Nov. 21, 1950 H. J. WOOLSLAYER ET AL 2,530,848

MAST STRUCTURE

Filed June 30, 1945 2 Sheets-Sheet 1

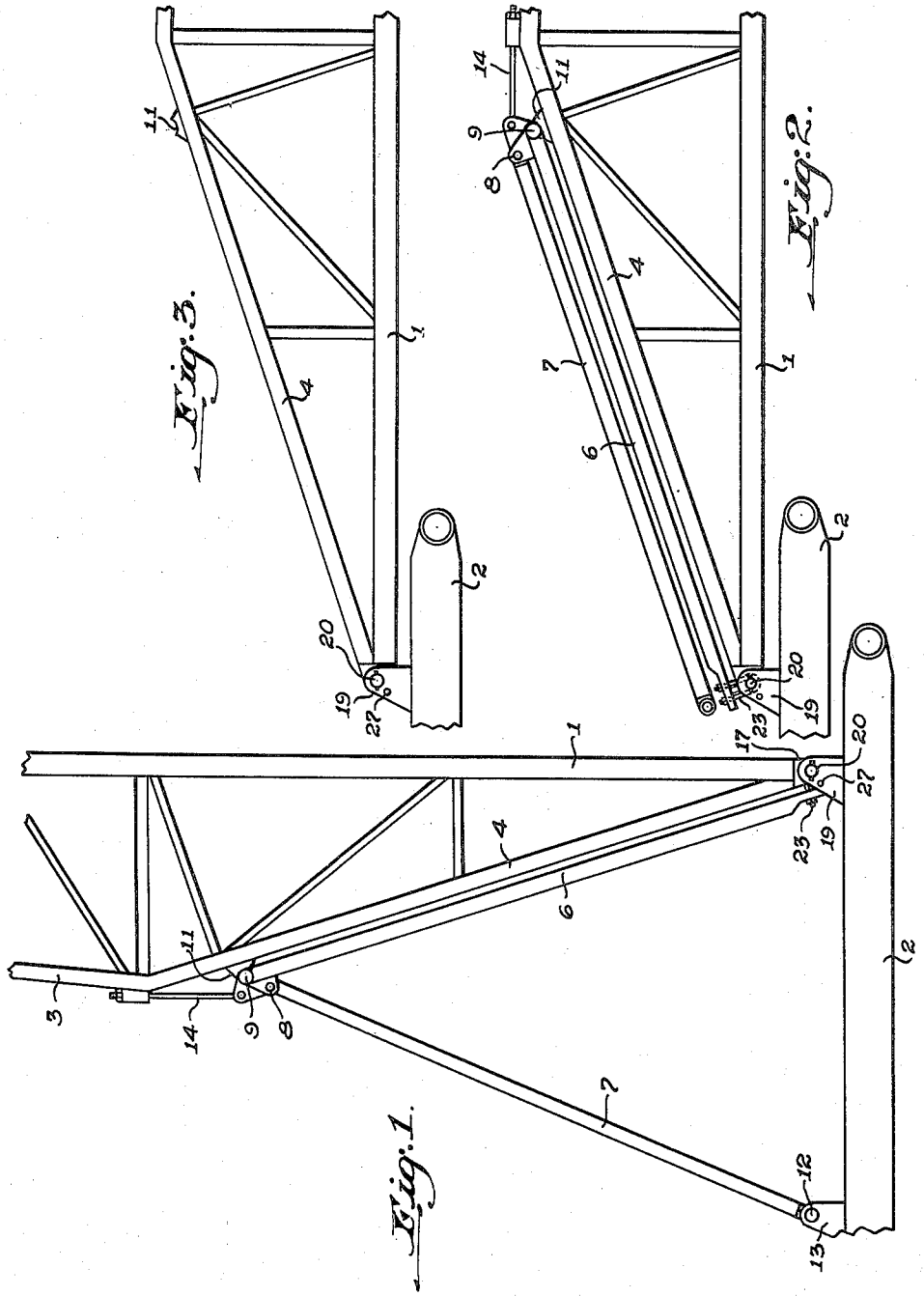


Fig. 3.

