Nov. 20, 1945. H. J. WOOLSLAYER ET AL 2,389,226

FAST SHEAVE MOUNTING FOR OIL WELL MASTS

Filed April 10, 1944

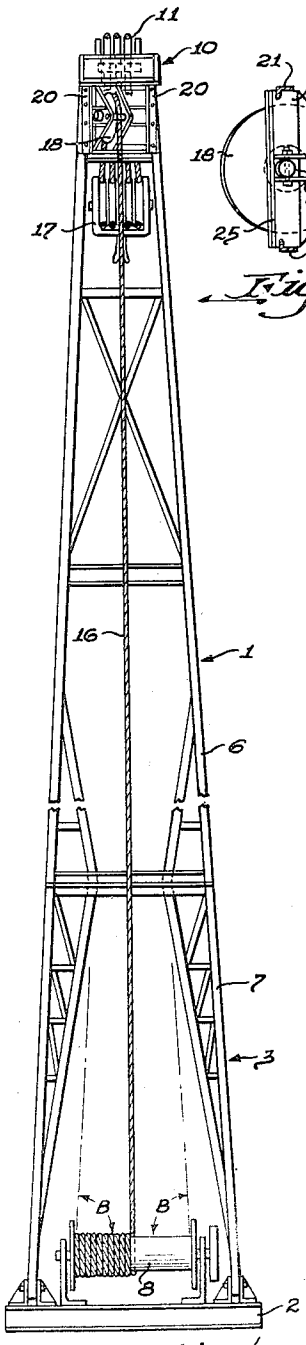


Fig. 1.

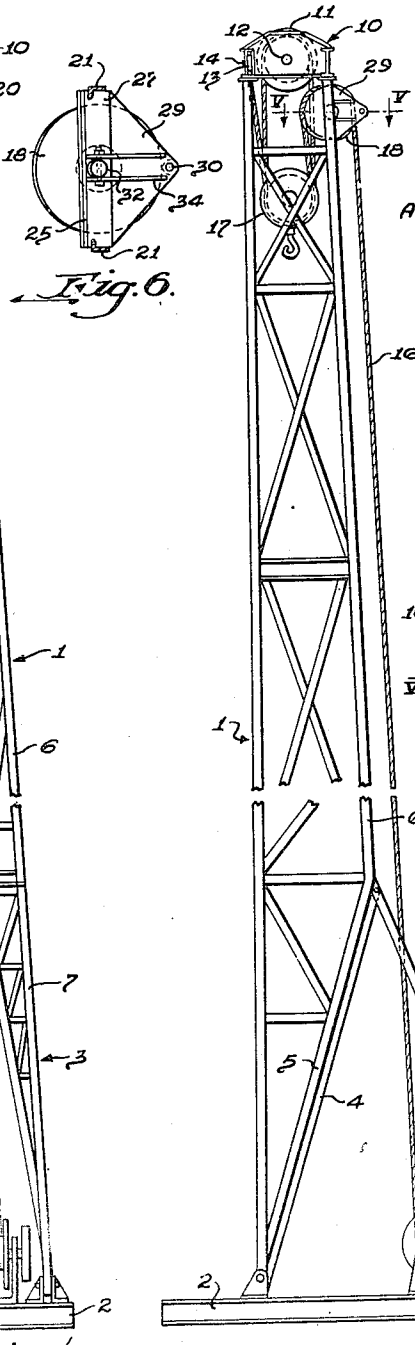


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

WITNESSES.
E. J. Maloney.
V. A. Peckham.

INVENTORS.
Homer J. Woolslayer
Erwin A. Campbell
Cecil Jenkins
BY Brown, Critchlow & Flick
their ATTORNEYS.

Patented Nov. 20, 1945 2,389,226

UNITED STATES PATENT OFFICE

2,389,226

FAST SHEAVE MOUNTING FOR OIL WELL MASTS

Homer J. Woolslayer, Erwin A. Campbell, and Cecil Jenkins, Tulsa, Okla., assignors to Lee C. Moore & Company, Inc., Pittsburgh, Pa., a corporation of Pennsylvania

Application April 10, 1944, Serial No. 530,290

8 Claims. (Cl. 254—145)

This invention relates to oil well masts, and more particularly to a special mounting for the fast sheave.

