

Dec. 19, 1950

J. SHANNON

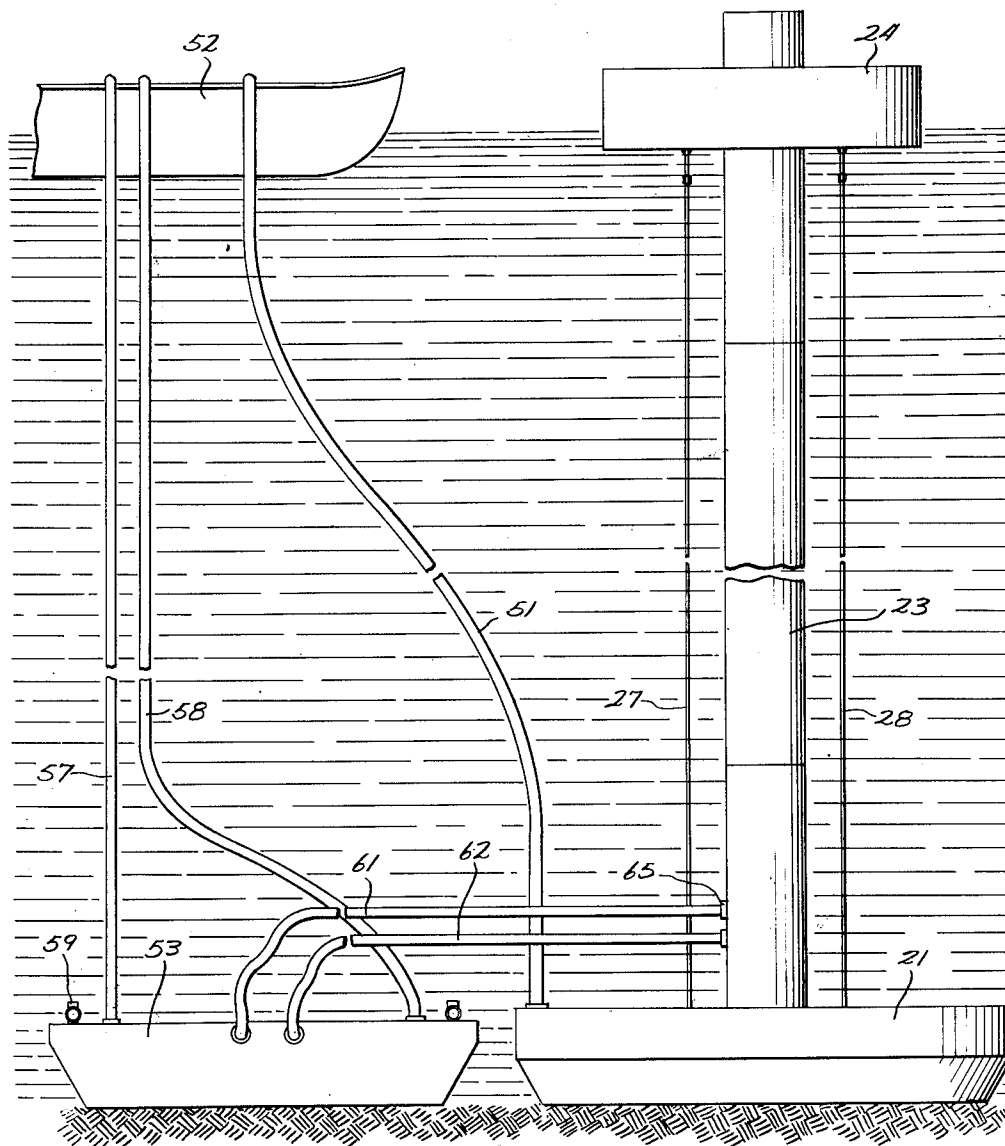
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MARINE OIL DRILLING MACHINE

Filed March 20, 1947

6 Sheets-Sheet 1

Fig. 1.



