Aug. 21, 1928. 1,681,533

L. GILIASSO

SUBMARINE DRILL

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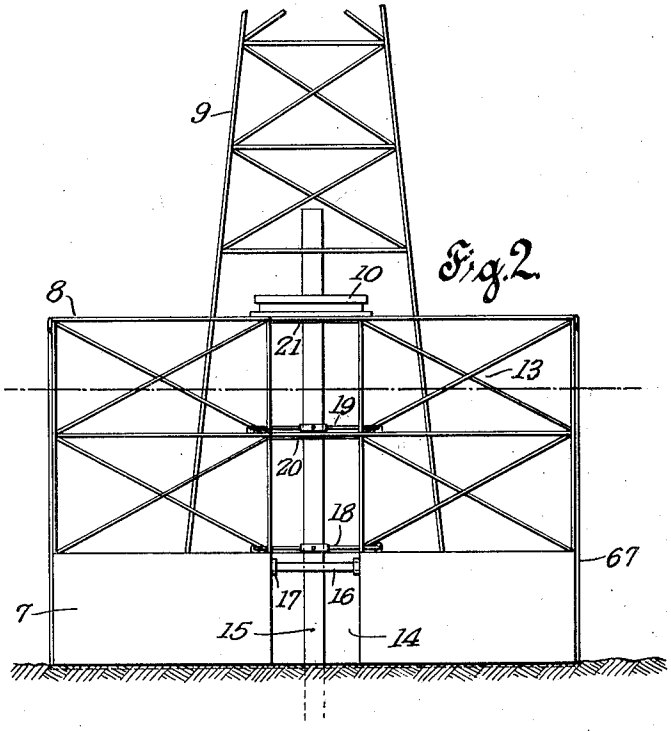

Fig. 2.

Fig. 1.

INVENTOR.

Louis Giliasso

BY

Philip S. McLean ATTORNEY

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Fig. 3.

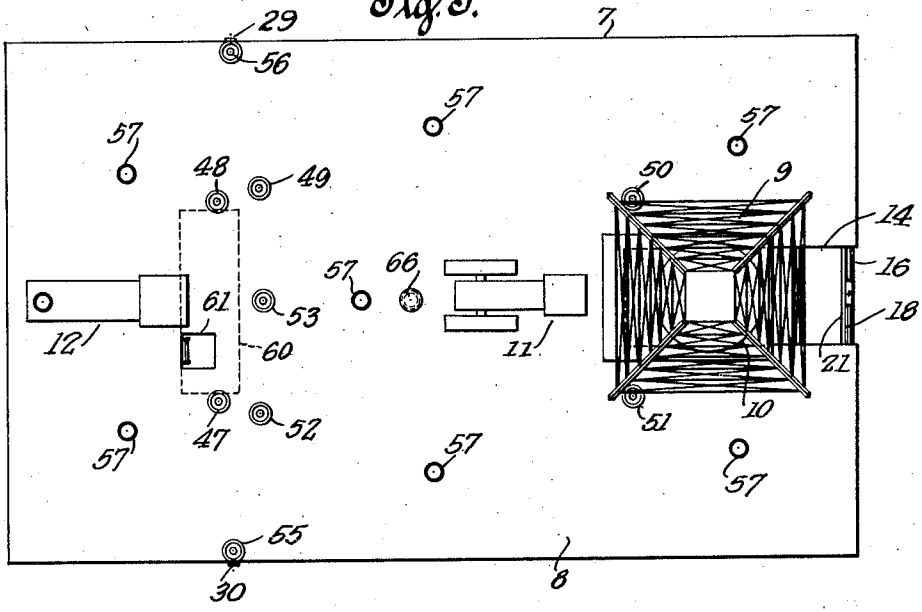
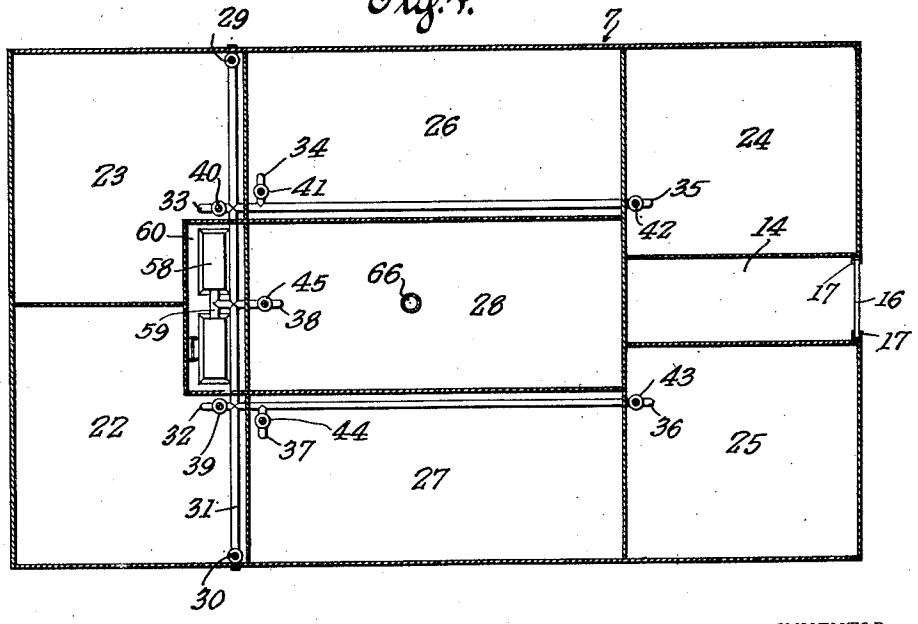


