Nov. 24, 1942. W. F. SHEFFIELD 2,303,312

WELL PIPE JACK

Filed April 11, 1941 2 Sheets-Sheet 1

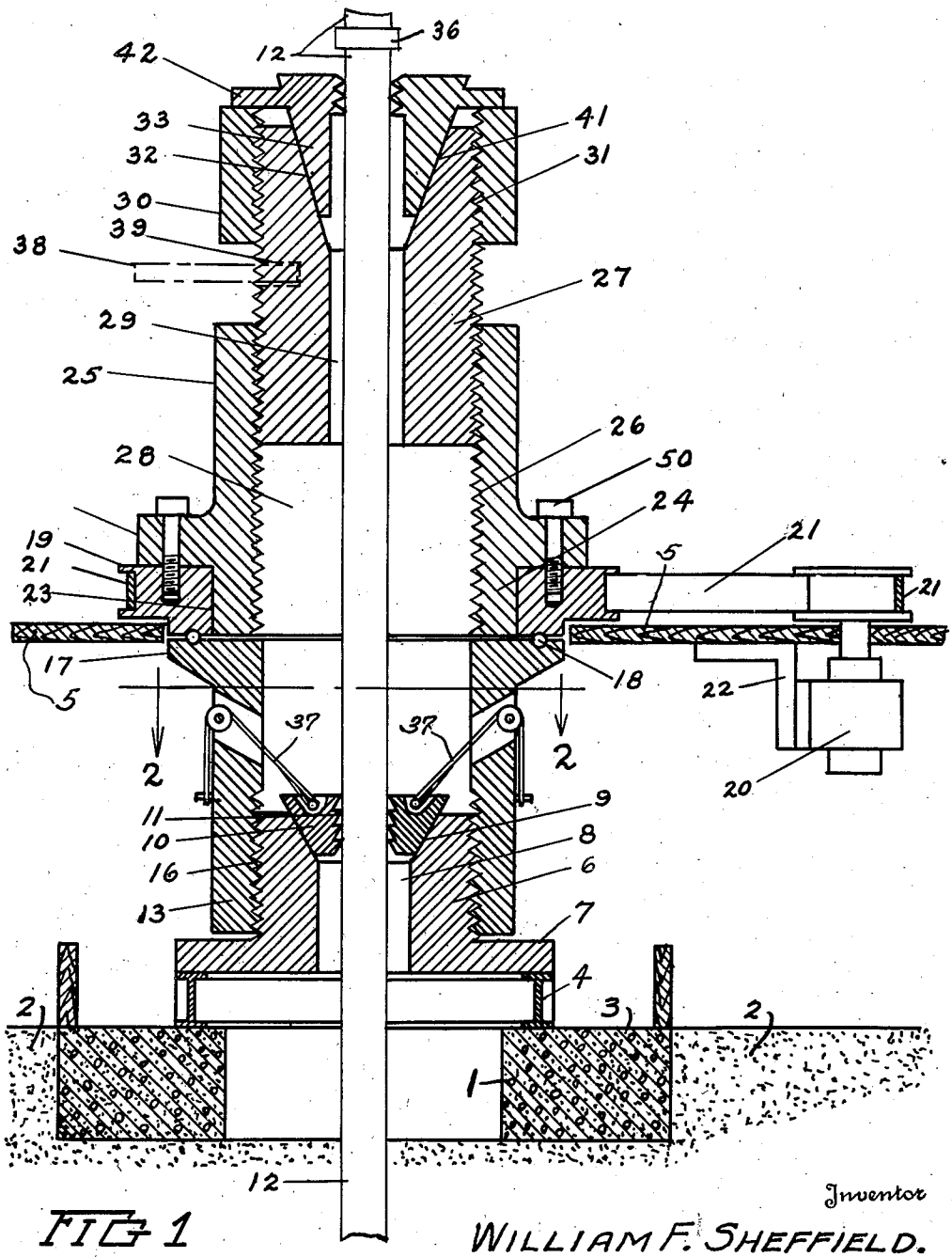



FIG 1

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Filed April 11, 1941 2 Sheets-Sheet 2

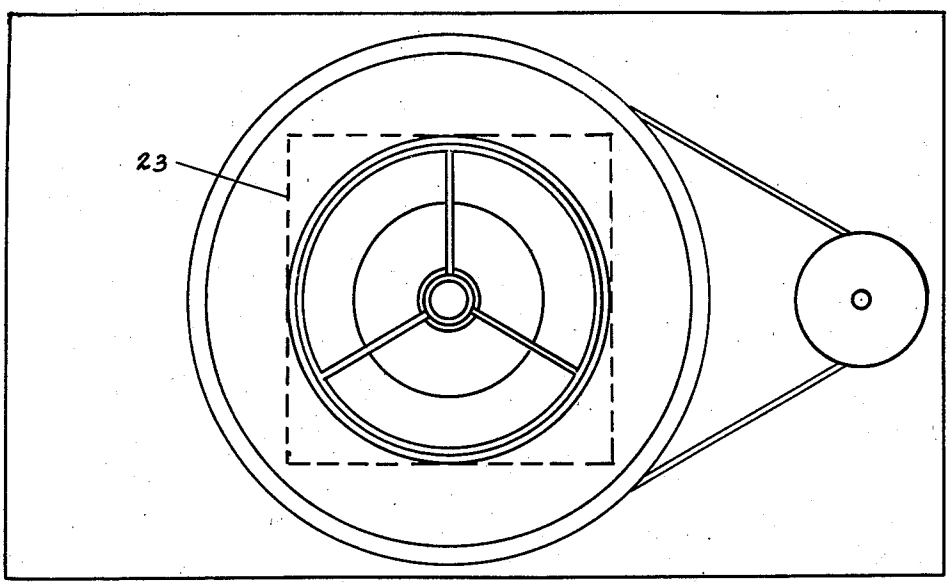



FIG. 3.

