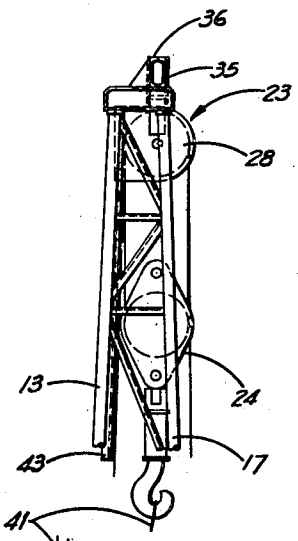
June 7, 1949. H. J. WOOLSLAYER ET AL 2,472,359

OIL WELL DRILLING APPARATUS HAVING CROWN BLOCK MOVABLE LENGTHWISE OF MAST

Filed April 20, 1948 2 Sheets-Sheet 1

Fig. 1



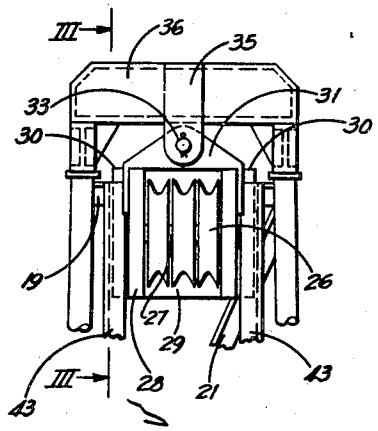
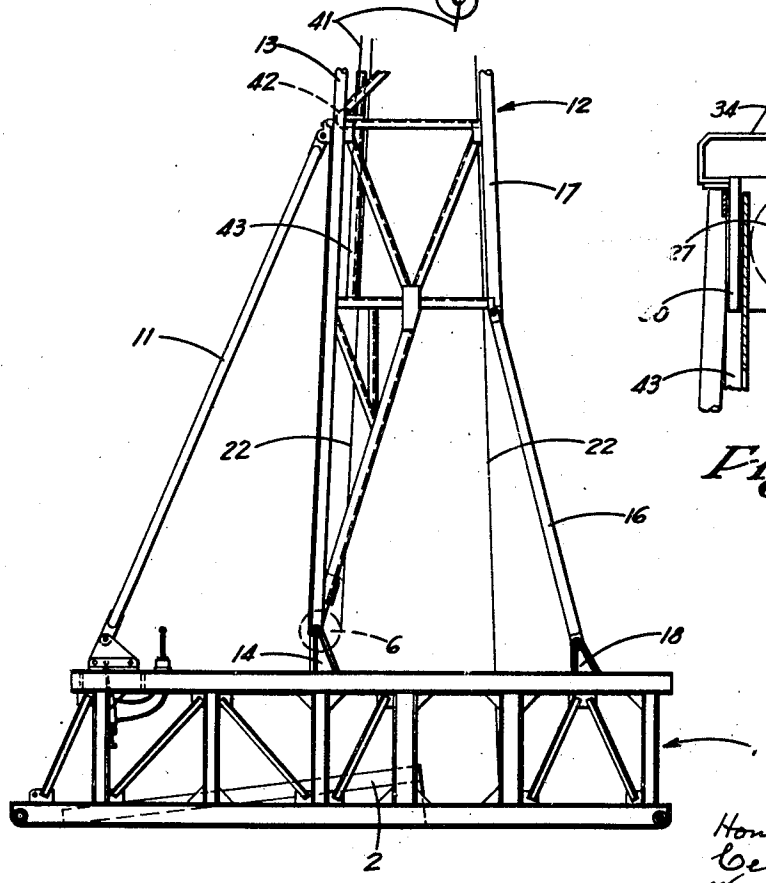


