow and enclosed tanks for floating said assembly, said tanks being disposed below said platform each in closely surrounding but substantially slidable relation with respect to one of said pylons, a tank superstructure framework rigidly attaching said tanks together and having height to project upwardly of said tanks to the underside of said platform to support the latter at an elevation which is a substantial distance above said tanks, connection means between said tank superstructure framework and said platform for holding all of said tanks and said platform in substantially fixed relation with respect to each other, said connection means including means for releasing said connection between said superstructure and said platform and consisting of means providing complete detachment of said tanks and their said superstructure from said platform, said releasing means being operable independently of any of said ratchet and pawl connection means, means for introducing and expelling water into and out from each of said tanks, and means for introducing and expelling water into and out from each of said pylons.

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