Fig. 2.

Fig. 1.

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MAST STRUCTURE

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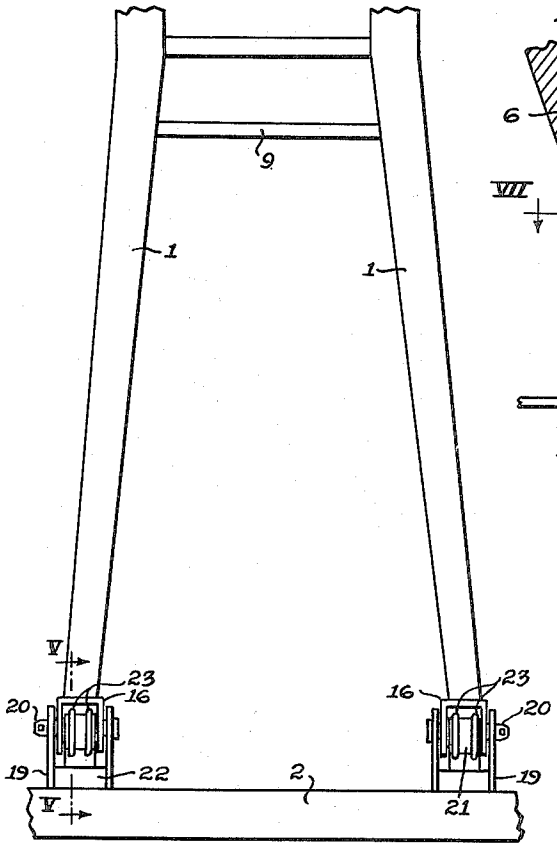


Fig. 4.

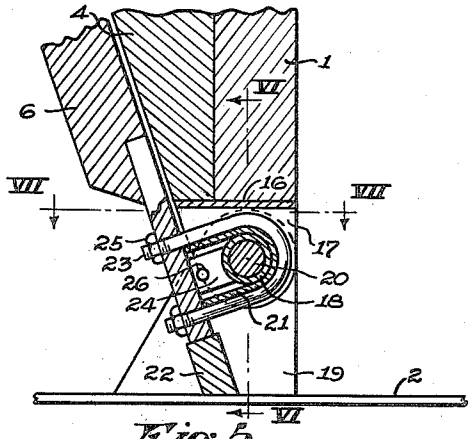


Fig. 5.

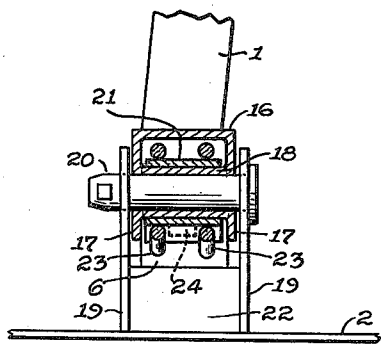


Fig. 6.

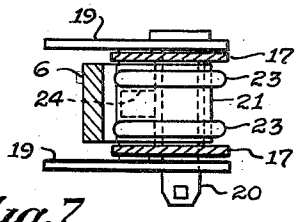


Fig. 7.

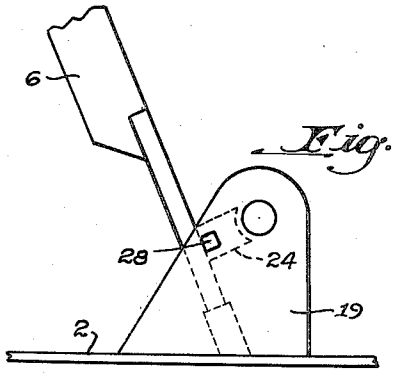


Fig. 8.

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Patented Nov. 21, 1950 2,530,848

UNITED STATES PATENT OFFICE

2,530,848

MAST STRUCTURE

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Application June 30, 1945, Serial No. 602,602

8 Claims. (Cl. 189—15)

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This invention relates to portable well drilling masts where a mast is hinged to a base on which there is a gin pole for swinging the mast from the ground up to an upright position and down again.

