Oct. 14, 1947. H. J. WOOLSLAYER ET AL 2,429,010

DERRICK SUBSTRUCTURE

Filed Feb. 9, 1946 3 Sheets-Sheet 1

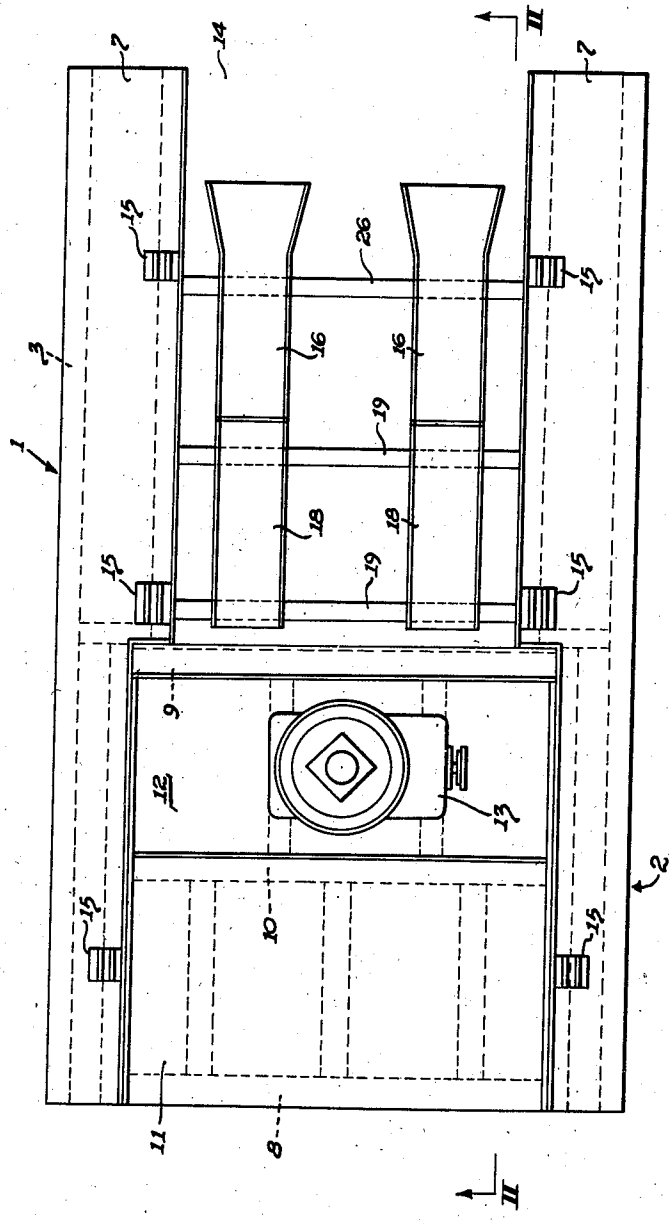


Fig. 1.

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DERRICK SUBSTRUCTURE

Filed Feb. 9, 1946 3 Sheets-Sheet 2

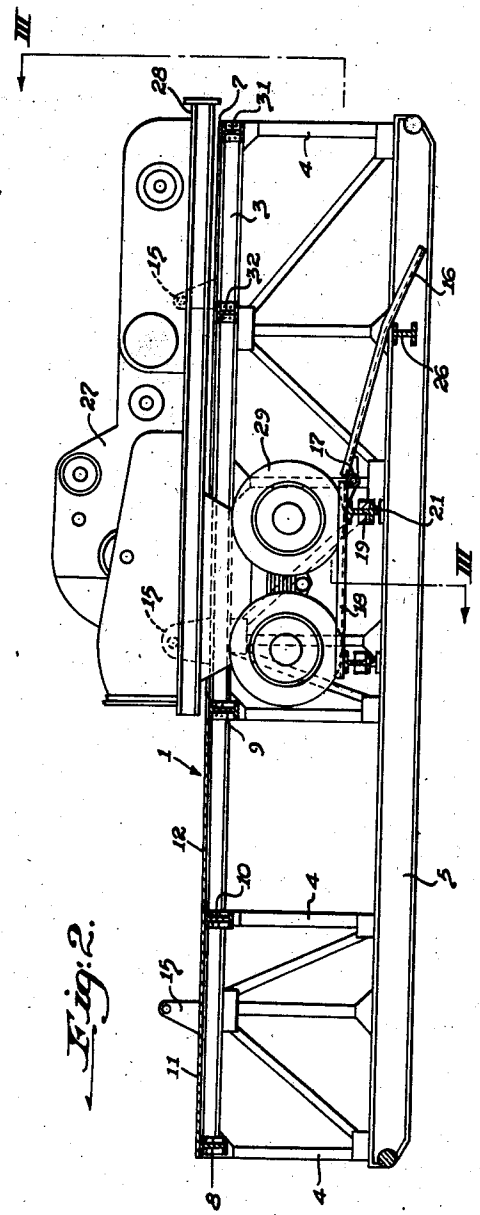


Fig. 2.

