April 2, 1957 H. J. WOOLSLAYER ET AL 2,787,344

PORTABLE OIL WELL MAST WITH FOLDING GIN POLE

Filed Feb. 10, 1954 3 Sheets-Sheet 1

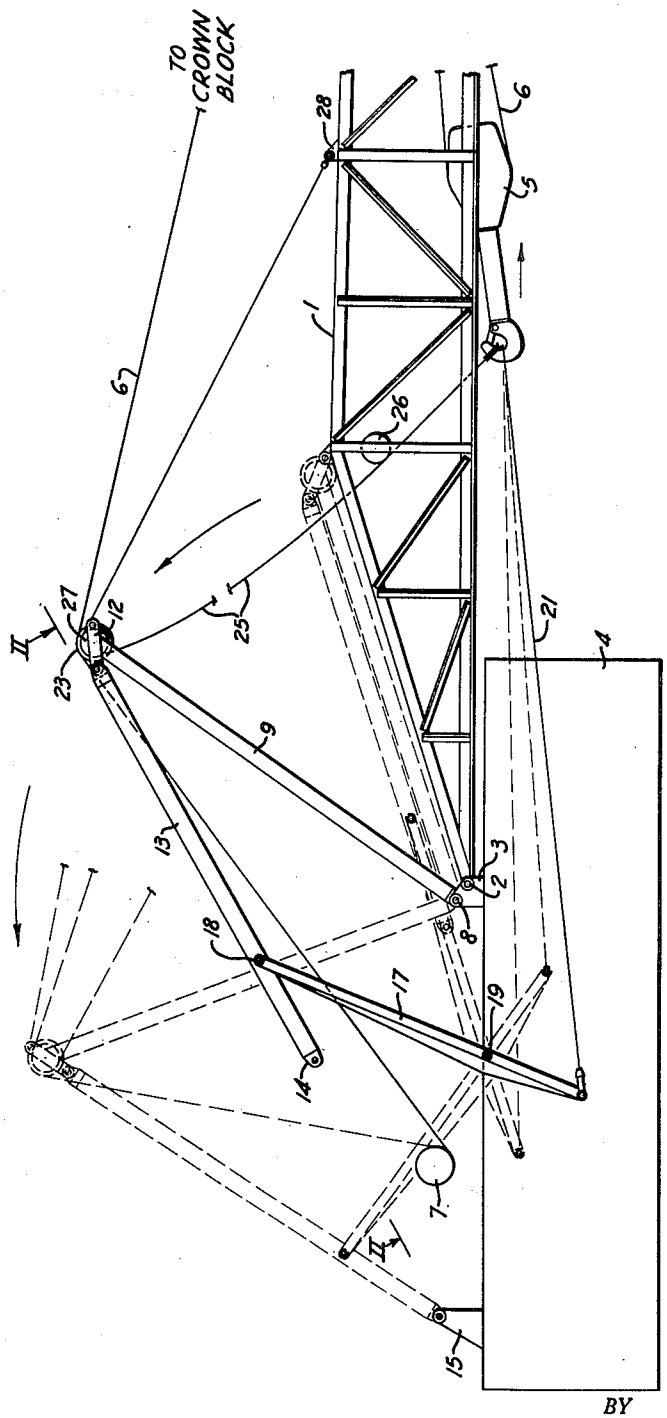


Fig. 1