Fig. 4.



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BY

Philip S. McLean. ATTORNEY

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Fig. 5.

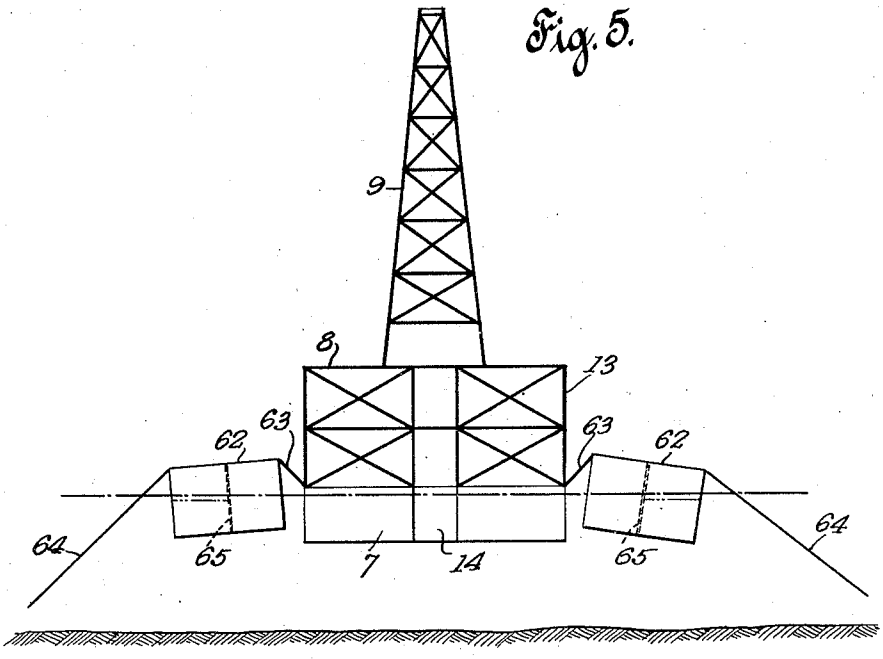
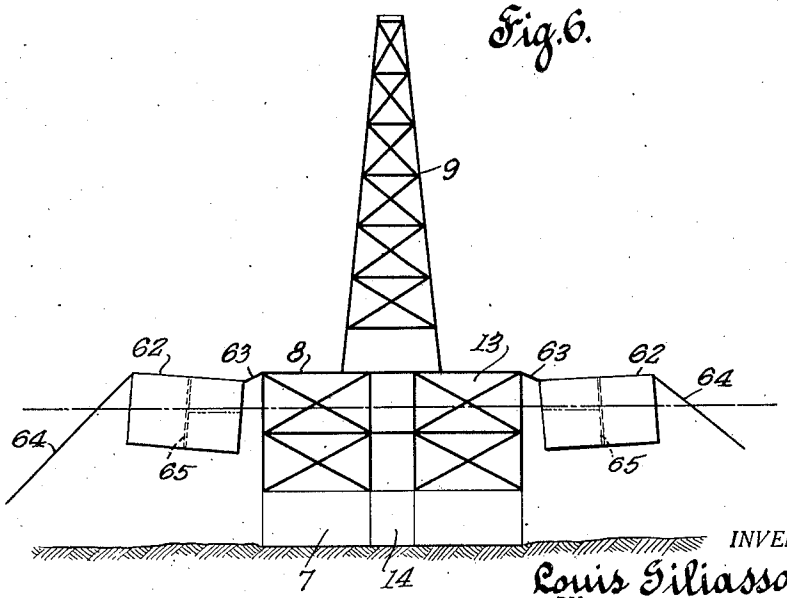