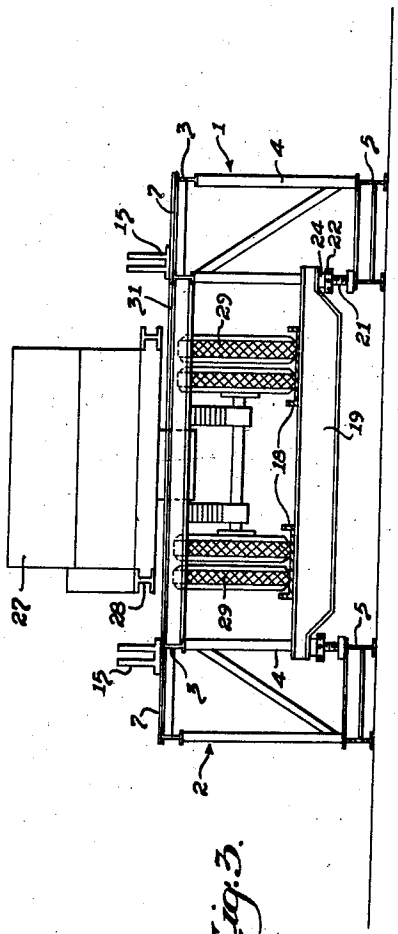


Fig. 3.

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DERRICK SUBSTRUCTURE

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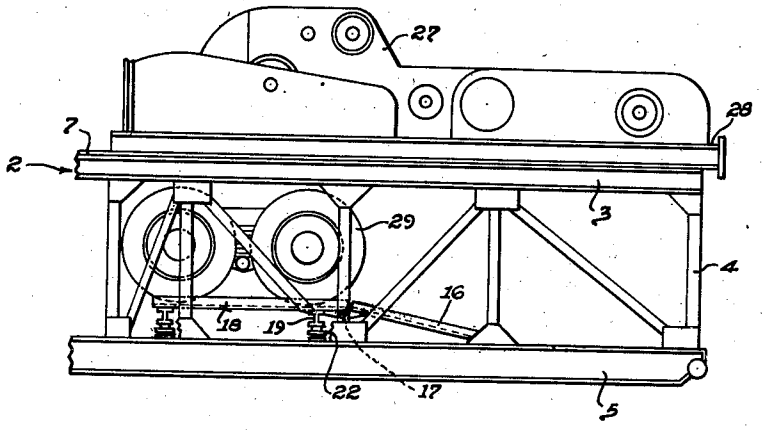


Fig: 4.

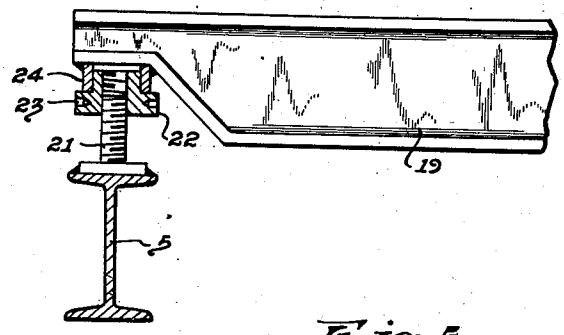


Fig: 5.

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UNITED STATES PATENT OFFICE

2,429,010

DERRICK SUBSTRUCTURE

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Application February 9, 1946, Serial No. 646,591

9 Claims. (Cl. 189—21)

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This invention relates to well drilling apparatus, and more particularly to substructures for oil well masts or derricks.

In the drilling and pumping of oil wells the practice has been adopted of using portable derricks and related equipment so that the apparatus can be moved from one location to another. Thus, a portable substructure may be used on which a removable mast can be mounted which can be swung from an upright position to a horizontal position along the ground. With such apparatus it also is necessary to move the hoisting equipment or draw works onto and off the substructure. This generally presents quite a problem because the draw works is heavy and has to be skidded from a truck onto the substructure.