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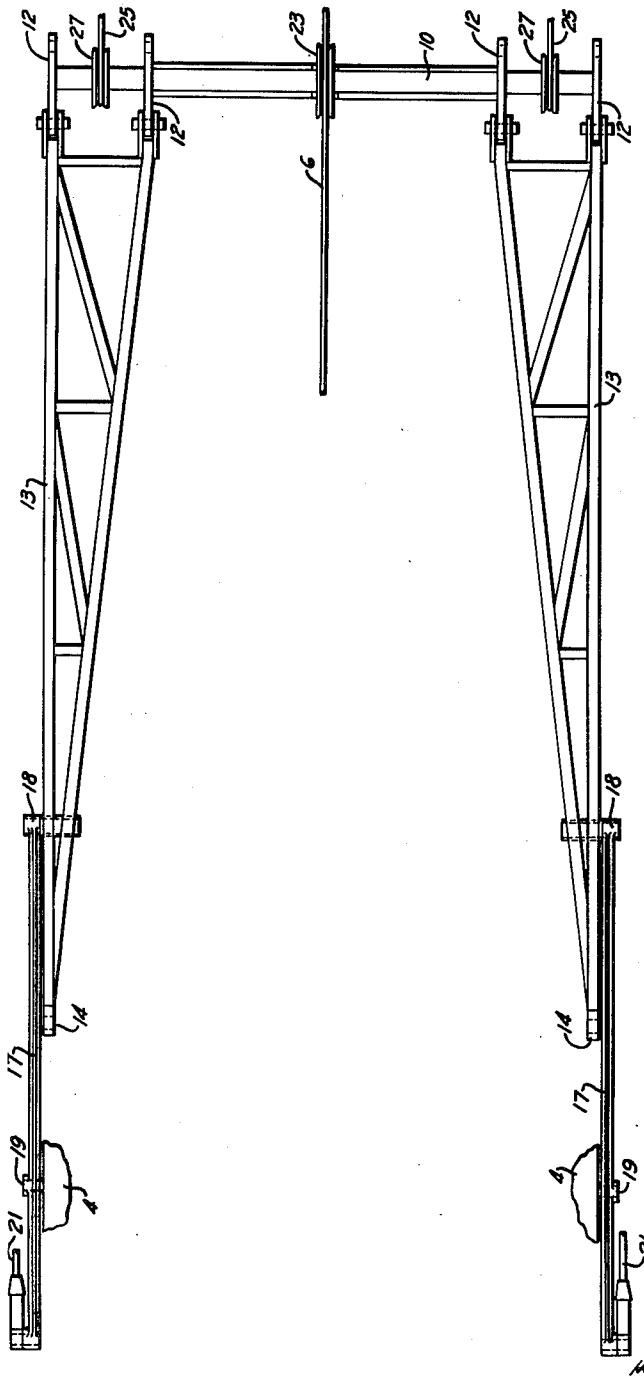


Fig. 2

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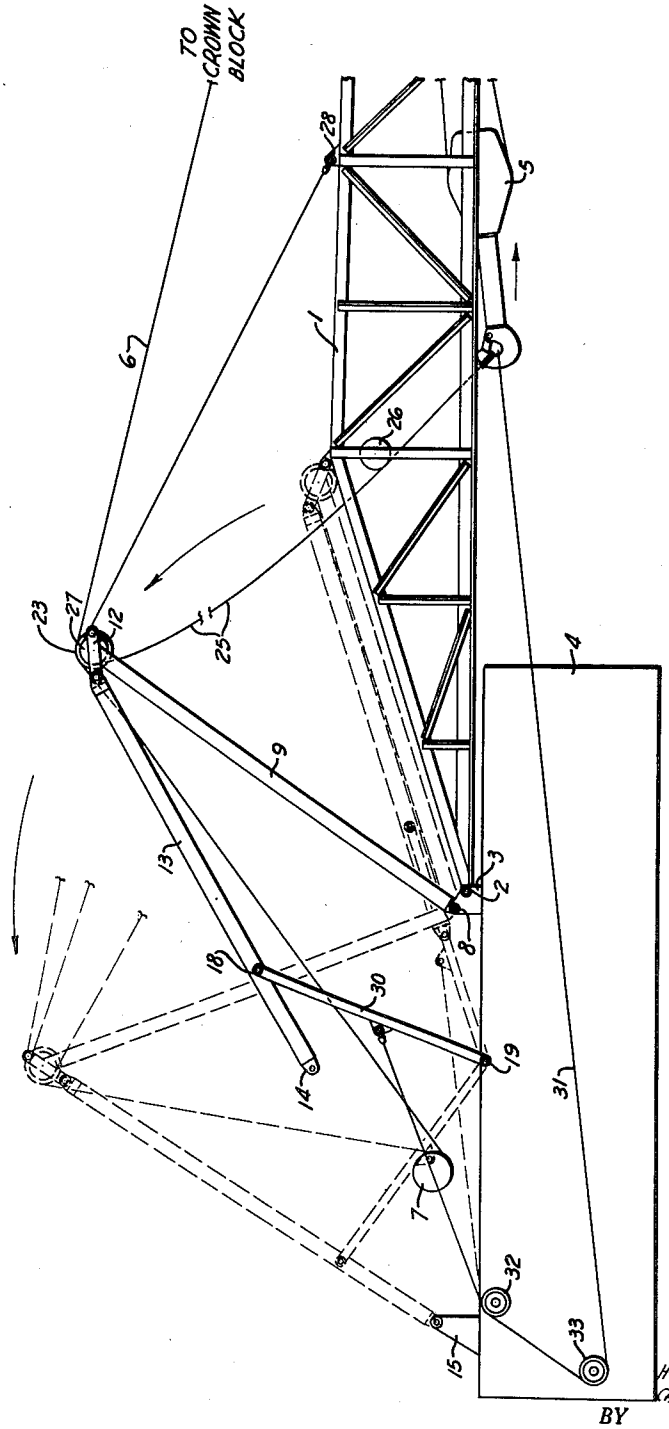