With the ordinary portable cantilever type of mast the hoisting drum or winch which controls the traveling block suspended inside the mast is mounted outside of the bottom of the mast behind the plane of its rear side. A line from the drum extends up outside the mast and over a sheave, called the fast sheave, journaled on the crown block. From the fast sheave the line extends down to one end of the traveling block and then up and down between the traveling block and the other crown block sheaves. The fast sheave is disposed at one end of the series of sheaves on the crown block, and therefore it is some distance from the central vertical plane of the mast extending parallel to the fast sheave. As the central transverse vertical plane of the hoisting drum generally coincides with the central plane of the mast, the angle between the line and the axis of the drum at the end of the drum farthest from the fast sheave is such that severe wear of the line may occur. Also, the line may pile up on one end of the drum instead of spooling evenly, which is generally injurious to the line.

It is among the objects of this invention to provide for the top of a mast a fast sheave which projects from the side of the mast above the hoisting drum, which has its outer portion close to the central vertical plane of the mast, which has its inner portion as directly above one end of the traveling block as possible, which keeps the lines from the traveling block from interfering with one another, and which can readily be interchangeably mounted on either side of the central plane of the mast.

In accordance with this invention, the fast sheave is journaled close to the crown block in the side of the mast adjacent the drum. The sheave projects from the mast to receive the line from the hoisting drum, and also extends into the mast to deliver the line to the traveling block below. The center of the sheave is located at one side of the central vertical plane of the mast that is perpendicular to the drum side of the mast. This is to permit the sheave to be skewed horizontally so that the portion of it outside of the mast can be located close to the central plane of the mast while the portion of the sheave inside the mast can be disposed substantially above the point at which the line from the sheave enters the traveling block. The sheave may be mounted in a frame that is detachably connected to the side of the mast and which is so formed that it can be turned bottom side up in order to move the sheave to the other side of the central plane of the mast when desired so that the line can be strung up from either the right or the left hand side of the mast. With the outermost part of the sheave located substantially in the center plane of the mast, the angles that the line makes with the ends of the drum are kept as near right angles as possible, thereby prolonging the life of the line and promoting even spooling.

The preferred embodiment of the invention is illustrated in the accompanying drawing in which Fig. 1 is a rear view of a mast equipped with our fast sheaves; Fig. 2 is a side view of the mast; Fig. 3 is an enlarged top view of the mast; Fig. 4 is a face view of the fast sheave frame; Fig. 5 is a horizontal section through the frame taken on the line V—V of Fig. 2; and Fig. 6 is a vertical section through the frame taken on the line VI—VI of Fig. 5.

Referring to Figs. 1 and 2 of the drawing, a mast is shown of the same general type as illustrated in our Patent No. 2,300,480. This mast is divided into two sections; the main section 1 which is hinged at its lower end to the base 2, and a short lower section 3 which serves as a gin pole in raising the tall section from a prone position along the ground and then serves as a support for the tall section which is rigidly connected to it in upright position as shown. The gin pole has front and rear legs joined together at their upper ends with the front legs 4 extending along diagonal bracing members 5 which extend upwardly from the bottom of the tall section to the lower ends of its rear legs 6. The rear legs 7 of the gin pole are fastened to the base some distance behind the plane of the rear side of the mast. Mounted on the base between the front and rear legs of the gin pole and outside of the bottom of the mast is the winch or hoisting drum 8 which forms part of the draw-works. This drum may be driven by one or more engines (not shown) mounted on the base behind the gin pole.

Mounted on top of the mast is a crown block 10 in which several sheaves 11 are journaled on an axle 12 parallel to the axis of the hoisting drum. In front of these sheaves, as shown in Fig. 3, there is another sheave 13 disposed at right angles to them and journaled on an axle 14 in the front side of the crown block. A cable or line 16 is dead-ended at a lower front corner of the mast in the customary way, and extends up inside the mast and over front sheave 13 in the

crown block. From there the line extends down to an end sheave of a series of parallel sheaves journaled in the usual traveling block 17 suspended inside the mast. The line then passes upwardly from the block and over the end sheave of the crown block series above it. From there the line passes up and down between it and the crown block until it leaves the other end sheave of the traveling block. The line then extends upwardly inside the mast and over a fast sheave 18 from which it extends downwardly outside of the mast to the hoisting drum.