It is among the objects of this invention to provide a derrick substructure onto which or from which a draw works or hoist can quickly and easily be moved, which facilitates the rapid transportation of such a hoist from one location to another, which forms a firm foundation for the hoist, and which requires but little labor to mount and dismount the hoist.

In accordance with this invention a derrick substructure of moderate height is provided with a bay which can be entered from one end of the structure. In the lower part of the bay there are ramps which are adapted to receive a hoist-supporting trailer, which has been backed up the ramps, and to elevate it high enough to locate the bottom of the hoist at the top and preferably above the bay. Removable cross members are fastened across the bay below the hoist after the trailer has been backed into it, and the hoist then is lowered in order to set it upon the cross members which form a firm foundation for the hoist. The hoist can be lowered, for example, by letting the air out of the pneumatic tires of the trailer, or by lowering the ramps. The latter can be accomplished in any convenient manner, preferably by mounting the ramps on jacks the height of which can be decreased. When it is desired to remove the hoist from the substructure the ramps are raised in order to lift the hoist from the supporting cross members which then are removed from the bay. The trailer then can be hooked to a truck and pulled out of the open bay.

The preferred embodiment of the invention is illustrated in the accompanying drawings in which Fig. 1 is a plan view of our improved substructure; Fig. 2 is a vertical section taken on the line II—II of Fig. 1 and showing a hoist

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mounted on a trailer which has been backed into the substructure bay; Fig. 3 is an end view of the hoist and substructure taken on the line III—III of Fig. 2; Fig. 4 is a fragmentary side view showing the hoist lowered onto the substructure; and Fig. 5 is an enlarged fragmentary side view of one end of one of the cross beams which support the ramps.

Referring to the drawings, a substructure, fabricated from structural steel members, has spaced parallel side frames 1 and 2 each of which is formed from parallel top beams 3 supported by vertical members 4 above parallel bottom beams 5 that serve as skids. Each side frame is covered by a steel plate 7. The front ends of the two side frames and their central portions are connected by cross beams 8 and 9, and there is a similar beam 10 located between the two just mentioned. These beams likewise may be covered with steel plates 11 and 12, on one of which a rotary table 13 (Fig. 1) for rotary drilling may be mounted. Behind the central cross beam there is an open space or bay 14 between the side frames. This bay is shown in Fig. 1 as being open at the rear end of the substructure. Mounted on top of the substructure are the usual shoes 15 to which a cantilever type mast can be fastened.

In the lower part of the bay there is a pair of parallel ramps extending lengthwise of the substructure and each of which has an inclined rear section 16 connected by a bottom hinge 17 (Fig. 2) to a substantially horizontal front section 18. The front sections of the ramps are rigidly mounted on a pair of parallel cross beams 19, the ends of which are supported by jacks mounted on the inner skids 5 of the substructure. As shown in Fig. 5, each jack has a vertical screw 21 welded to the underlying skid, and a flanged circular nut 22 threaded on the screw. The nut is provided with radial openings 23 to receive a rod (not shown) by which it can be turned in order to run it up or down the stationary screw. Encircling the upper part of the nut and resting on its flange is a ring 24 which is welded to the bottom of the adjoining cross beam 19. The jacks, therefore, connect the cross beams to the skids, but when the nuts are turned the beams are either raised or lowered. This changes the elevation of the horizontal sections of the ramps. When this occurs, the inclined sections of the ramps slide across a supporting member 26 secured to the inner skids of the two side frames 1 and 2.

A draw works or hoist 27 to be used with this

substructure is permanently mounted on the bed 28 of a trailer which has the usual wheels 29. The trailer can be drawn from one location to another by any suitable motor vehicle. When it is desired to mount the hoist in operating position on the substructure, the trailer is backed into the substructure bay and up the inclined sections of the ramps to the horizontal sections 18 thereof. At this time the jacks are extended to elevate the ramps to their upper position so that the bed of the trailer is disposed above the top of the substructure, as shown in Figs. 2 and 3, and the inner end of the trailer bed overlies central cross beam 9. The trailer then is disconnected from the vehicle that backed it up the ramps. Following this a pair of cross members 31 and 32 are placed across the top of the bay and are bolted to the inner top beams 3 of the side frames. Cross member 31 is located at the rear end of the substructure, and the other one is placed some distance in front of it. Both of them, of course, are beneath the bed of the trailer.