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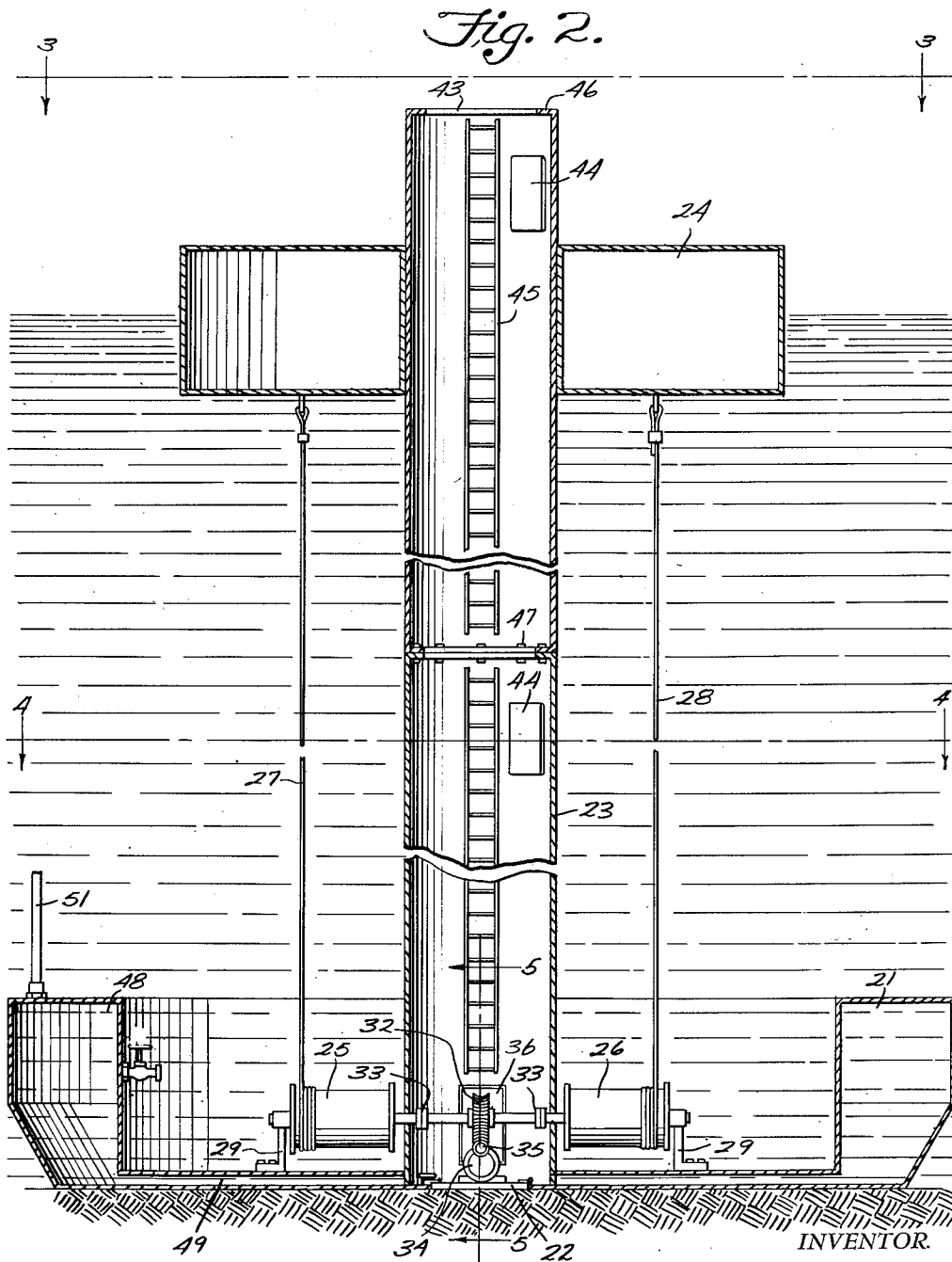
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6 Sheets-Sheet 3

Fig. 3.

