United States Patent [19]

Weaver

[11] **3,802,209**

[45] **Apr. 9, 1974**

[54] **SELF-CONTAINED DRILL SHIP**

[76] Inventor: **Carnes W. Weaver,** Chamber of Commerce Bldg., Suite 1432, Houston, Tex. 77002

[22] Filed: **Sept. 25, 1972**

[21] Appl. No.: **291,917**

[52] **U.S. Cl.**..... **61/72.3,** 61/46.5, 114/.5 D, 175/7

[51] **Int. Cl.**..... **E21b 15/02,** B63b 35/04

[58] **Field of Search**..... 61/46.5, 72.3, 72.1; 175/7, 5, 8, 9; 114/.5 D

[56] **References Cited**

UNITED STATES PATENTS

3,685,305	8/1972	Lloyd	61/72.3
3,368,509	2/1968	Knight, Jr. et al.	114/.5 D
2,976,693	3/1961	Showalter et al.	61/46.5
2,938,352	5/1960	Knapp et al.	61/46.5

Primary Examiner—Jacob Shapiro

Attorney, Agent, or Firm—Pravel, Wilson & Matthews

[57] **ABSTRACT**

A self-contained, multi-purpose drill ship including means for drilling and completing to production an offshore oil well without the use of additional vessels or equipment.

11 Claims, 4 Drawing Figures

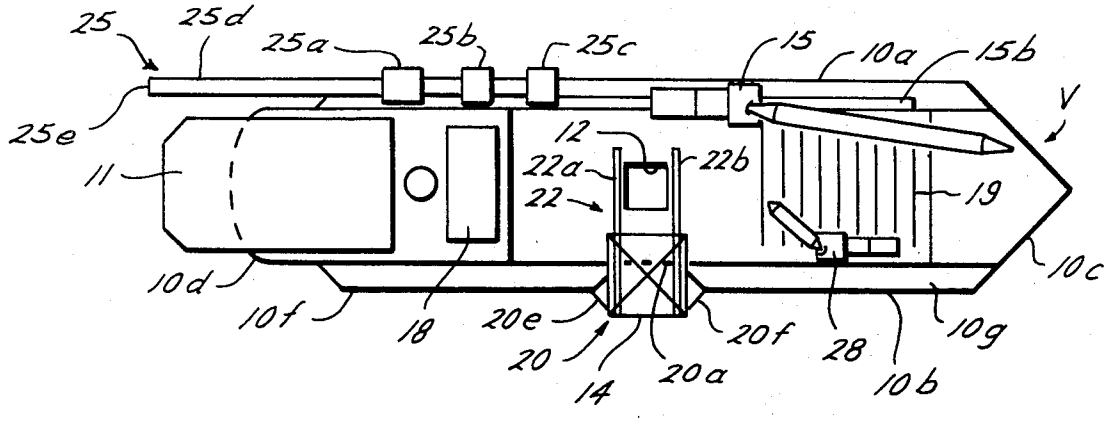


Fig. 1

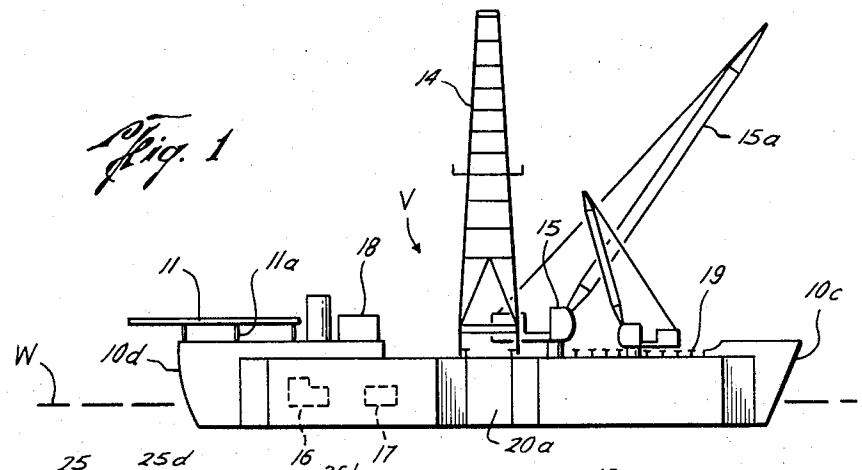
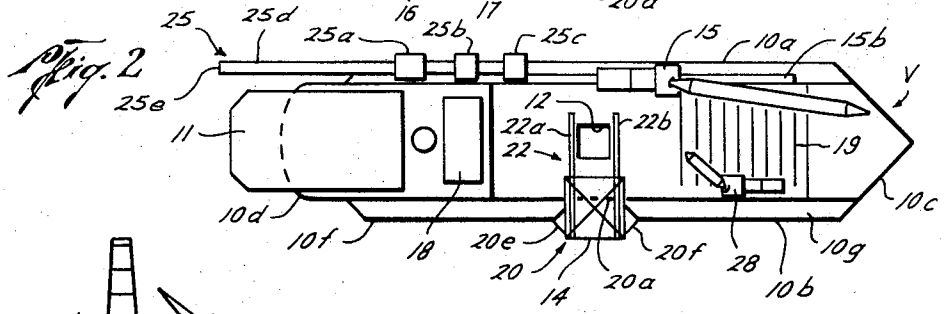