Fig. 2



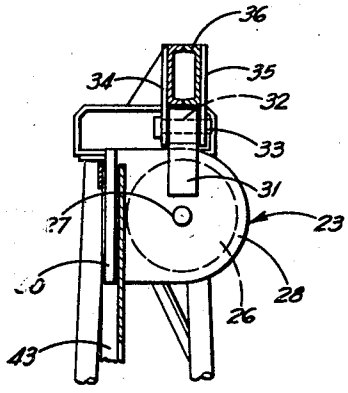


Fig. 3

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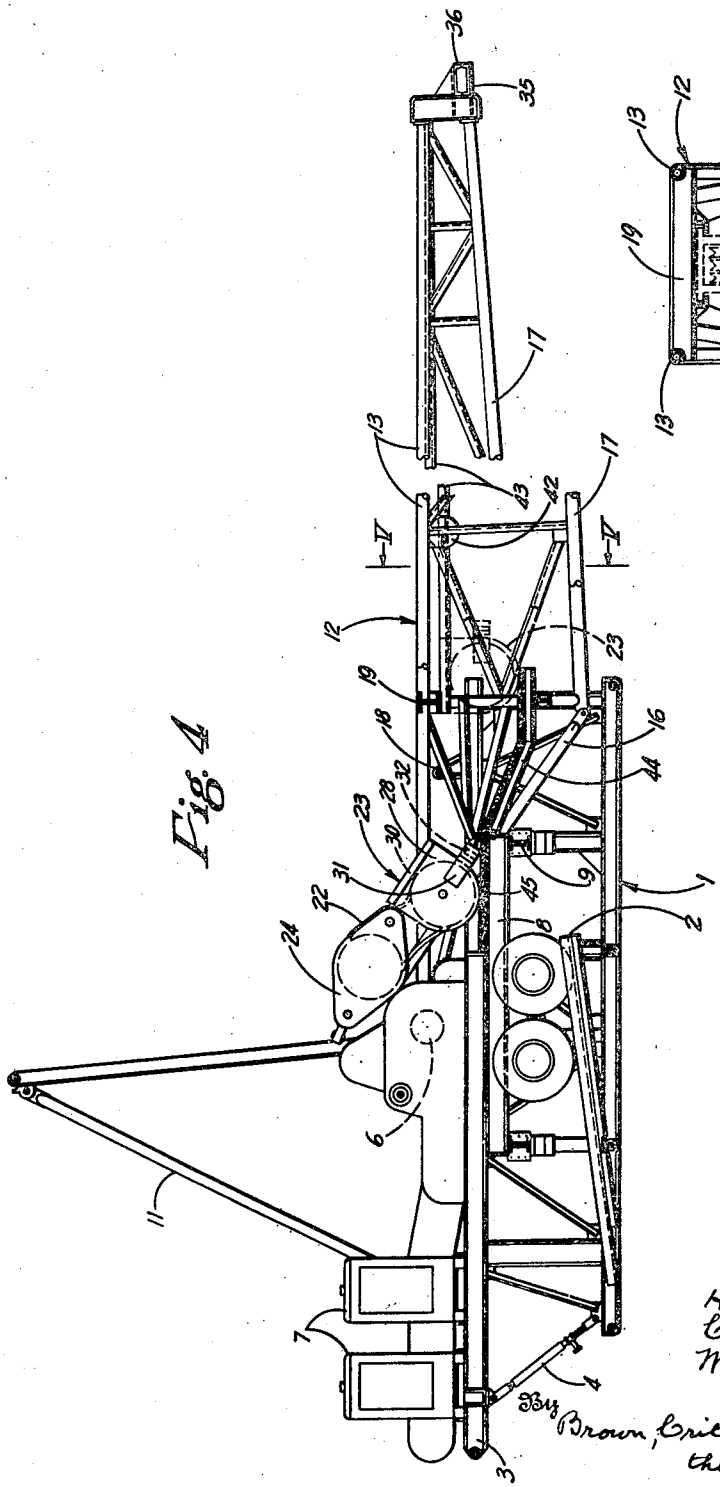


Fig. 4

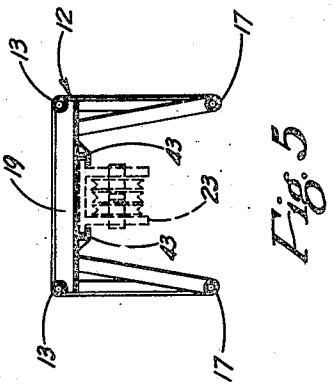


Fig. 5

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2,472,359

OIL WELL DRILLING APPARATUS HAVING CROWN BLOCK MOVABLE LENGTHWISE OF MAST

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Application April 20, 1948, Serial No. 22,204

8 Claims. (Cl. 189—21)

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This invention relates to oil well drilling apparatus, and more particularly to such apparatus having a mast that can be swung down to the ground for dismantling and transportation from one location to another.