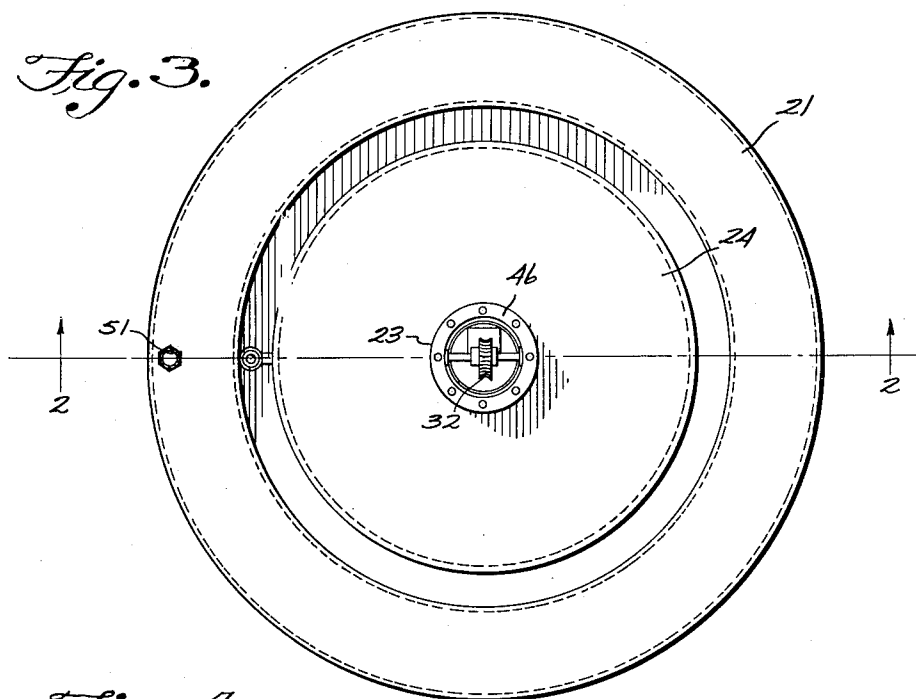
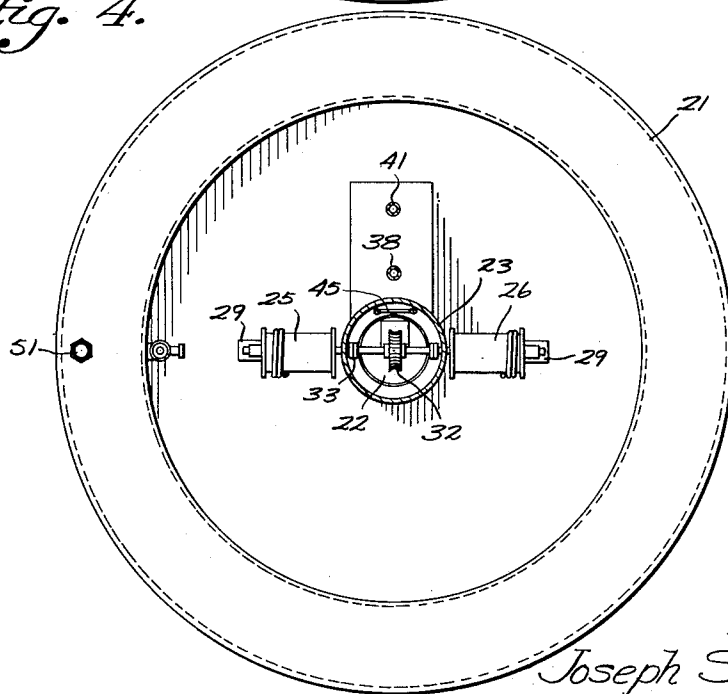


Fig. 4.