Fig. 3

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PORTABLE OIL WELL MAST WITH FOLDING GIN POLE

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Application February 10, 1954, Serial No. 409,311

7 Claims. (Cl. 189—15)

This invention relates to the erection of gin poles used with portable oil well drilling masts.

It is among the objects of this invention to provide oil well drilling apparatus in which a gin pole folded on a reclining mast is raised and unfolded to the proper position by the same means, in which the power for accomplishing this may come through the traveling block in the mast, and in which movement of the opened gin pole into final position may be snubbed by the drilling line connected with the traveling block.

In accordance with this invention, a reclining mast has its foot hinged to a base, from which the mast extends forward. A folded gin pole above the base has reclining front and rear sides that extend forward over the mast. The front ends of the gin pole sides are hinged together, while the rear end of the front side is pivotally supported by the base to permit the gin pole to be swung upward. There are means on the base behind the supporting means for receiving the lower end of the rear side of the gin pole after it has been swung upward. Lever means are pivotally connected to the rear side of the gin pole and to the base between the supporting means and receiving means. An erection line is connected to the lever means and is adapted to be pulled in a direction that will swing the upper end of the lever means upwardly and rearwardly, whereby to lift the gin pole and swing the lower end of its rear side back to the receiving means. This line preferably extends forward from the base and is connected to the traveling block in the mast. Also connected to the traveling block is a sling which is connected to the top of the gin pole and to the mast for raising the mast as the traveling block is pulled nearer to the head of the mast after the gin pole has been erected. The drilling line connected with the traveling block extends from the head of the mast back over a sheave at the top of the gin pole and then down to the drawworks on the base. This connection of the line with the gin pole snubs or retards downward movement of the rear side of the gin pole toward the receiving means.

The invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a fragmentary side view of a portable oil well derrick, showing the folded gin pole raised part way;

Fig. 2 is an enlarged view of the back of the gin pole structure taken on the line II—II of Fig. 1; and

Fig. 3 is a view similar to Fig. 1 of a modified embodiment of this invention.

Referring to Fig. 1 of the drawings, each of the feet of a reclining mast 1 is pivotally mounted on a hinge pin 2 in the front part of a shoe 3 mounted on a base 4 of any suitable construction. The mast shown has its lower or front side open, and the traveling block 5 is shown near the base and connected by the drilling line 6 with the head or crown block (not shown) of the mast, from which the line extends back above the mast to the drawworks drum 7 located behind the shoes.

Pivotally mounted on a pin 8 in the upper back part of each of the shoes is the lower end of one of the front legs 9 of a folding gin pole. As shown in Fig. 2, the upper ends of these legs are rigidly connected by a horizontal tubular member 10. Projecting rearwardly from the tubular member at an acute angle to the front legs, are short plates 12 that are pivotally mounted in the forked upper ends of the rear legs 13 of the gin pole. The lower ends of the rear legs are provided with perforated pin-receiving feet 14 so that they can be removably mounted in rear shoes 15 mounted on the base behind the drawworks drum.

In order to swing the folded gin pole upward and to spread its front and rear sides apart the correct distance so that the feet of the rear legs will be received in the rear shoes, lever means are provided. These preferably include a pair of levers 17, the front or upper ends of which are pivotally connected to the outside of the rear legs of the gin pole at 18. Pivots 18 are in front of shoes 3 when the gin pole is fully folded. Near their lower ends the levers are pivotally mounted on horizontal pins 19 mounted in the base between the front and rear shoes. The levers extend down behind pins 19 and have their lower ends detachably connected to the opposite ends of an erection line or sling cable 21. The sling extends forward beyond the base and has its front part looped over the hook of the traveling block.