In our copending patent application, Serial Number 20,994, filed April 14, 1948, we have shown an oil well derrick substructure provided with a bay having ramps in it up which a truck trailer can be backed and then firmly fastened to the substructure. The trailer carries the drawworks, and also is equipped to carry the traveling block and crown block from one well to another.

It is among the objects of this invention to provide oil well drilling apparatus of the type shown in said copending application in which the crown block can be disconnected from the outer end of the lowered mast and moved through the mast to the substructure and onto the trailer, and in which the construction of the mast permits the traveling block and crown block to be carried away by the trailer without unstringing the blocks.

In accordance with this invention a mast, having an open side and a closed side, is mounted on a substructure with which a power drum is associated. Preferably, the drum is mounted on a vehicle that can be moved into a bay in the substructure. The lower end of one side of the mast is hinged to the substructure to permit the mast to be swung down to a position along the ground so that it can be separated into sections and moved to another location. A crown block is detachably mounted in the top of the mast, and a traveling block is suspended from it by a line that has one end attached to the power drum. Inside the mast adjacent its closed side is a track that extends from the top of the mast to a point near its bottom. When the mast is in its lower position on the ground the crown block can be disconnected from the outer end of the mast and slid along the track toward its opposite end and then out onto the substructure. Preferably, the closed side of the mast is uppermost when the mast is in its lower position, and the crown block is suspended from the track which may take the form of parallel rails.

The preferred embodiment of the invention is illustrated in the accompanying drawings in which Fig. 1 is a side view of our oil well drilling apparatus; Fig. 2 is a rear view of the upper end of the mast; Fig. 3 is a vertical section taken on the line III—III of Fig. 2; Fig. 4 is a side view with the substructure in section, showing the mast extending along the ground and the traveling and crown blocks removed from the mast; and Fig. 5 is a vertical section of the prone mast taken on the line V—V of Fig. 4.

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Referring to the drawings, the same substructure 1 is shown as is disclosed in the above-mentioned patent application. This substructure is formed from structural steel members and is provided with ramps 2 up which a truck trailer 3 has been backed and then leveled by means of jacks 4. The trailer carries the drawworks, which include the usual winding drum 6 driven by engines 7. Projecting beyond the rear end of the main frame of the trailer are a pair of horizontal beams 8 that rest on a cross beam 9 in the substructure. A gin pole 11 straddles the drawworks, and a mast 12 is mounted in front of it on the substructure. The lower ends of the rear legs 13 of the mast are pivotally and detachably mounted in the same shoes 14 that support the front of the gin pole. The lower portions 16 of the mast's front legs are hinged to their upper portions 17 and are detachably connected to shoes 18 near the front of the substructure. The front side of the mast is open for most of its height so that pipe can be swung in and out of it, but the back side is closed by horizontal girts 19 and diagonal braces 21. A line 22 is connected to the drawworks drum 6 and extends up inside the mast to a crown block 23 and then down to support the traveling block 24 in the usual way.

The crown block 23 includes sheaves 26 rotatably mounted on a shaft 27, the ends of which are mounted in parallel side plates 28. The rear edges of these plates are connected by a cross plate 29 that projects beyond them to form flanges 30. Connecting the side plates above shaft 27 is an upwardly extending suspension member 31 that has a horizontal opening 32 through it parallel to the side plates. Extending through this opening is a heavy pin 33, the ends of which extend through openings in the lower ends of a pair of parallel supporting members 34 and 35 which have their upper portions secured to the front and back of a cross beam 36 mounted on top of the mast above its front legs.

When it is desired to move this apparatus to another location, the traveling block 24 is connected to the loop of a sling 41 that extends down in the mast and around under sheaves 42 to the top of the gin pole where the ends of the sling are anchored. The lower portions 16 of the mast's front legs are disconnected from shoes 18 and swung back out of the way, and then the drawworks drum slowly lets out line 22 to per-

mit the mast to swing forward and down to the ground. During this operation the mast is supported by the sling. The front of the substructure is provided with a recess that receives part of the mast.

