Sept. 11, 1951 H. J. WOOLSLAYER ET AL 2,567,795

PORTABLE MAST STRUCTURE

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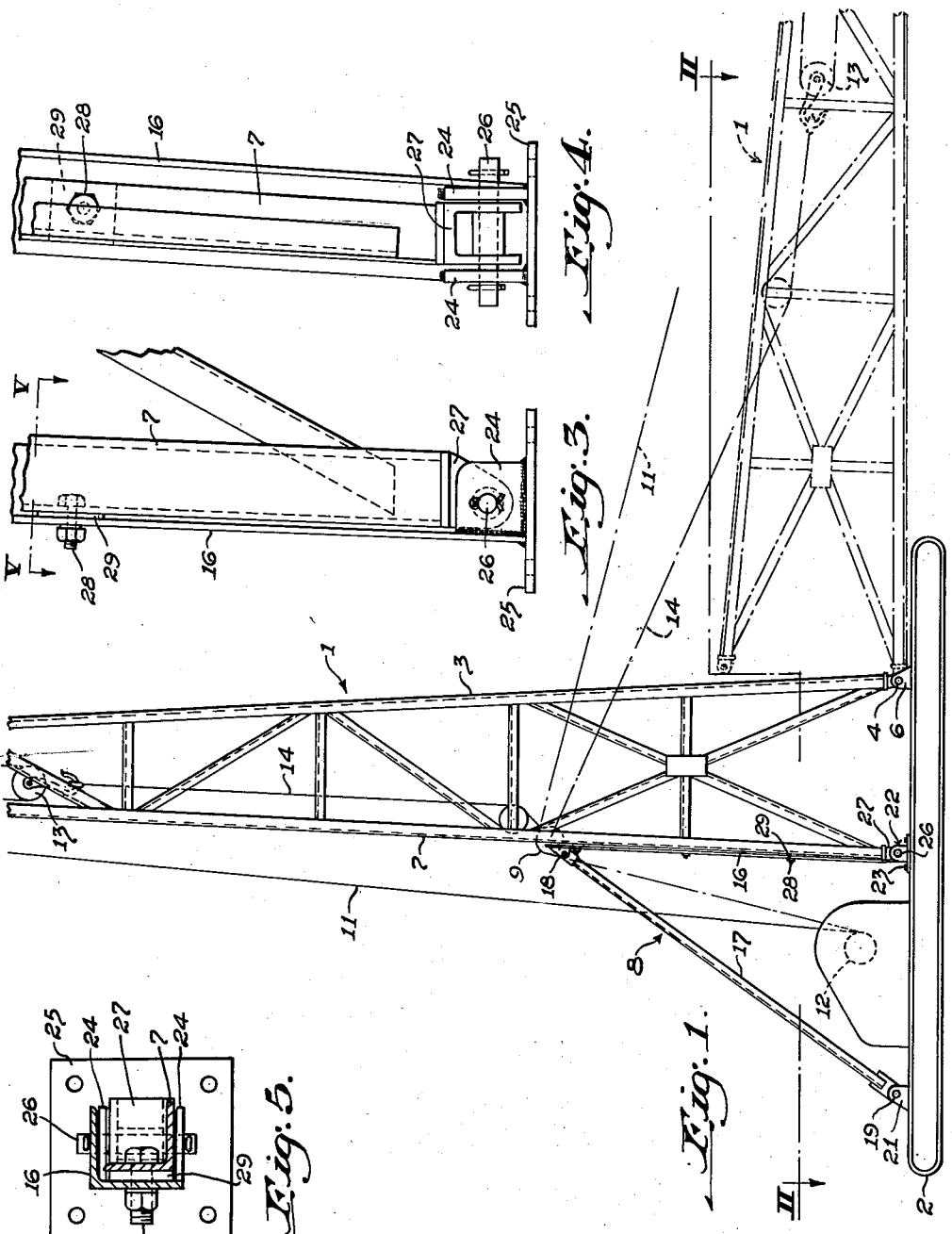


Fig. 1.

Fig. 4.

Fig. 3.

Fig. 5.

INVENTORS,
HOMER J. WOOLSLAYER,
CECIL JENKINS.

BY
Brown, Critchlow, Flick & Peckham
their ATTORNEYS.