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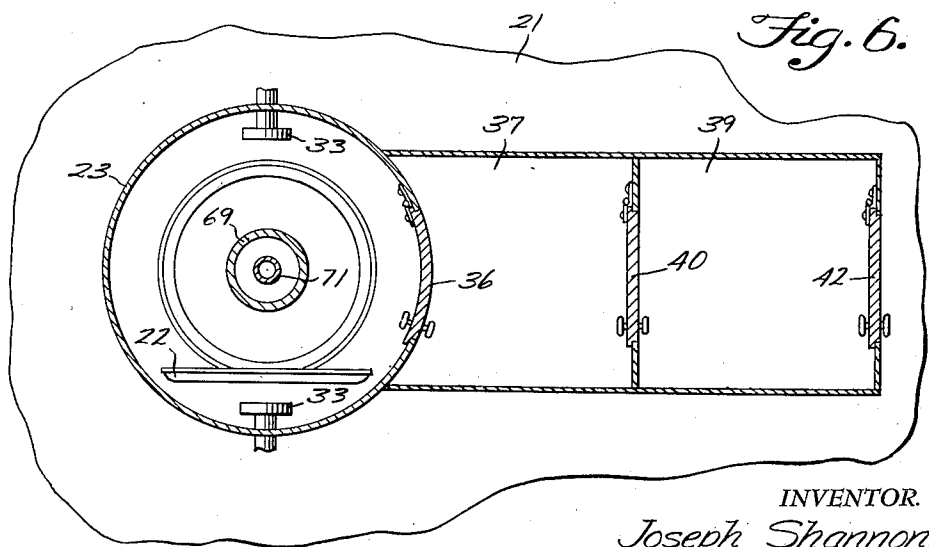
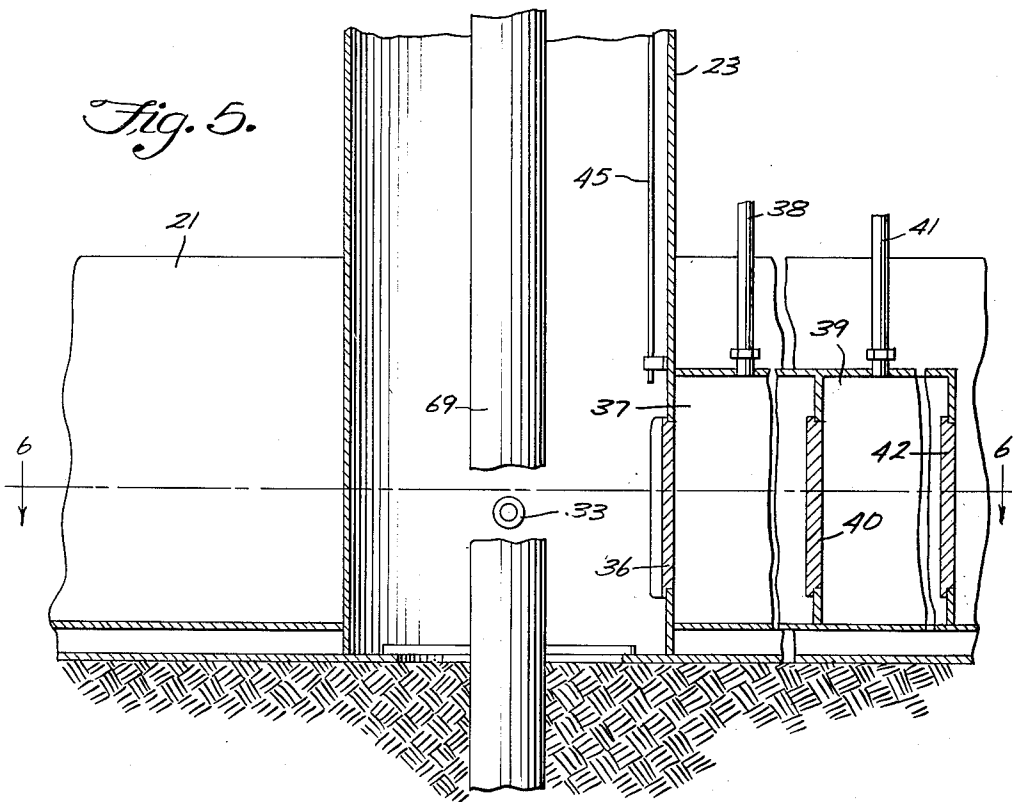
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