After the mast reaches its lower position shown in Fig. 4, line 22 continues to be paid out so that the traveling block can be pulled by the cat line (not shown), or by any other suitable means, toward the substructure and out of the lower or rear end of the prone mast. The traveling block is pulled up onto the substructure and preferably up against the drawworks to which it is lashed. The pin 33 then is removed from the crown block to disconnect it from the upper or outer end of the mast, but the crown block will not drop because its flanges 30 are supported by parallel rails 43 forming a track inside the mast near its closed rear or upper side and extending from the outer end of the mast to the substructure. The rails preferably are formed from angle bars secured to girts 19, which are quite wide. These angle bars have flanges spaced from the girts and projecting toward each other to slidably support the crown block flanges. By reversing the drum to reel in line 22, the crown block can be pulled along the track toward the substructure by the shortening loops connecting the crown block to the stationary traveling block. A temporary ramp 44 may be mounted in the recess in the front of the substructure to support the crown block when it leaves the track and to guide it up to a temporary platform 45 laid on the trailer beams 8. In this manner both the traveling block and the crown block are brought to the trailer while remaining strung together and connected by line 22 to the drawworks. The mast then can be disconnected from shoes 14 and separated into sections for transportation, and the two blocks can be carried by the trailer out of the substructure to the new location.

In reversing the procedure just outlined, so that the mast can be erected, an auxiliary line may be connected to the crown block at the substructure and to a winch or truck at the outer end of the prone mast for pulling the crown block away from the substructure and along the track to its operating position while line 22 unwinds from the drum. The crown block is fastened in place by inserting pin 33 in suspension member 31 and supporting members 34 and 35. The traveling block then is released from the substructure, and the drum is reversed to pull the block out into the mast to the point where it can be attached to the sling. Further winding of the line on the drum will cause the sling to swing the mast up to operating position, where the lower ends of front legs 16 can be attached to shoes 18 to support the mast when the sling is released.

This invention makes it possible to transport the crown block and traveling block independently of every part of the mast, and to do this without having to unstring the blocks or disconnect them from the drawworks. Also, the blocks can be removed from the mast and replaced therein quickly and easily.

According to the provisions of the patent statutes, we have explained the principle of our invention and have illustrated and described what we now consider to represent its best embodiment. However, we desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

We claim:

1. Oil well drilling apparatus comprising a substructure, a power drum associated therewith, a mast mounted on the substructure and having an open side and a closed side, the lower end of one of said sides being hinged to the substructure to permit the mast to be swung down to a position along the ground, a crown block detachably mounted in the top of the mast, a traveling block in the mast, a line suspending the traveling block from the crown block and having one end attached to the drum for raising and lowering the traveling block, and a track inside the mast adjacent said closed side and extending from the top of the mast to a point near its bottom, the crown block being slidably supported by said track when the mast is in its lower position with the crown block disconnected from the top of the mast, whereby the crown block can be moved along the track toward the opposite end of the mast and onto the substructure.

2. Oil well drilling apparatus comprising a substructure, a power drum associated therewith, a mast mounted on the substructure and having an open side and a closed side, the lower end of one of said sides being hinged to the substructure to permit the mast to be swung down to a position along the ground with its open side down, a crown block detachably mounted in the top of the mast, a traveling block in the mast, a line suspending the traveling block from the crown block and having one end attached to the drum for raising and lowering the traveling block, and a track inside the mast adjacent said closed side and extending from the top of the mast to a point near its bottom, the crown block being slidably suspended from said track when the mast is in its lower position with the crown block disconnected from the top of the mast, whereby the crown block can be moved along the track toward the opposite end of the mast.

3. Oil well drilling apparatus comprising a substructure, a power drum associated therewith, a mast mounted on the substructure and having an open side and a closed side, the lower end of one of said sides being hinged to the substructure to permit the mast to be swung down to a position along the ground with its open side down, a crown block detachably mounted in the top of the mast, a traveling block in the mast, a line suspending the traveling block from the crown block and having one end attached to the drum for raising and lowering the traveling block, and a pair of parallel angle bars inside the mast connected to its closed side and extending from the top of the mast to a point near its bottom, said bars having flanges spaced from said closed side and projecting toward each other, the crown block having lateral projections slidably mounted on said flanges when the mast is in its lower position with the crown block disconnected from the top of the mast and hanging down between said bars, whereby the crown block can be moved along the bars toward the opposite end of the mast.