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

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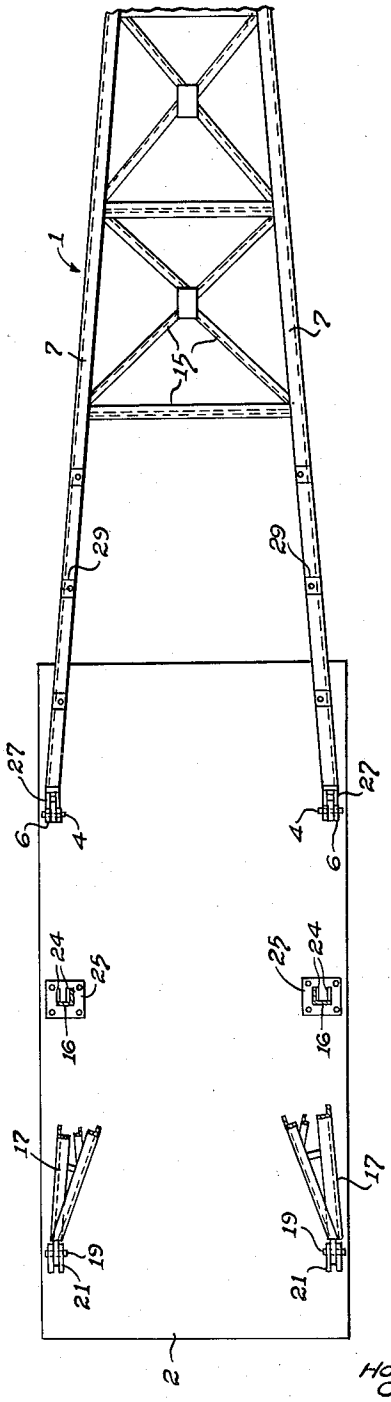


Fig. 2.

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

INVENTORS.
HOMER J. WOOLSLAYER, &
CECIL JENKINS.
BY.
Brown, Critchlow, Flick & Peckham
their
ATTORNEYS.

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PORTABLE MAST STRUCTURE

Homer J. Woolslayer and Cecil Jenkins, Tulsa, Okla., assignors, by mesne assignments, to Lee C. Moore Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

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2 Claims. (Cl. 189—15)

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This invention relates to oil well derricks or masts which are adapted to be assembled in sections on the ground and then swung upwardly into upright position where it remains until it is desired to transport the structure to another location.

It is among the objects of this invention to provide a mast structure of this character in which a gin pole serves to reinforce the lower portion of the adjacent side of the mast which otherwise would be too weak to support working loads, and in which gin pole legs project between the adjacent legs of the mast.

In accordance with this invention an upright mast having front and rear legs is mounted on a base. The lower ends of a pair of the mast legs are hinged to the base to permit the mast to be swung between erect and prone position along the ground. For convenience of description only, the legs of the mast that are hinged to the base will be referred to herein as the front legs. The rear legs of the mast are substantially the same length as the front legs. Mounted on the base behind the mast is a gin pole which aids in swinging the mast between its two positions. The gin pole has legs extending along the lower portions of the rear legs of the mast. The rear face of the mast between the portions of its rear legs that are beside the gin pole legs is free of adequate bracing, by which it is meant that the rear legs are not strong enough nor reinforced well enough to support the mast while it is being used. To overcome this difficulty, the lower portions of the mast's rear legs and the adjacent legs of the gin pole are detachably connected together in order to brace the mast. The connected legs may be formed from overlapping angle bars that are separated a short distance by spacing members located at vertically spaced intervals. Preferably, there are no cross braces connecting the lower portions of the rear legs of the mast, so the gin pole can project between those legs.

The preferred embodiment of the invention is illustrated in the accompanying drawings in which Fig. 1 is a fragmentary side view of the mast in operative position; Fig. 2 is a horizontal section taken on the line II—II of Fig. 1, but with the mast reclining on the ground; Fig. 3 is an enlarged fragmentary side view of connected mast and gin pole legs; Fig. 4 is a front view of the legs shown in Fig. 3; and Fig. 5 is a horizontal section taken on the line V—V of Fig. 3.

Referring to Figs. 1 and 2 of the drawings, the bottom of a vertical oil well derrick or mast 1

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is mounted on a supporting base 2 so formed as to be slidable along the ground or transportable from one location to another as desired. The mast is made from prefabricated structural steel sections that have been assembled at the well site to form a mast extending along the ground as indicated by the broken lines in Fig. 1 and by full lines in Fig. 2. It has four legs, all of which are substantially the same length and preferably are formed from angle bars having their flanges projecting along the sides of the mast. The lower ends of a pair of its legs, which only for convenience of description shall be called front legs 3, are hinged to the base by means of removable pivot pins 4 that extend through brackets 6 mounted on the base. The lower ends of the rear legs 7 of the mast are detachably connected to the base in a manner that will be described presently.