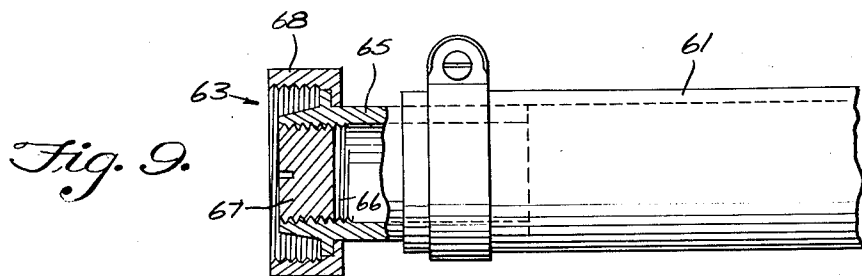
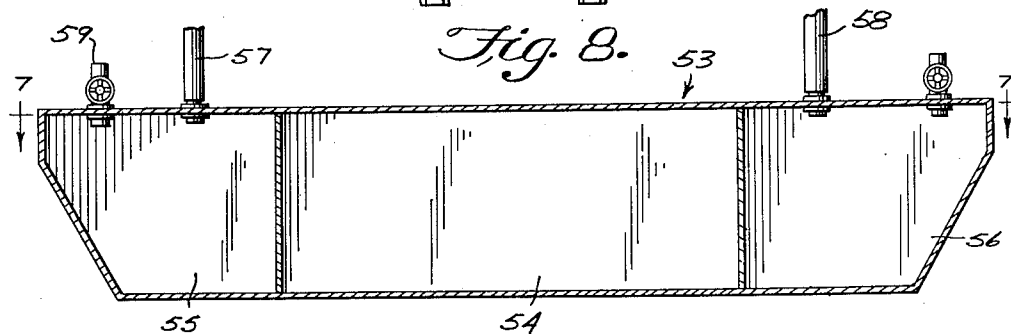
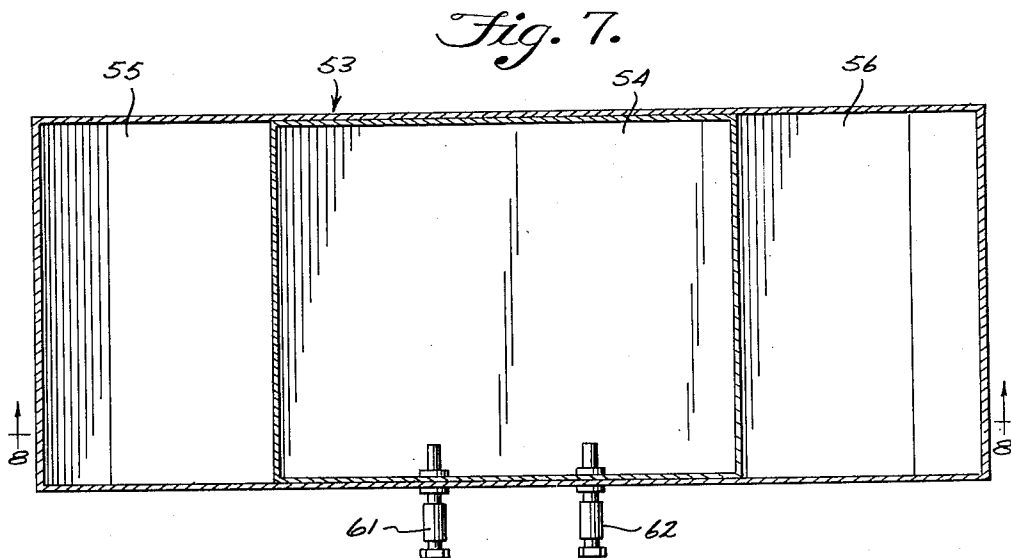
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MARINE OIL DRILLING MACHINE