It is a feature of this invention that the fast sheave is so located that the line is spooled evenly on the hoisting drum and with a minimum of wear on the line. Inside the mast the line between the fast sheave and the traveling block is kept from interfering with the strands suspending the traveling block from the crown block. Accordingly, the fast sheave is journaled immediately below the crown block substantially in the rear side of the mast, which is adjacent the hoisting drum. That is, the location of the sheave is such that it extends completely through the drum side of the mast and therefore projects out of the mast as well as into it. As shown in Figs. 3 and 5, the center of this sheave is located at one side of the central vertical plane of the mast, indicated by the line A—A, that is perpendicular to the rear side of the mast and also to the axis of the drum. The fast sheave is disposed at the side of this plane at which is located that end of the traveling block to which the line from the fast sheave is connected. Also, the fast sheave is skewed horizontally so that its axis is oblique to the axes of the sheaves of the crown block and traveling block. The direction in which the fast sheave is skewed is such that the portion of the sheave outside of the mast is closer to the central vertical plane of the mast than the portion of the sheave inside the mast. Moreover, the amount of skewing preferably is such that the outermost portion of the sheave, which is the outer end of its line-engaging area, is located approximately in the central vertical plane of the mast, and the innermost portion of the sheave is located nearly directly above the end sheave of the traveling block that receives the line from the fast sheave. As a result, the portion of the line between the fast sheave and the traveling block does not cross or interfere with the lengths of the line between the traveling block and the crown block. Neither does the line from the fast sheave enter the traveling block sheave at an angle that would cause it to rub against the edges of the two sheaves and thereby produce wear. Outside of the mast the upper end of the line is substantially in the central vertical plane of the mast so that the angles B (Fig. 1) that the line makes with the axis of the drum, when the line approaches the ends of the drum, depart a mimimum amount from right angles. The same thing is true of the angles that the line makes with the fast sheave. This means that the line can spool evenly across the drum without building up at one end. It also means that with only a little side pull on the line, the wear on it as it is wound on and unwound from the drum is kept at a minimum.

Although the fast sheave may be permanently mounted in any suitable manner in one position in the mast, it is preferred to so mount it that it can be interchangeably located on either side of the central vertical plane of the mast so that line 16 can be strung up from either the right or the left side of the mast. For this purpose the fast sheave is most suitably journaled in a welded rectangular frame that is detachably connected to the mast so that it can be turned bottom side up in order to place the sheave on either side of the central plane of the mast. The frame is formed from a pair of vertical angle bars 20 rigidly connected at top and bottom by horizontal angle bars 21. The vertical bars are provided at uniformly spaced intervals with openings 22 (Fig. 4) that register with similar openings in the rear legs 6 of the mast near its top. Bolts 23 (Fig. 5) extend through these openings for removably securing the frame against the mast.

Another vertical angle bar, which is skewed horizontally as shown in Fig. 5, has one flange 25 disposed inside the mast with its free edge connected by a narrow plate 26 to the adjoining side of the frame. The other flange 27 of this bar extends obliquely through the frame with its upper and lower ends secured in slots in the vertical flanges of the top and bottom bars of the frame, as shown in Fig. 4. Spaced from this upright angle is another vertical angle bar 28 one of the flanges of which is parallel to flange 27 of the first bar and likewise extends into slots in the flanges of frame bars 21. The other flange of bar 28 is welded at top and bottom to both the vertical and the horizontal flanges of frame bars 21.

Connected to the opposing parallel surfaces of the two skewed upright bars is a pair of parallel vertical plates 29 that have outwardly projecting triangular portions which are rigidly connected at their apexes by a bolt 30 extending through a spacing member 31 between them. These plates and the two bars to which they are connected are all provided with aligned openings through which a short shaft 32 extends. This shaft is held in place by bolts 33 that extend through vertical openings in its ends and through two pairs of vertically spaced horizontal bracing plates 34 and 35 that are rigidly connected to the central portions of vertical plates 29 and to all four of the upright angle bars. The fast sheave 18 is journaled on shaft 32 between the vertical plates from which it is spaced by thrust washers 37 encircling the shaft.