Fig. 2



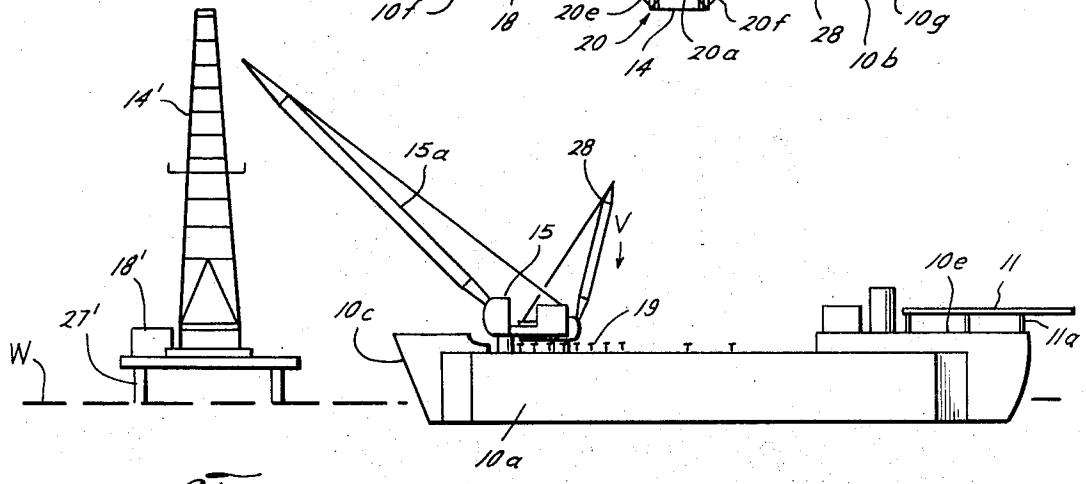
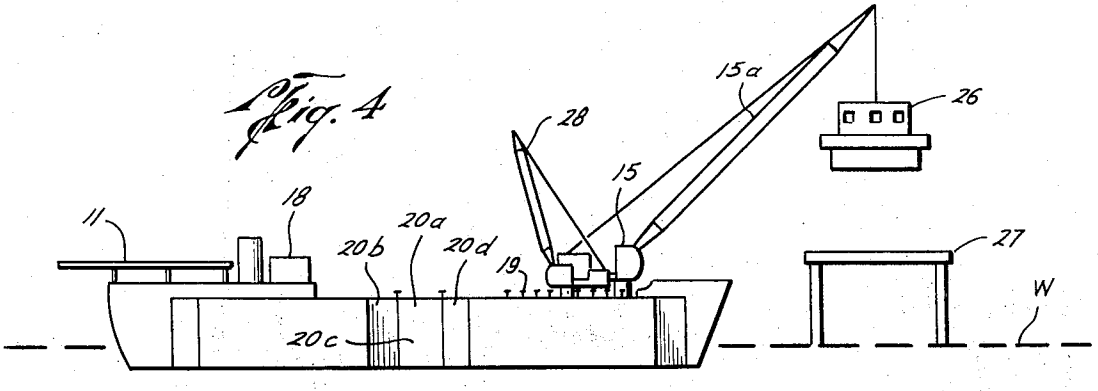


Fig. 3

Fig. 4



SELF-CONTAINED DRILL SHIP

BACKGROUND OF THE INVENTION

The field of this invention is offshore oil well drilling and production.

In offshore oil well drilling and production, it is known to use different vessels for drilling, erecting platforms, or laying piping for production of a completed well.

For example, U. S. Pat. No. 3,378,086, issued to Kivisild, disclosed embodiments for either off-the-side or through the vessel drilling only. U. S. Pat. No. 3,001,595, issued to Lucus, disclosed a derrick barge arrangement for platform erection drilling and servicing only and U. S. Pat. No. 3,373,807, issued to Fischer et al., disclosed a barge whose sole function is connecting pipeline to a submerged well head.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a new and improved self-contained, multi-purpose vessel for drilling and completing a wildcat well or developing an entire field offshore and providing a flow line from the producing wells to storage without using any other vessels. The self-contained drilling and completion vessel of the preferred embodiment of this invention has a central opening therein for drilling a well through the vessel and a side drill means for drilling and/or completing a well over the side area of the vessel. Pipe laying means are provided on the deck for laying a flow line from a completed well to a storage area, which may be located on shore or offshore. The vessel of this invention further includes tender platform apparatus for servicing a well platform such as a developmental platform. The vessel also performs as a derrick barge for providing general lifting capabilities in order to build a platform and otherwise move drilling equipment. By utilizing the vessel of this invention, it is possible to drill and complete an initial or wildcat well and thereafter develop the field of the wildcat well and then provide flow lines from the field of producing wells to a storage area without the use of any other floating vessels.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view of the self-contained, multi-purpose floating vessel of the preferred embodiment of this invention;