2,534,480

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6 Sheets-Sheet 5



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2,534,480

MARINE OIL DRILLING MACHINE

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6 Sheets-Sheet 6

Fig. 10.

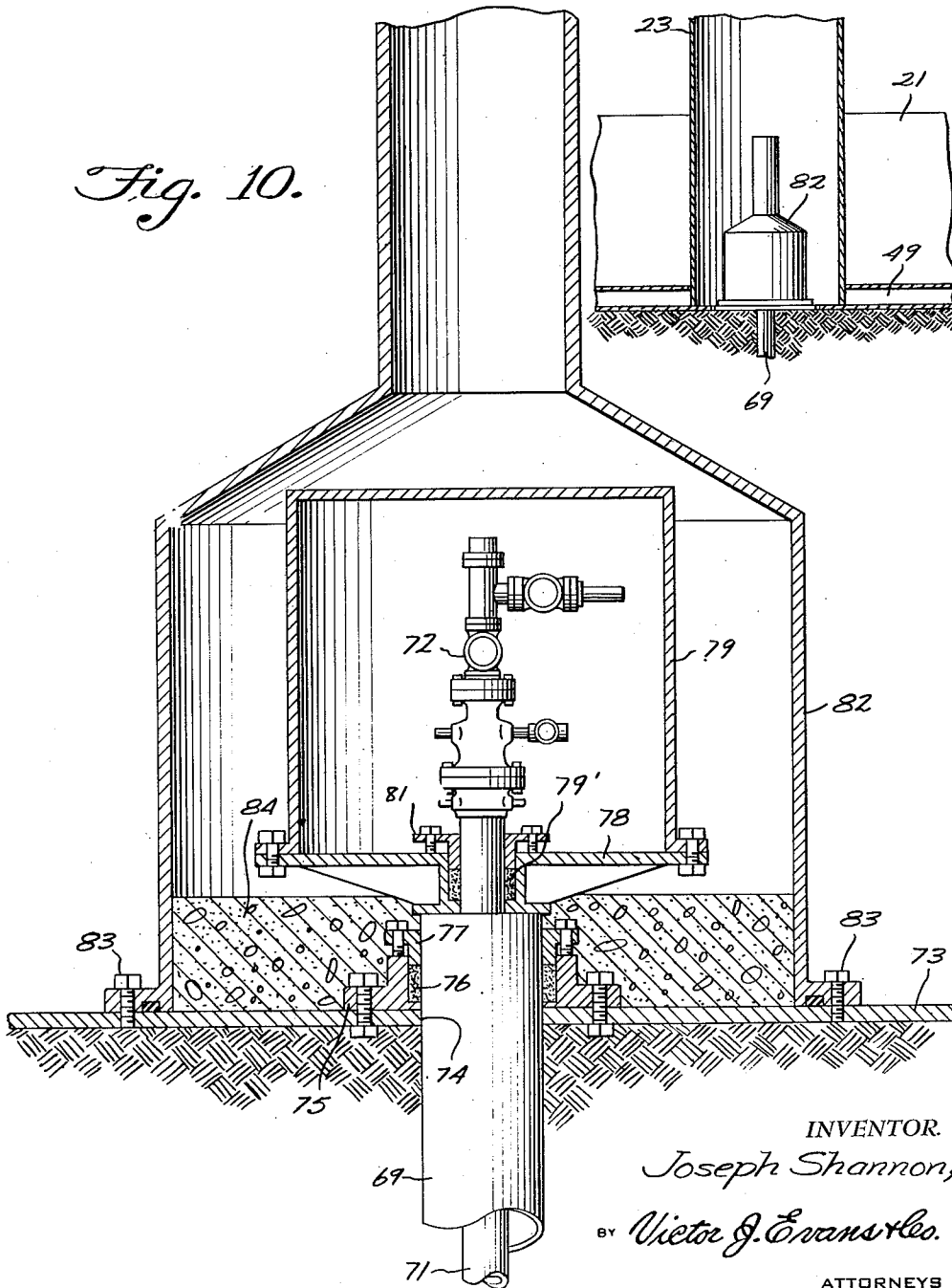


Fig. 11.

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UNITED STATES PATENT OFFICE

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MARINE OIL DRILLING MACHINE

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Application March 20, 1947, Serial No. 735,832

8 Claims. (Cl. 61—81)

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This invention relates to oil well drilling equipment for use under water.

It is an object of the present invention to provide an apparatus for use in drilling wells under water and particularly for reworking wells after the original drilling rig, derricks and the like have been removed, and which can be readily floated to the location of the well, easily submerged over the well and as distinguished from the usual drilling equipment will withstand high winds and waves.

Another object of the present invention is to provide oil drilling equipment adapted for use under water which has adequate working space and wherein the lowered ballast tank has derrick equipment attached to an upper ballast tank by which the lowered ballast tank over the oil well can be hoisted vertically so that the tower will be extended upwardly through the upper ballast tank and the equipment conditioned for transport and location over another well site.

Other objects of the present invention are to provide undersea oil well drilling equipment which is of simple construction, easy to transport and install, of durable and sturdy construction, and efficient in operation.

For other objects and for a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawing, in which

Fig. 1 is an underwater elevational view of the equipment installed over an oil well site.

Fig. 2 is a cross-sectional view of the enclosure equipment taken on line 2—2 of Fig. 3.

Fig. 3 is a top plan view of the enclosure equipment looking into the upper end of the vertical pipe and upon the top faces of the ballast tanks, the view being taken generally on line 3—3 of Fig. 2.

Fig. 4 is a transverse cross-sectional view taken on line 4—4 of Fig. 2 and looking in the direction of the arrows thereof.