According to the provisions of the patent statutes, we have explained the principle and construction 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. The combination with a mast, a crown block at its top and a hoisting drum at its bottom adjacent one side of the mast, of a vertical sheave journaled substantially in the drum side of the mast adjacent the crown block and projecting from the mast, a line connected to said drum and extending up outside the upper portion of the mast to said projecting sheave, the center of the sheave being located at one side of the central vertical plane of the mast that is perpendicular to said drum side, and said sheave being skewed horizontally with the portion of it outside of the mast closer to said plane than the portion of the sheave inside the mast.

2. The combination with a mast, a crown block at its top and a hoisting drum at its bottom adjacent one side of the mast, of a vertical sheave

journaled substantially in the drum side of the mast adjacent the crown block and projecting from the mast, a line connected to said drum and extending up outside the upper portion of the mast to said projecting sheave, the center of the sheave being located at one side of the central vertical plane of the mast that is perpendicular to said drum side, and said sheave being skewed horizontally to position its outermost area substantially in said plane and its innermost area adjacent one end of the crown block.

3. The combination with a portable hinged mast, a crown block at its top and a hoisting drum at its bottom adjacent one side of the mast, of a vertical sheave journaled substantially in the drum side of the mast below the crown block and projecting from the mast, a line connected to said drum and extending up outside the upper portion of the mast to said projecting sheave, the center of the sheave being located at one side of the central vertical plane of the mast that is perpendicular to said drum side, and the outer end of the sheave's line-engaging area being disposed close to said plane with the inner end of said area disposed adjacent one end of the crown block.

4. The combination with a mast, a crown block at its top and a hoisting drum at its bottom adjacent one side of the mast, of a vertical sheave journaled substantially in the drum side of the mast adjacent the crown block and projecting from the mast, a line connected to said drum and extending up outside the upper portion of the mast to said projecting sheave, the center of the sheave being located at one side of the central transverse vertical plane of said drum, and said sheave being skewed horizontally with the portion of it outside of the mast closer to said plane than the portion of the sheave inside the mast.

5. The combination with a mast having legs connected by cross members, a crown block at its top, a hoisting drum at its bottom adjacent one side of the mast, a traveling block inside the mast, and a line suspending the traveling block from the crown block and also extending from the traveling block down the outside of said cross members to the drum, of a vertical sheave journaled substantially in the drum side of the mast below the crown block and projecting from the mast, said sheave supporting said line between the drum and traveling block, the center of the sheave being located at one side of the central vertical plane of the mast that is perpendicular to said drum side, and said sheave being skewed horizontally to position its outermost point near said plane and its innermost point nearly directly above the point at which said line from the sheave enters the traveling block.

6. The combination with a mast, a crown block at its top and a hoisting drum at its bottom adjacent one side of the mast, of a vertical frame connected to the drum side of the mast near its top, and a vertical sheave journaled in said frame and projecting from the mast, a line connected to said drum and extending up outside the upper portion of the mast to said projecting sheave, the center of the sheave being disposed at one side of the central transverse vertical plane of said frame, and said sheave being skewed horizontally with the portion of it outside of the mast closer to said plane than the portion of the sheave inside the mast.

7. The combination with a mast, a crown block at its top and a hoisting drum at its bottom adjacent one side of the mast, of a vertical frame detachably connected to the drum side of the mast near its top, and a vertical sheave journaled in said frame and projecting from the mast, a line connected to said drum and extending up outside the upper portion of the mast to said projecting sheave, the center of the sheave being disposed at one side of the central vertical plane of the mast that is perpendicular to said drum side, and said sheave being skewed horizontally with the portion of it outside of the mast closer to said plane than the portion of the sheave inside the mast, said frame being reversible on the mast to position the sheave on the opposite side of said plane.

8. In combination, a substantially rectangular frame adapted to be fastened either side up against the outside of a mast near its top, and a vertical sheave journaled in said frame and projecting from opposite sides of it, the center of the sheave being disposed at one side of the vertical center line of the frame, and said sheave being skewed horizontally with the portion projecting beyond the outer side of the frame disposed closer to said center line than the portion of the sheave projecting beyond the inner side of the frame.

HOMER J. WOOLSLAYER.
ERWIN A. CAMPBELL.
CECIL JENKINS.