In such mast structures the gin pole generally balances and supports the mast after it has been swung up into position, but the pole may be used only for raising and lowering the mast where the mast is self-supporting. In either case the lower end of the mast side of the gin pole generally is disposed close to the mast legs that are hinged to the base. Sometimes the gin pole is detachably connected to the base independently of the mast, but in such cases the gin pole must be handled as a separate item because it can not be folded over onto the mast when the latter is down. In other instances folding of the gin pole onto the lowered mast is possible, but the pole and mast are permanently connected together. While in general this is satisfactory, because it reduces the number of separate sections that have to be handled during transportation, it sometimes is desirable to remove the mast from the base without the gin pole, or to replace a damaged gin pole in the field.

It is among the objects of this invention to provide a mast structure in which either the gin pole or the mast can be rotated relative to the base independently of the other but on a common axis, and in which either the gin pole or the mast can be disconnected from the base without disturbing the other.

In accordance with this invention the lower end of a mast is hinged to a supporting base by means of a removable pivot pin. A gin pole on the base has spaced sides one of which is disposed beside the mast. The lower end of the opposite side of the gin pole is detachably connected to the base, while the lower end of the mast side of the pole is detachably connected to the pivot pin. Consequently, the mast and gin pole are pivotally connected to the base on a common axis and are independently removable from the base. The connection between the gin pole and the pivot pin preferably is made by means detachably connected to the pole and extending around the pin. When the pin and mast are removed from the base without the gin pole, the latter can be anchored to the base by anchoring members which are not used at other times.

The preferred embodiment of the invention is illustrated in the accompanying drawings in which Fig. 1 is a side view of the lower portion of a mast structure; Fig. 2 is a fragmentary side

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view showing the mast and folded gin pole reclining ready for transportation to a new location; Fig. 3 is a view similar to Fig. 2 but with the gin pole removed from the mast; Fig. 4 is a front view of the lower portion of the mast structure; Fig. 5 is an enlarged vertical section taken on the line V—V of Fig. 4; Fig. 6 is a vertical section taken on the line VI—VI of Fig. 5; Fig. 7 is a horizontal section taken on the line VII—VII of Fig. 5; and Fig. 8 is a fragmentary side view showing the lower end of a gin pole leg anchored to the base from which the mast and pivot pin have been removed.

Referring to Figs. 1 and 4 of the drawings, a skeleton mast has front legs 1 supported by a base 2, and rear legs 3 the lower ends of which terminate a considerable distance above the base. The words "front" and "rear" are merely arbitrary designations for the legs to aid in describing the mast, and the front legs could just as well be called rear legs and vice versa. The lower ends of the front and rear legs are connected by diagonal braces 4. The mast is hinged to the base in a manner to be described presently, and is supported in upright position by means of a gin pole also mounted on the base. This pole has inclined front and rear legs 6 and 7 hinged together at 8 near the top of the pole. The upper ends of the front legs are rigidly connected by a cross member 9 engaged by seats 11 secured to the diagonal braces 4 of the mast. The front legs of the gin pole are disposed close to braces 4 and parallel to them. The lower ends of the rear legs of the gin pole are connected by removable pins 12 to shoes 13 rigidly mounted on top of the base. The gin pole is used for raising and lowering the mast in a well known manner by cables connected to the pole. When the mast is upright it is secured to the top of the gin pole by means of vertical eye bolts 14.

The mast is hinged to the base in the following manner, as shown in Figs. 4, 5, 6, and 7. Rigidly connected to the lower end of each front leg 1 of the mast is a foot having a top plate 16 from which parallel end plates 17 extend downwardly. These end plates are provided with aligned openings connected by a horizontal cylindrical sleeve 18. Each foot is disposed between the upper portions of a pair of vertical shoe plates 19 rigidly mounted on the base. The plates are provided with openings registering with the ends of the sleeve, and a removable pivot pin 20 extends through these openings and the sleeve for supporting the foot and pivotally connecting it to the shoe plates.