4. Oil well drilling apparatus comprising a substructure, a power drum associated therewith, a mast mounted on the substructure and having an open side and a closed side, the lower end of the closed side being hinged to the substructure to permit the mast to be swung down to a position along the ground with its open side down, a crown block detachably mounted in the top of the mast, a traveling block in the mast, a line suspending

the traveling block from the crown block and having one end attached to the drum for raising and lowering the traveling block, a track inside the mast adjacent said closed side and extending from the top of the mast to a point near its bottom, the crown block being slidably suspended from said track when the mast is in its lower position with the crown block disconnected from the top of the mast, whereby the crown block can be moved along the track toward the opposite end of the mast, and a ramp removably mounted in the substructure for receiving the crown block from the mast as its slides therefrom and for guiding it to the top of the substructure.

5. Oil well drilling apparatus comprising a substructure provided with a bay extending inward from one end, a vehicle disposed in said bay, drawworks mounted on the vehicle, a mast mounted on the substructure and having an open side and a closed side, the lower end of one of said sides being hinged to the substructure to permit the mast to be swung down to a position along the ground, a crown block detachably mounted in the top of the mast, a traveling block in the mast, a line suspending the traveling block from the crown block and having one end attached to the drawworks for raising and lowering the traveling block, and a track inside the mast adjacent said closed side and extending from the top of the mast to a point near its bottom, the crown block being slidably supported by said track when the mast is in its lower position with the crown block disconnected from the top of the mast, whereby the crown block can be moved along the track toward the opposite end of the mast and onto the substructure and vehicle.

6. Oil well drilling apparatus comprising a substructure provided with a bag extending inward from one end, a vehicle disposed in said bay, drawworks mounted on the vehicle, a mast mounted on the substructure and having an open side and a closed side, the lower end of the closed side being hinged to the substructure to permit the mast to be swung down to a position along the ground with its open side down, a crown block detachably mounted in the top of the mast, a traveling block in the mast, a line suspending the traveling block from the crown block and having one end attached to the drawworks for raising and lowering the traveling block, a track inside the mast adjacent said closed side and extending from the top of the mast to a point near its bottom, the crown block being slidably suspended from said track when the mast is in its lower position with the crown block disconnected from the top of the mast, whereby the crown block can be moved along the track toward the opposite end of the mast, and a ramp removably mounted in the sub-structure for receiving the crown block from the mast as it slides therefrom and for guiding it to the top of said vehicle.

7. Oil well drilling apparatus comprising a substructure provided with a bay extending inward from its rear end and having a recess in its front end, a vehicle disposed in said bay, drawworks mounted on the vehicle, a mast mounted on the substructure and having an open front side and a closed rear side, means detachably hinging the lower end of said rear side to the substructure to permit the mast to be swung forward and down into said recess so that the mast will extend along the ground in front of the substructure, a crown block detachably mounted in the top of the mast, a traveling block in the mast, a line suspending the traveling block from the crown block and having one end attached to the drawworks for raising and lowering the traveling block, and a track inside the mast adjacent said closed side and extending from the top of the mast to a point near its bottom, the crown block being slidably suspended from said track when the mast is in its lower position with the crown block disconnected from the top of the mast, whereby the crown block can be moved along the track toward the opposite end of the mast and onto the substructure and vehicle.

8. Oil well drilling apparatus comprising a substructure, a power drum associated therewith, a mast mounted on the substructure and having an open side and a closed side, the lower end of one of said sides being hinged to the substructure to permit the mast to be swung down to a position along the ground, a crown block provided with an upwardly projecting suspension member having a transverse opening through it, a pin extending through said opening, supporting members secured to the top of the mast and having openings in their lower ends receiving the ends of said pin, said pin being removable to disconnect the crown block from said supporting members, a traveling block in the mast, a line suspending the traveling block from the crown block and having one end attached to the drum for raising and lowering the traveling block, and a track inside the mast adjacent said closed side and extending from the top of the mast to a point near its bottom, the crown block being slidably supported by said track when the mast is in its lower position with said pin removed from said suspension member, whereby the crown block can be moved along the track toward the opposite end of the mast and onto the substructure.

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No references cited.

Certificate of Correction

Patent No. 2,472,359. June 7, 1949.

HOMER J. WOOLSLAYER ET AL.

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 1, line 7, for the serial number "20,994", read *20,944*; column 5, line 13, claim 4, for the word "its" read *it*; line 38, claim 6, for "bag" read *bay*;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of November, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.