The nuts 22 on the four jacks then are turned in order to lower cross beams 19 under the ramps so that the trailer will descend until its bed rests on the cross members 9, 31 and 32 at the top of the substructure, as shown in Fig. 4. If desired, the trailer bed can be clamped or fastened in any suitable manner to the substructure. It will be apparent that the hoist now rests on and is supported firmly by the substructure the same as if the trailer were not present.

When it is desired to remove the hoist from the substructure for transportation to a new location, the jacks are raised in order to elevate the ramps so that the bed of the trailer will be lifted from the supporting cross members. The two removable cross members 31 and 32 then are disconnected from the substructure and taken out of the bay. The trailer is reconnected to a motor vehicle which pulls it down the ramps and out of the bay, leaving the substructure as it appears in Fig. 1.

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. In combination, a derrick substructure provided with a bay open at one end, ramps in the lower part of the bay adapted to receive and raise a hoist-supporting trailer high enough to locate the bottom of the bed of the trailer above the top of the bay, and means for lowering the ramps to set the bed of the trailer upon the substructure, whereby to steady the hoist.

2. In combination, a derrick substructure provided with a bay open at one end, removable cross members extending across the top of the bay for supporting a hoist carrying trailer bed, trailer ramps in the lower part of the bay having portions extending down toward its open end, and means for raising the ramps high enough to cause the hoist-carrying trailer to lift the trailer bed from said cross members, whereby said members can be removed from the substructure to permit the trailer to travel down the ramps and out of the bay.

3. In well drilling apparatus, a derrick substructure provided with a bay open at one end, removable cross members fastened across the top of the bay, a hoist carrying trailer bed resting on said cross members, and ramps in the lower part of the bay for supporting the wheels of the trailer, said hoist carrying trailer bed being adapted to be raised above said cross members, whereby said members can be removed from the substructure to permit the trailer to travel down the ramps and out of the bay.

4. In well drilling apparatus, a derrick substructure provided with a bay open at one end, removable cross members fastened across the top of the bay, a hoist carrying trailer bed resting on said cross members, ramps in the lower part of the bay for supporting the wheels of the trailer, and means for lifting the hoist carrying trailer bed above said cross members, whereby said members can be removed from the substructure to permit the trailer to travel down the ramps and out of the bay.

5. In well drilling apparatus, a derrick substructure provided with a bay open at one end, removable cross members extending across the top of the bay, means for detachably fastening said cross members in place, a hoist carrying trailer bed resting on said members, ramps in the lower part of the bay for supporting the wheels of the trailer, and means for raising the ramps high enough to cause the trailer wheels to lift the hoist carrying bed from said cross members, whereby said members can be removed from the substructure to permit the trailer to travel down the ramps and out of the bay.

6. In well drilling apparatus, a derrick substructure provided with a bay open at one end, removable cross members fastened across the top of the bay, a hoist carrying trailer bed resting on said cross members, ramps in the lower part of the bay for supporting the wheels of the trailer, and jacks adapted to raise the ramps in order to lift the trailer and hoist, whereby said cross members can be removed from the substructure to permit the trailer to travel down the ramps and out of the bay.

7. In well drilling apparatus, a derrick substructure provided with a bay open at one end, removable cross members fastened across the top of the bay, a hoist carrying trailer bed resting on said cross members, ramps in the lower part of the bay for supporting the wheels of the trailer, horizontal cross beams supporting the ramps, and vertically movable means supporting said beams, said means being adapted to be moved upward in order to raise said cross beams and thereby lift the hoist carrying bed from said cross members, whereby said members can be removed from the substructure to permit the trailer to travel down the ramps and out of the bay.

8. In well drilling apparatus, a derrick substructure provided with a bay open at one end, removable cross members fastened across the top of the bay, a hoist, a trailer bed on which the hoist is permanently mounted, said bed resting on said cross members, ramps in the lower part of the bay for supporting the wheels of the trailer and having horizontal sections hinged at one end to inclined sections extending downward toward the open end of the bay, jacks supporting said horizontal sections and adapted to be elevated in order to raise those sections high enough to cause the trailer wheels to lift the hoist carrying bed from said cross members, whereby said members can be removed from the substructure to permit the trailer to travel down the ramps and out of the bay.

9. In well drilling apparatus, a derrick substructure provided with a bay open at one end, removable cross members detachably secured across the top of the bay for supporting a hoist carrying trailer bed, trailer ramps in the lower part of the bay having portions extending down toward its open end, and jacks for raising the ramps high enough to cause the hoist-carrying trailer to lift the trailer bed from said cross members, whereby said members can be removed from the substructure to permit the trailer to travel down the ramps and out of the bay.

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