Fig. 6.



INVENTOR.
Louis Giliasso
BY
Philip S. McKean ATTORNEY

Patented Aug. 21, 1928. 1,681,533

UNITED STATES PATENT OFFICE.

LOUIS GILIASSO, OF PHILADELPHIA, PENNSYLVANIA.

SUBMARINE DRILL.

Application filed January 13, 1928. Serial No. 246,627.

The objects of this invention are to provide practical apparatus for drilling oil wells in lake bottoms and other submerged lands, which will afford a firm, stable base for the drilling operations and which can be transported by floating from one location to another.

These objects are attained by mounting the entire drilling equipment on an elevated platform on a barge structure and by providing means whereby the barge may be sunk to seat the same on bottom to afford a solid foundation for drilling operations and means whereby when a well is completed, the barge may be freed from its foundations and floated to carry the entire drilling equipment intact to another location.

Figure 1 is a side view of the apparatus showing the barge settled on bottom for drilling operations.

Figure 2 is a view looking at the derrick and rotary table end of the apparatus.

Figure 3 is a plan view of the apparatus.

Figure 4 is a horizontal sectional view of the barge as taken on line 4—4 of Figure 1.

Figures 5 and 6 are diagrammatic views showing methods of controlling the barge during sinking and raising operations.

The barge 7 is made of ample size and buoyancy to carry the raised working platform 8 and its superimposed load of full drilling equipment such as the derrick 9, rotary table 10, engine 11, boiler 12, pumps and other auxiliaries. The support for the platform or working base is shown as an open trestle work 13 to permit free flow of tides or water current, braced to hold the platform rigid, the height depending on the depth of waters in which the apparatus is used.

At the table end, the barge is shown formed with a bay 14 for the drill pipe or casing 15 deep enough and wide enough for all drilling operations and which enables the barge to be floated away from the standing pipe of the well. To prevent "weaving" strains, the end portions of the barge separated by this bay may be braced before the barge is sunk, as by means of a stay 16 dropped into sockets 17 across the end of the bay and turn buckles 18, 19, connected across the separated end sections of the barge and across the trestle work. If necessary, the trestle work and platform may have removable sections, such as indicated at 20, 21, across the bay, to afford clearance during removal operations, but such will ordinary not be necessary when the barge is fully floated.

To control sinking and floating operations, the barge is shown divided into watertight compartments, including corner tanks 22, 23, 24, 25, side tanks 26, 27, and a center tank 28, with sea-cocks 29, 30, at opposite sides of the barge opening to a transverse header 31, having branches 32, 33, 34, 35, 36, 37, 38, opening to the several tanks and controlled individually by valves 39, 40, 41, 42, 43, 44, 45, having elongated valve stems 46, carrying hand wheels 47, 48, 49, 50, 51, 52, 53, accessibly located relative to the working platform. The sea-cocks likewise have elongated operating stems 54, with hand wheels 55, 56, convenient to the elevated platform. Vent pipes 57 are shown rising from the several compartments and these may be equipped with valves, if necessary.

The compartments are emptied by a suitable pump 58 shown as connected with the transverse header by a branch 59 and as located in a well 60 in the barge and connected with the platform through a shaftway 61.

To steady and guide the barge while sinking it on bottom, Figure 5, pontoons such as illustrated at 62 may be used at opposite sides of the barge, connected therewith by lines 63, said pontoons being suitably anchored as at 64 and shown as divided by partitions 65 so that they may be water ballasted to exert the proper sustaining tendency. In raising the barge off the bottom, as in Figure 6, the same pontoons may be used, but ballasted in their inner compartments so as to be able to exert a restraining force when the barge has been lightened to the point where it commences to rise. By means of the guide lines from the anchored pontoons, the barge may be shifted one way or the other and held to straight up and down movements, this control being exercised in conjunction with the valving and pumping operations.