Fig. 5 is an enlarged fragmentary and cross-sectional view, in elevation, taken on line 5—5 of Fig. 2 and showing the safety chambers.

Fig. 6 is a transverse cross-sectional view taken on line 6—6 of Fig. 5.

Fig. 7 is a transverse cross-sectional view of the slush pit and taken on line 7—7 of Fig. 3.

Fig. 8 is a cross-sectional view, in elevation, of the slush pit taken on line 8—8 of Fig. 7.

Fig. 9 is a fragmentary and cross-sectional view of a hose fitting used in connection with the present equipment.

Fig. 10 is an enlarged cross-sectional view of a

2

completed oil well head with the various packings, the cement base, the top cover and the cement form used in fixing the base.

Fig. 11 is a view similar to Fig. 10 but showing the cement base form in full elevation.

Referring now to the figures, 21 represents a lowered ballast tank adapted to be submerged and rested upon the bottom of the sea over an oil site and through the bottom of which the drilling, cleaning and other operations are performed. To gain access to the bottom land, there is provided a trap door 22 which can be lifted to expose the land surface or a previously formed oil well where the equipment replaces the original drilling rig. Fixed to and extending upwardly from the lowered ballast tank 21 is a large pipe 23 providing a caisson which is formed in sections connected together and added one above the other as the ballast tank 21 is submerged and lowered from upper ballast tank 24. Both of the ballast tanks are of ring formation and the upper ballast tank 24 may fit the interior of the lower ballast tank. In the bottom of the lower ballast tank are two winches 25 and 26 connected respectively by their ropes 27 and 28 with the bottom of the upper ballast tank at opposite sides of the pipe 23. The winches 25 and 26 are supported at one end upon a bearing block 29 and upon the other end by a bearing sleeve in the lower end of the pipe 23. Within the bottom of the pipe 23 is a detachable driving gear element 32 which is connected through face plates 33 with the winches and can be removed after the ballast tank 21 has been properly located over the oil well site. A driving motor 34 with a pinion 35 serves to drive the element 32. This equipment can likewise be removed from its location to provide adequate working space at the bottom of the pipe 23.

In the bottom of the pipe 23 is a door 36 which enters a safety chamber 37, Figs. 5 and 6, which is air conditioned and which will provide an escape for workmen should large volumes of gas be let loose from the well. A hose 38 connects this chamber 37 with the surface of the water and by means of this hose air or oxygen can be pumped to the chamber. To give double assurance to the workmen, a second chamber 39 is provided on the end of the chamber 37 and access is had to it through a door 40. This chamber 39 is likewise connected to the surface by a hose 41. This chamber 39 has an escape door 42 through which the workmen may take to the water or leave the chamber 39 when the ballast tank is raised to the surface. Likewise the work-

men may enter the bottom end of the pipe 23 by way of the escape doors. Other access and egress is had with the lower end of the pipe 23 from the opening in the top of the pipe as indicated at 43, or side doors 44 by way of a ladder 45. The ends of the pipe sections 23 at the openings radially inwardly flanged as indicated at 46 so as not to interfere with the sliding movement of the pipe 23 through the upper ballast tank 24. The flanges 46 are connected together in a watertight manner by bolts 47.

With the lowered ballast tank raised, the tanks and the pipe are easily floated to the oil well site. Thereafter the lowered ballast tank is dropped to the bottom by releasing the winches 25 and 26 and by causing the ballast tank 21 to take on water in its annular chamber 48. The pipe 23 is slid downwardly through the tank 24. The ballast tank 21 has a double bottom surrounding the pipe 23 into which water from the chamber 48 is extended as indicated at 49. The chamber 48 is connected by an airline 51 to a supply boat 52 standing by as indicated in Fig. 1.