FIG. 2 is a top view of the vessel of this invention illustrating the pipe laying means thereof;

FIG. 3 is an elevational view illustrating the vessel of the preferred embodiment of this invention performing tender platform activities; and

FIG. 4 is an elevation view illustrating the operation of the vessel as a derrick barge.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawing, the letter V generally designates a self-propelled, floating vessel for performing all the necessary drilling and completion operations to bring either a single oil well or an entire field located offshore into production without the use of additional vessel or floating equipment. The vessel V is a single-hull ship defined by vessel sides **10***a* and **10***b*, bow **10***c* and stern **10***d*. A helioport **11** is mounted by supports **11***a* over the stern deck **10***e*.

The vessel V has a central opening **12** located substantially in the middle of the ship near the pitching axis of the ship. The opening **12** is defined by four walls and extends entirely through the center portion of the vessel. Referring to FIG. **1**, a derrick **14** is erected over the opening **12**. The derrick **14** may be erected utilizing a main crane **15**. The main crane **15** has sufficient boom **15***a* to erect the derrick **14** and is mounted for 360° rotation. The main crane **15** may be moved longitudinally of the ship along a track **15**b. The vessel V includes all the power equipment necessary to drill a well through the center opening **12**. For example, the mud tanks are schematically represented at **16** as being located between the center of the ship and the stern and the mud pumping equipment **17** is schematically represented as being located next to the mud tanks **16**. Further, the rotary power equipment may be housed within housing **18** and, a plurality of pipe racks generally designated as **19** may be provided between the main crane as illustrated in FIG. **1** and the bow **10***c* of the vessel. It should be understood that the exact location of the various rotary power equipment **18** may be anywhere within the confines of the vessel so long as they are operative in cooperation with the derrick **14** to drill an oil well.

A side drill means generally designated as **20** is formed at side **10***b* of the vessel V. The side drill means is actually a recess or indentation **20***a* formed by side wall **20***c* and walls **20***b* and **20***d* of sponsons **10***f* and **10***g*.

The derrick **14** is mounted by a skid means generally designated as **22** for movement between a position over the central opening **12** and a position substantially over the side recess drilling area **20***a*. The skid means includes tracks **22***a* and **22***b* which extend from a position substantially adjacent the central opening **12** outwardly over the walls **20***b*, **20***c*, and **20***d* of the recessed side drilling area **20***a*. In this manner, the derrick **14** can be moved between a position over the central drilling opening **12** to a position over the recessed area **20***a* at the side **10***b* of the vessel V so that the drilling operations can take place at the side **10***b* of the vessel. The derrick **14** is fully supported over recess **20***a* by supports **20***e* and **20***f*, which extend from walls **20***b* and **20***d* to the derrick such that no part of the derrick extends beyond the supports **20***e* and **20***f*.

Referring to FIG. **2**, a pipe laying means generally designated as **25** is provided for laying a pipe or flow line from a christmas tree of a completed off-shore well to a storage area either on shore or off shore. The pipe laying means includes welding stations **25***a*, **25***b* and **25***c* at side **10***a* of the vessel V and a ramp **25***d* which extends from the welding stations downwardly at an incline to water level generally designated as W. Of course, it is understood that the number of welding stations such as **25***a* as well as the angle of inclination and actual height or elevation of end **25***e* of the pipe ramp **25** may be varied as desired. Further, the ramp **25** includes machinery such as clamping devices for controlling the descent of pipe within the ramp.

Referring in particular to FIG. **4**, the vessel V of the preferred embodiment of this invention can be operated for general lifting purposes as a derrick barge in the following manner. The crane **15**, which is mounted for 360° rotation and movement longitudinally along track **15***b*, may be used to lift practically any type of drilling equipment and platform equipment such as

platform housing **26** onto the platform **27**, which can also be constructed by the use of the main crane **15**. A second crane generally designated as **28**, which is also mounted for 360° rotation, is located adjacent side **10***b* of the vessel V in order to be utilized for moving general drilling equipment such as pipe from the pipe rack **19**. It is within the scope of this invention to utilize one or both of the cranes **15** and **28** for any general lifting purposes normally provided by a separate derrick barge.