To "break" the barge off bottom, a well 66 is shown extending from the platform down through the bottom of the barge through which a hose or pipe carrying a nozzle may be introduced to force water beneath the bottom of the barge. In addition, drag lines 67 are shown, extending in loops beneath and across the bottom of the barge, which when the barge is to be raised can be

drawn along to break contact and let in the floating forces beneath the barge.

The side tanks may be kept full or partly full when the barge is afloat for ballasting purposes and by filling or emptying the different tanks, the barge may be balanced to float as required. In sinking the barge, the water may be admitted in the different compartments so as to lower the barge evenly. With the guide lines, the sinking is controlled until the barge is brought to rest on bottom in the desired location. The expanse of the barge is sufficient to provide a firm and sound footing and the working platform is large enough to support all the necessary drilling equipment. When the well is brought in and the proper connection is made, the barge may be again floated by exercise of proper care in pumping out the compartments, breaking it away from the bottom and controlling its rising movements and then after the bay is opened by removal of the stays or braces, the entire equipment may be floated away to another drilling location and the same operation be repeated. When not in use, the nozzle well 66 may be capped, as indicated in Figures 1 and 3. The removal of this cap enables the connection of a pressure line for forcing water or air beneath the bottom to break the "hold" on the barge.

If necessary, the derrick may be levelled by jacks and wedges or the like, after the barge is fully settled on bottom, and similarly, the rotary table may be levelled.

What is claimed is:

1. In submarine drilling, a barge, means for sinking and for raising the same to enable the seating of the barge on "bottom" for drilling purposes and removal by floating when drilling is completed, a working platform supported in elevated relation on the barge to stand above water when the barge is on "bottom" and a well drilling machine on said elevated platform operative to drive a well when the barge is stationed on "bottom", said barge having buoyancy when unwatered to float the entire load of the elevated working platform and drilling equipment carried thereby.

2. A structure as in claim 1, in which the drilling equipment includes a rotary table at one end of the barge, a derrick over the table and machinery for operation of the table and derrick located at the opposite end of the barge to counterbalance the weight of the table and derrick.

3. A structure as in claim 1, in which the barge has a bay for the drill pipe or casing enabling the barge to be floated away from the pipe which is left standing at the well.

4. A structure as in claim 1, in which the barge has a bay for the drill pipe or casing and in which removable bracing means are provided across said bay.

5. A structure as in claim 1, in which the supporting structure for the working platform is a trestle enabling unobstructed flow of surface water beneath the platform and over the sunken barge.

6. A structure as in claim 1, with means for "breaking" the "grip" of the "bottom" when the barge is to be raised.

7. A structure as in claim 1, with means for enabling the forcing of a cleavage stream between the barge and the "bottom" on which it rests.

8. A structure as in claim 1, with a cleavage line beneath the barge operative to break contact with the "bottom" when the barge is to be raised.

9. A structure as in claim 1, with a well in the barge and a shaftway extending from the working platform down into said well.

10. A structure as in claim 1, in which the sinking and raising means includes seacocks and pumping apparatus with suitable controls operative at the working platform.

11. A structure as in claim 1, in which the barge has closed compartments in different portions of the same which can be individually controlled for buoyancy purposes.

12. A structure as in claim 1, in which the barge is divided into watertight compartments and in which the sinking and raising means includes piping and valves by which admission and discharge of water in said compartments is controlled.

13. A structure as in claim 1, in which the barge has watertight compartments with vent pipes extending up to the working platform and in which the sinking and raising means includes piping and valves for individual control of the compartments.

14. The process of drilling wells in lake "bottoms" and the like, which comprises mounting the drilling equipment on a working platform supported on a barge at such height that when the barge is on "bottom" said platform will be above water level, sinking the barge to a solid foundation on the "bottom", operating the drilling equipment to drill the well while the barge is thus stationed on "bottom" and then after completing the well, floating the barge to remove the equipment from the well for subsequent use in drilling other wells.

15. A process as in claim 14 with the added steps of positively restraining and guiding the barge during the flooding and the unwatering operations.

In testimony whereof I affix my signature.

LOUIS GILIASSO.