When the drawworks drum 7 is driven to reel in the drilling line 6, the traveling block is pulled toward the head of the mast and it therefore pulls the erection sling and swings the lower ends of levers 17 forward from their rear broken line position shown in Fig. 1. This causes their upper ends to swing upward and backward and thereby lift the gin pole while simultaneously swinging its rear legs away from its front legs, as shown in full lines in Fig. 1. It will be seen that the pressure of drilling line 6 against the back of a sheave 23, mounted on the center of tubular member 10 at the top of the gin pole, tends to oppose raising of the gin pole. Nevertheless, due to the mechanical advantage of the line reeving, the erecting force exerted through line 21 prevails.

The traveling block continues to raise and spread the gin pole in the manner just described, until the center of gravity of the pole passes over hinge pins 2. The pole then will swing backward and downward by gravity to the rear broken line position shown in Fig. 1, which is the erect position for the gin pole. The length of the levers between their connections to the base and to the gin pole is such that the levers will control the position of the rear feet 14 and will guide them into the rear shoes 15 for connection thereto. Consequently, the gin pole is spread to the desired extent automatically by the levers as it is erected by them.

As soon as gravity starts to take effect, the pressure of the drilling line against the back of sheave 23 will snub the pole and retard the descent of feet 14 into rear shoes 15. At the same time, erection sling 21 will go slack and another sling 25 will be pulled more or less taut. Sling 25 also is looped over the traveling block hook and extends back beneath a pair of sheaves 26 journaled in opposite sides of the mast and then up around another pair of sheaves 27 journaled on the tubular head of the gin pole. From there the sling extends forward and down to the back of the mast, where it is anchored to brackets 28.

After the back feet of the gin pole have been fastened in the rear shoes, the slack sling 21 is removed from the traveling block and more of the drilling line is wound on the drum in order to cause the block to pull on sling 25 and thereby swing the mast up and back against the gin pole in a well known manner.

When it is desired to lower the gin pole after the mast has been lowered, the back feet of the pole are disconnected from the rear shoes, erection sling **21** is attached to the traveling block, and the pole is swung forward, by means of a suitable auxiliary line (not shown) attached to its top, until the center of gravity of the gin pole passes over the front shoes. The gin pole is prevented from then falling forward by the restraining influence of the erection sling which must drag the traveling block toward the base. This movement of the traveling block is controlled by the rate at which the drilling line is unwound from the drawworks drum.

In the modification shown in Fig. 3, all of the parts have been designated by the same numerals as in the first embodiment of the invention, except for the levers and erection sling. The gin pole and mast likewise are raised and lowered in the same manner as described above, the only difference being in the point at which the erection sling is connected to the erecting levers. In Fig. 3 the levers **30** do not extend below their fulcrum points **19**, so the sling **31** is attached to the back of the levers about half way between their ends. The sling then extends toward the back of base **4** and down around vertically spaced sheaves **32** and **33** journaled in the base. From the lower sheaves the sling extends forward to the traveling block as before.

When the traveling block pulls the front part of erection sling **31** forward, the rear end of the sling pulls backward on levers **30** and thereby swings them upward and backward to raise the gin pole and spread its front and back legs the required amount.

It will be understood that with the apparatus described herein the gin pole is raised and spread the proper distance by the same levers, which in turn receive their power from the drawworks through the traveling block. Also, the drilling line snubs the gin pole into operative position, thereby eliminating the necessity for a separate snubbing operation.

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. A portable oil well derrick comprising a base, a reclining mast having a foot hinged to the base and extending forward therefrom, a traveling block near the foot of the mast, a drilling line connecting the block with the head of the mast, a folded gin pole above the base having reclining front and rear sides extending forward over the mast, means hinging the upper ends of said sides together, means pivotally supporting the lower end of the front side on the base to permit said sides to be swung upward, means on the base behind said supporting means for receiving the lower end of said rear side after it has been swung upward, lever means pivotally connected to said rear side of the gin pole and to the base between said supporting means and receiving means on axes parallel to the pivotal support for said front side, and an erection line connecting said lever means and traveling block the line being connected to the lever means in a position to swing the upper end of the lever means upwardly and rearwardly away from the traveling block when the block is pulled toward the head of the mast, whereby to lift the pole and swing the lower end of its rear side back to said receiving means.