Rigidly mounted on the base between each pair of shoe plates 19 is a seating member 22 on which rests the lower end of one of the front legs 6 of the gin pole. Two U-bolts 23 extend around each sleeve 18 with their ends extending through holes in the foot of the adjacent gin pole leg which is spaced from the sleeve by a spacing block 24 secured to the leg, as shown in Fig. 5. This block has a concave surface slidably engaging the sleeve against which it is held by means of nuts 25 threaded on the projecting ends of the U-bolts. To prevent the bolts from being drawn up so tightly as to press the block against the sleeve hard enough to prevent relative rotation between them, a U-shape plate 21 extends around the sleeve in sliding engagement therewith and with its ends abutting against the foot of the gin pole leg. The U-bolts engage the outside of this plate.

It will be seen that the front legs 6 of the gin pole are hinged to the base on the same axis as the mast, so that the gin pole can be folded against the reclining mast as shown in Fig. 2 after pins 12 have been removed from the rear legs of the pole. On the other hand, the gin pole and mast can be disconnected from each other, and they are independently removable from the base. Thus, by removing the U-bolts the gin pole can be disconnected from the mast and the base, as shown in Fig. 3. If the pivot pins 20 as well as the U-bolts are removed, the mast can be detached from the base without disturbing the gin pole. In such a case the front legs of the gin pole should be anchored to the base. This can be done by providing the spacing blocks 24 with transverse openings 26 (Fig. 5) registering with openings 27 (Figs. 1, 2, and 3) in the adjacent shoe plates so that bolts 28 (Fig. 8) can be inserted through them to hold the gin pole legs on seating members 22 after those legs have been disconnected from sleeves 18.

It will be noted in Fig. 1 that the point 8 at which the front and rear legs of the gin pole are hinged together is substantially directly below the lower ends of the rear legs 3 of the mast and is as close as those lower ends to the front legs 1 of the mast. It also will be seen that the head of the gin pole does not project an appreciable amount behind a vertical plane parallel to the front of the mast and passing through the most rearward point of the mast, which is where eye bolts 14 connect to the lower ends of rear legs 3 at the heel of the mast. In this arrangement, with the head of the gin pole beneath the heel of the mast, the combined thickness of mast and gin pole from front to back through the head of the gin pole when it is folded against the mast as shown in Fig. 2, is substantially no greater than the thickest part of the mast, which is above the gin pole. The reason for this arrangement, which is different from any known heretofore, is to permit the mast to be thicker at the heel than otherwise would be allowed. That is, in transporting these masts in sections on trucks over highways, the lower sections generally are laid on their sides with the gin poles folded against them, it being the practice to leave the gin poles attached to the masts. As there are highway restrictions which limit the width of truck loads, usually to eight feet, if the head of the gin pole is located behind the rear legs of the mast the thickest part of the mast must be enough less than eight feet through to allow for the thickness of the gin pole head. In other words, the combined maximum thickness of mast and folded gin pole must not exceed the highway limitation.

By locating the head of the gin pole beneath the heel of the mast in the manner disclosed in the drawings, the mast can be approximately eight feet thick at the heel because the gin pole does not add to the thickness of the mast and therefore does not have to be taken into account.

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, a mast thereon, a horizontal sleeve rigidly mounted on the lower end of the mast, a pivot pin extending through said sleeve and detachably connected to the base, a gin pole on the base having upwardly converging sides with one of them disposed adjacent the mast, means detachably connecting the lower end of the opposite side of the gin pole to said base, and means mounted on said sleeve for rotation around its axis and detachably connected to the lower end of said mast side of the gin pole, whereby the mast and gin pole are independently connected to the base on a common pivotal axis.

2. A mast structure comprising a base, a mast thereon, a horizontal sleeve rigidly mounted on the lower end of the mast, a pivot pin extending through said sleeve and detachably connected to the base, a gin pole on the base having upwardly converging sides with one of them disposed adjacent the mast, means detachably connecting the lower end of the opposite side of the gin pole to said base, and means detachably connected to the lower end of said mast side of the gin pole and extending around said sleeve for pivotally connecting the gin pole to the sleeve, whereby the mast and gin pole are pivotally connected to said base on a common axis and are independently removable from the base.