The vessel V of the preferred embodiment of this invention may be utilized and operated as a tender to a platform in the manner illustrated schematically in FIG. **3**. In FIG. **3**, the crane **15** has been utilized to construct the platform **27'** having the derrick **14'** thereon. The vessel V performs operations substantially adjacent to the drilling platform **27** and by providing auxiliary drilling functions. For example, the pipe rack **19** will be utilized to stack the drill pipes whenever necessary and the mud tank **16** and mud pump **17** are utilized in cooperation with rotary drilling equipment such as **18'**, which is moved from the vessel V onto the platform **27'**, to drill one or more wells from the platform **27'**. It is within the scope of this invention to utilize the vessel V as a tender to provide all necessary drilling services to the platform **27'** such that the platform **27'** may drill one or more wells below water level W.

In the operation and use of the self-contained, multipurpose drilling and production vessel V of the preferred embodiment of this invention, the derrick **14** may be utilized in cooperation with rotary drilling equipment **18** and mud tank **16** and mud pump **17** and other drilling equipment to drill an offshore oil well such as an initial wildcat well through the central opening **12**. As the drilling of the oil well approaches completion, the derrick **14** may be moved over the recessed area **20***a* of the side **10***b* of the vessel V and thereafter the final drilling operations are completed over the side **10***b*. After final drilling operations are completed, the well casing is brought to the surface at water level W and the well is completed by utilizing main crane **15** and second crane **28** to place a christmas tree and/or protective wall jacket at the completed well.

After the initial or wildcat well is thus completed, the main crane **15** and second crane **28** may be used as a derrick barge to build developmental platform **27'** having derrick **14'** thereon. As is known in the art of offshore oil well drilling, the developmental platform **27'** may be utilized to develop the field of the completed wildcat well.

In developing the entire field from the platform **27'**, the vessel V is positioned as illustrated in FIG. **3** and the drilling equipment on board the vessel V is utilized such that the vessel operates as a tender to the developmental platform **27'**.

Further, the pipe laying means **25** may be utilized to provide a flow line from the completed wildcat well and other wells completed from the platform **27'**. The flow line is laid utilizing the welding stations **25***a*, **25***b* and **25***c* to weld pipe lengths (not shown) together and lower such welded pipe lengths down ramp **25***d* into the water. In this manner, the vessel V of the preferred embodiment of this invention is utilized to drill an initial or wildcat well and thereafter develop the entire field and even provide flow line for production purposes from the developed field wells to storage facilities, all such functions being accomplished without the use of additional floating vessels.

It should be understood that it is within the scope of this invention to provide a vessel V having the dimensions and displacement and propulsion means necessary to function in whatever ocean or sea desired. It is further understood that all equipment will be provided as necessary to house a full crew of men in addition to providing drilling equipment necessary to drill a plurality of oil wells.

The foregoing disclosure and discription of the invention are illustrative and explanatory thereof, and various changes in the size, shape and materials as well as in the details of the illustrated construction may be made without departing from the spirit of the invention.

What is claimed is:

1. A self-contained, multi-purpose offshore drill and well completion vessel, comprising:
a floating vessel having a central opening therein for drilling a well through the vessel;
side drill means mounted with said floating vessel for completing a well over a side of said vessel;
an oil well derrick positioned on the deck of said vessel over said central opening;
means mounting said derrick for movement between said central opening and said side drill means; and

pipe laying means for laying a flow line from a completed well whereby an offshore well is drilled and brought to production by said vessel.

2. The structure set forth in claim **1**, including:
tender-platform means for serving a platform.

3. The structure set forth in claim **1**, including:
derrick barge means for operating said vessel as a derrick barge for loading and unloading platform and drilling equipment or the like.

4. The structure set forth in claim **1**, wherein:
said side drill means includes means for drilling a well over the side of said vessel.

5. The structure set forth in claim **1**, including:
a crane located on said vessel, said crane having sufficient boom to provide an oil well derrick.

6. The structure set forth in claim **1**, wherein said pipe laying means includes:
a welding station for welding pipe lengths together; and means for lowering said pipe into the water.

7. The structure set forth in claim **2**, wherein said tender-platform means includes:
drilling fluid storage and pumping facilities.

8. The structure set forth in claim **1**, wherein:
said side drill means includes a recess in a side of said vessel; and means for mounting a derrick over said recess.

9. The structure set forth in claim **1**, including
tender-platform means for serving a platform; and
derrick barge means for operating said vessel as a derrick barge for loading and unloading drilling equipment or the like.

10. The structure set forth in claim **1**, including:
pipe rack means for storing pipe.

11. The structure set forth in claim **5**, including:
said first-mentioned crane being positioned at approximately the middle of said vessel; and
a second crane positioned between said first-mentioned crane and the bow of said vessel.

* * * * *