Also working with this equipment is a slush pit barge 53, Figs. 1, 7 and 8, having a slush pit opening or chamber 54 and air chambers 55 and 56. The air chambers 55 and 56 are disposed at opposite ends of the barge and are connected respectively by air holes 57 and 58 to supply boat 52. Valve fittings 59 are connected to the air chambers 55 and 56 through which air and water can be extended at times of submerging and raising the barge 53. Hose connections 61 and 62 extend between the slush pit 54 and the pipe 23. The slush pit has fittings 63 at the side of the barge for supporting the hose 61 and 62. The connection of the hose with the pipe 23 is usually effected after the pipe has been submerged and by a diver working under water. In Fig. 9 there is shown a specially formed fitting 65 which the diver uses for connecting the hose 61 and 62 to the pipe 23. This fitting 65 has internal threads 66 adapted to receive a plug 67 which will be accessible to the workmen within the pipe 23 after the fitting has been secured to the pipe by an annular internally threaded coupling member 68. Adequate pumping equipment can be brought to the lower end of the pipe 23 for extending the slush to the slush pit 54.

As the well is being worked, pipe casing 69 is extended down through the pipe 23 and into the well. After the well has been finally formed a head arrangement, as shown in Figs. 10 and 11, is formed thereover. The oil pipe through which the oil is brought to the surface lies internally of the casing 69 as indicated at 71 and is brought upwardly therethrough to have adequate outlet fittings 72 connected thereto. Over the land surface there is disposed a bottom piece 73 which has a central opening 74 through which the casing 69 extends. A packing member 75 is secured to the plate 73 and is filled with packing material 76 which is retained therein by a pressure plate 77. On the top of the casing 69 there is supported a base 78 on which can be placed a cover 79 to keep out seawater from space surrounding the fittings 72. This base is formed to receive packing material 79 and a pressure plate 81.

With the fitting arrangement established a cement form 82 is secured to the plate 73 by bolts 83. Concrete 84 is then poured through the upper end of the cement form and allowed to set about the packing parts surrounding casing 69 and about base 78.

It should now be apparent that there has been provided simple equipment for handling oil wells under water and that this equipment is portable, easy to install and provides adequate space and safety for the workmen.

While various changes may be made in the detail construction, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

I claim:

1. Undersea oil well working equipment comprising a lower ballast tank, a large pipe extending upwardly from the bottom of the lower ballast tank and providing a chamber for equipment and workmen, said pipe having a door in the lower end opening through said bottom, an upper ballast tank through which the pipe is vertically slidable, and winch devices mounted on the lower ballast tank and connected by cables to the upper ballast tank for permitting their separation and for drawing the tanks together for lowering the lower tank and for raising the same, respectively.

2. Undersea oil well working equipment as defined in claim 1, and said winch device extending into the pipe for connection with actuating parts, and actuating parts lying within the pipe and detachably connected with the inwardly extended winch part.

3. Undersea oil well working equipment as defined in claim 1, and safety chamber means on the lower ballast tank to which access can be had from the side of the pipe when the well has let loose gas.

4. Undersea oil well working equipment as defined in claim 1, and said vertically extending pipe being formed in sections and having inwardly extending flanges by which the pipe sections can be connected together and whereby the pipe will have a smooth surface to permit its passage through the upper ballast tank.

5. Undersea oil well working equipment as defined in claim 1, and said ballast tanks being of annular shape and said lower tank having an inner annular recess therein, and the upper tank being smaller to fit the recess of the lower tank.

6. Undersea oil well working equipment as defined in claim 1, and said pipe having fittings to which slush pit hose can be connected, and a slush pit hose having a fitting with a plug therein accessible from the interior of the large pipe connected thereto.

7. In a well drilling caisson, the combination which comprises a vertically disposed tubular well providing a housing for equipment and workmen with the upper end open and having a horizontally disposed door in the lower end, an upper annular ballast tank slidably mounted on the said well, an annular lower ballast tank having an intermediate annular recess in the upper surface for receiving the upper ballast tank carried by the lower end of the well, cables connecting the upper and lower ballast tanks, and means actuating the cables to draw the upper ballast tank into the annular recess of the lower ballast tank.

8. In an under water well drilling caisson, the combination which comprises a vertically disposed tubular well providing a housing for equipment and workmen with the upper end open and having a horizontally disposed door in the lower end through which well drilling equipment may be extended, an upper annular ballast tank slidably mounted on said well, said well formed of

5

sections having inwardly extended connecting flanges whereby a smooth outer surface is provided for passage of the upper annular ballast tank, an annular lower ballast tank having an intermediate annular recess for receiving the upper ballast tank carried by the lower end of the well, cables connecting the upper and lower ballast tanks, and means actuating the cables to draw the upper ballast tank into the annular recess of the lower ballast tank.

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