The mast is swung up and down, between prone position on the ground and upright position, with the aid of a gin pole 8 provided at its top with a sheave 9 (Fig. 1) over which a line 11 passes from the draw-works drum 12 on the base to the crown block (not shown) at the top of the mast while the mast is being raised or lowered. From the crown block the line hangs down in the mast to support the traveling block 13 which is hooked onto a sling 14 attached to the top of the gin pole during erection and lowering of the mast. The back side of the mast, from the top down to approximately the top of the gin pole, is provided with the usual horizontal and diagonal braces 15 shown in Fig. 2, but from the top of the gin pole to the base the rear legs preferably are not connected by any braces at all, and in no case by sufficient bracing to permit the mast to sustain the loads that it has to when drilling. However, these lower portions of the back legs are strong enough to support the mast during erection while it is not supporting any load. The opposite sides of the mast may be braced from top to bottom, but its front generally is open and free of bracing members.

The gin pole preferably is formed from substantially vertical front legs 16 and inclined rear legs 17 hinged together at their upper ends at 18 so that the front and rear legs can be folded together when the mast is down and the gin pole is not in use. The lower ends of the rear legs of the gin pole are pivotally connected by removable pivot pins 19 to brackets 21 mounted on the base. The front legs of the gin pole preferably are made from angle bars permanently connected to shoes 22 detachably connected to

the base by bolts 23. As shown in Figs. 3, 4, and 5, each shoe includes a pair of forwardly projecting spaced side walls 24 mounted on a horizontal plate 25 and provided with aligned openings. Extending through these openings when the mast is erect, is a pin 26 which also extends through registering openings in a bifurcated foot 27 rigidly mounted on the adjacent rear leg of the mast.

With this arrangement the front legs of the gin pole extend up along the rear portions of the rear legs of the mast. One flange of each pin pole front leg is parallel to the rear flange of the adjacent rear leg of the mast, and where there are no interfering cross braces between the rear legs of the mast the other flange of the gin pole leg preferably extends forward between the rear legs of the mast. By locating the major portion of the front legs of the gin pole between the rear legs of the mast in this manner, space is economized. The adjacent parallel flanges of these legs are fastened together by means of bolts 28. In order to take care of possible irregularities in the legs that would make it difficult to fasten them face to face, spacing members 29, are placed between the legs at predetermined vertically spaced intervals. The spacing members may be permanently connected to one of the legs and are provided with openings through which the fastening bolts extend. Thus, the lower portions of the rear legs of the mast, even though not connected by braces, are reinforced adequately by the front legs of the gin pole fastened to them. Elimination of the lower cross braces effects a material saving, and the reinforcing gin pole legs make it unnecessary to use extra heavy mast legs that would support the mast without bracing. With the rear legs secured to the gin pole, they can take a heavy load without buckling.

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. A mast structure comprising a base, an upright mast mounted thereon having substantially straight front and rear legs extending upwardly from the base, means hinging the lower ends of the front legs to the base to permit the mast to be swung downwardly into prone position along the ground, a gin pole mounted on the base to aid in swinging the mast between prone and upright positions and having front and rear legs, the front legs of the gin pole extending along the lower portions of said rear mast legs in close proximity thereto, the rear legs of the mast being in the form of upright angle bars with their flanges projecting along the rear face and adjoining sides of the mast, the front legs of the gin pole also being in the form of upright angle bars with a pair of their flanges parallel to the rear flanges of the rear mast legs and with the other pair of the front gin pole leg flanges projecting forward between said rear mast legs, and means bolting said adjacent parallel flanges together.

2. A mast structure comprising a base, an upright mast mounted thereon having substantially straight front and rear legs extending upwardly from the base, means hinging the lower ends of the front legs to the base to permit the mast to be swung downwardly into prone position along the ground, a gin pole mounted on the base to aid in swinging the mast between prone and upright positions and having front and rear legs, the front legs of the gin pole being in the form of upright angle bars with a pair of their flanges substantially parallel to the rear face of the mast and with their other pair of flanges projecting forward between said rear mast legs in close proximity thereto, shoes mounted on the lower ends of the front gin pole legs and attached to said base, each shoe including a pair of forwardly projecting spaced side walls, the lower end of each rear leg of the mast projecting down between said side walls of a shoe, means extending through said side walls and rear mast legs for detachably connecting them together, and detachable means rigidly connecting said front gin pole legs to said lower portions of the mast legs at a plurality of vertically spaced points to reinforce said lower leg portions and hold them straight.

HOMER J. WOOLSLAYER.
CECIL JENKINS.

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