2. A portable oil well derrick comprising a base, a reclining mast having a foot hinged to the base and extending forward therefrom, drawworks on said base behind the foot of the mast, a traveling block near the foot of the mast, a drilling line connecting the block with the head of the mast and extending from said head back over said sheave and down to the drawworks, a folded gin pole above the base having reclining front and rear sides extending forward over the mast, means hinging the upper ends of said sides together, a sheave carried by the upper end of the gin pole, means pivotally supporting the lower end of the front side on the base to permit said sides to be swung upward, means on the base behind said supporting means for receiving the lower end of said rear side after it has been swung upward, lever means pivotally connected to said rear side of the gin pole and to the base between said supporting means and receiving means on axes parallel to the pivotal support for said front side, and an erection line connecting said lever means and traveling block, the line being connected to the lever means in a position to swing the upper end of the lever means upwardly and rearwardly when the block is pulled toward the head of the mast, whereby to lift the pole and swing the lower end of its rear side back to said receiving means, the pressure of the drilling line against said sheave serving to retard downward movement of said rear side of the gin pole toward said receiving means.

3. A derrick in accordance with claim 2, in which said lever means extends below its pivotal connection to said base, and said erection line is connected to the lower end of the lever means and extends forward therefrom.

4. A derrick in accordance with claim 2, including a sheave pivotally connected to said base behind said lever means, said erection line being connected to said lever means above the base and extending rearwardly therefrom around said last-mentioned sheave and then forward.

5. The combination with a base for an oil well mast, of a folded gin pole having reclining front and rear sides with the rear side overlying the front side, means hinging the upper ends of said sides together, means on the base pivotally supporting the opposite end of said front side to permit said sides to be swung upward, means on the base behind said supporting means for receiving the lower end of said rear side after it has been swung upward, lever means pivotally connected to said rear side of the gin pole and to said base between said supporting means and receiving means on axes parallel to the pivotal support for said front side, said lever means extending below its pivotal connection to said base, and lever swinging means connected to the lower end of said lever means and adapted to be moved forward to swing the upper end of the lever means upwardly and rearwardly, whereby to lift the gin pole and swing the lower end of its rear side back toward said receiving means, the length of the lever means between said axes being such as to cause the lower end of said rear side of the gin pole to engage said receiving means when the gin pole is erect.

6. The combination with a base for an oil well mast, of a folded gin pole having reclining front and rear sides with the rear side overlying the front side, means hinging the upper ends of said sides together, means on the base pivotally supporting the opposite end of said front side to permit said sides to be swung upward, means on the base behind said supporting means for receiving the lower end of said rear side after it has been swung upward, levers having upper and lower ends pivotally connected respectively to said rear side of the gin pole and to said base between said supporting means and receiving means on axes parallel to the pivotal support for said front side, and lever swinging means connected directly to said levers between their upper and lower ends and adapted to be moved lengthwise of the base in a direction that will swing the upper ends of the levers upwardly and rearwardly, whereby to lift the gin pole and swing the lower end of its rear side toward said receiving means, the length of each lever between its pivotal connections being such as to cause the lower end of said rear side of the gin pole to engage said receiving means when the gin pole is erect.

7. The combination with a base for an oil well mast, of a folded gin pole having reclining front and rear sides with the rear side overlying the front side, means hinging the upper ends of said sides together, means on the base pivot-

ally supporting the opposite end of said front side to permit said sides to be swung upward, means on the base behind said supporting means for receiving the lower end of said rear side after it has been swung upward, lever means pivotally connected to said rear side of the gin pole and to said base between said supporting means and receiving means on axes parallel to the pivotal support for said front side, a sheave pivotally connected to said base behind said lever means, and a line connected to said lever means above the base and extending rearwardly therefrom around said sheave and then forward, said line being adapted to be pulled forward to swing the upper end of the lever means upwardly and rearwardly to lift the gin pole and

swing the lower end of its rear side back toward said receiving means, the length of the lever means between said axes being such as to cause the lower end of said rear side of the gin pole to engage said receiving means when the gin pole is erect.

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