3. A mast structure comprising a base, a mast thereon, a horizontal sleeve rigidly mounted on the lower end of the mast, a pivot pin extending through said sleeve and detachably connected to the base, a gin pole on the base having upwardly converging sides with one of them disposed adjacent the mast, means detachably connecting the lower end of the opposite side of the gin pole to said base, and a U-bolt extending around said sleeve with its ends detachably connected to the lower end of said mast side of the gin pole, whereby the mast and gin pole are pivotally connected to said base on a common axis and are independently removable from the base.

4. A mast structure comprising a base, a mast thereon, a horizontal sleeve rigidly mounted on the lower end of the mast, a pivot pin extending through said sleeve and detachably connected to the base, a gin pole on the base having upwardly converging sides with one of them disposed adjacent the mast, means detachably connecting the lower end of the opposite side of the gin pole to said base, means mounted on said sleeve for rotation around its axis and detachably connected to the lower end of said mast side of the gin pole, whereby the mast and gin pole are independently connected to the base on a common pivotal axis, and means for bolting the lower end of said mast side of the gin pole to

the base when the pin and mast are removed without the gin pole.

5. A mast structure comprising a base, a mast thereon, a horizontal sleeve rigidly mounted on the lower end of the mast, a pivot pin extending through said sleeve and detachably connected to the base, a gin pole on the base having upwardly converging sides with one of them disposed adjacent the mast, means detachably connecting the lower end of the opposite side of the gin pole to said base, a U-bolt extending around said sleeve with its ends detachably connected to the lower end of said mast side of the gin pole, and a spacing member mounted on said gin pole adjacent said U-bolt and slidably engaging said sleeve.

6. A mast structure comprising a base, a mast thereon, a horizontal sleeve rigidly mounted on the lower end of the mast, a pivot pin extending through said sleeve and detachably connected to the base, a gin pole on the base having upwardly converging sides with one of them disposed adjacent the mast, means detachably connecting the lower end of the opposite side of the gin pole to said base, a U-bolt extending around said sleeve with its ends detachably connected to the lower end of said mast side of the gin pole, a spacing member mounted on said gin pole adjacent said U-bolt and slidably engaging said sleeve, said spacing member being provided with an opening extending transversely therethrough, and a bolt adapted to be inserted in said opening for bolting the gin pole to the base after said U-bolt has been removed, whereby the gin pole can be anchored to the base even though the mast is removed.

7. A mast structure comprising a base, a pair of spaced parallel vertical plates rigidly mounted thereon, a horizontal pivot pin removably mounted in said plates, a sleeve rotatably mounted on the pin between the plates, a mast having its lower end rigidly connected to said sleeve, a gin pole on the base having upwardly converging sides with the lower end of one of them positioned adjacent said plates, means detachably

connecting the lower end of the opposite side of the gin pole to said base, a U-bolt extending around said sleeve with its ends detachably connected to the adjacent lower end of the gin pole, a spacing member mounted on said gin pole and slidably engaging said sleeve, said spacing member and plates being provided with registering openings, and a bolt adapted to be disposed in said openings when the pin and mast are removed from the plates without removing the gin pole.

8. A mast structure comprising a base, a mast thereon, a horizontal sleeve rigidly mounted on the lower end of the mast, a pivot pin extending through said sleeve and detachably connected to the base, a gin pole on the base having upwardly converging sides with one of them disposed adjacent the mast, means detachably connecting the lower end of the opposite side of the gin pole to said base, a U-shape plate extending around said sleeve in sliding engagement therewith and with its ends abutting the lower end of said mast side of the gin pole, a U-bolt extending around said sleeve outside said plate, the ends of said bolt being detachably connected to the lower end of said mast side of the gin pole, and a spacing member mounted on said gin pole adjacent said U-bolt and slidably engaging said sleeve.

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