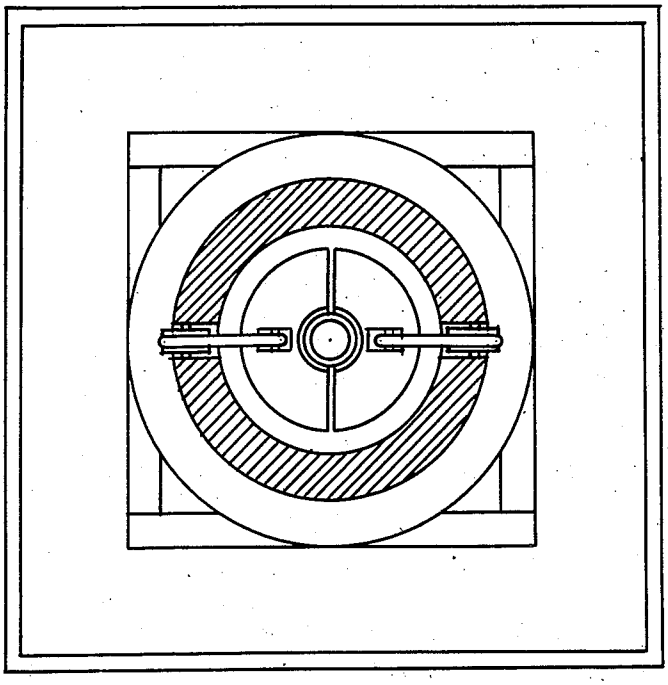


FIG. 2.

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Patented Nov. 24, 1942

2,303,312

# UNITED STATES PATENT OFFICE

2,303,312

## WELL PIPE JACK

William F. Sheffield, Sparrows Point, Md.

Application April 11, 1941, Serial No. 388,126

2 Claims. (Cl. 254—30)

This invention refers to oil well machinery and more particularly to raising device for use in the removal or replacement of oil casing and drilling equipment in wells being drilled. It has among its objects to provide a mechanism for raising oil well casing and drilling equipment without the use of long derricks. Its purpose is also to provide an arrangement of derricks that will not have to be especially substantial or designed to sustain all the load of the pieces of casing etc. in the well from the top of the derrick, as well as avoid a different size or type of derrick for different well depths. Another object is to provide an arrangement that will permit oil wells and the like to be drilled through the use of a uniform or standard type and size of derrick and raising device. A further object is to have the device adapted to employ the least amount of equipment regardless of the amount of drilling equipment or casing tied in or the depth of the well, and thereby keep the cost down to a minimum. A still further object is to provide a device that will be safer to use and more powerful in action than customary equipment used, without involving additional expense.

Other objects will become apparent as the invention is more fully set forth.

It is customary in oil well drilling to lift the casings or drilling equipment with cables running over pulleys at the top of the derrick. If several lengths of casing etc. are to be pulled up and inserted at a time, the derricks have to be made long enough to take them tied together in sets. They are then disconnected from those in the well and placed upright within the derrick structure. Since the supporting pulleys are at the top of the derrick structure, the latter has to be made very substantial and strong throughout its entire framework. The higher the derrick, the stronger or more expensive has it to be. In this invention, the lifting arrangement for the casings etc., is located on the so-called floor level of the rig and its lifting action is kept close to this level and kept away from the derrick structure. The derrick is made to take care of the removal of individual casings singly from the well, when they have been lifted up from it. This requires but a simple structure of no great strength, as its use is but incidental and not for supporting the full load of the casings in the well. With the device in use, it is possible to avoid the use of derrick entirely.

In the drawings which are outlined to show an example of the invention:

Figure 1 is a sectional elevation through a device applied to an oil well for raising the casings or drilling equipment embodying this invention;

Figure 2 is a sectional plan view on line 2—2 of Figure 1;

Figure 3 is a plan view of Figure 1.

Similar reference characters refer to similar parts throughout the drawings.

In the drawings, 1 represents an oil well orifice in the ground 2, where 3 is the ground level. A foundation member 4 is mounted on a platform 5 located over the oil well orifice. The foundation supports an extended base 7 mounted on a cylindrical body 6 which is externally bolt threaded at 16, on its periphery.

The body has a passage 8 therethrough having its mouth 9 bevelled inwardly and adapted to take the sections of a clamp means 10. The sections have their outside surfaces bevelled to engage and wedge on the surfaces of the mouth 9 and their jaws 11 to dig into the outside surface of the casing or rod 12 inserted in the well and passage 8. This clamp curves to hold the casing when the jaws 33 are released and prevents the casing or rod from dropping back into the well.

Stanchion means 13 is formed with engagement grooves to embrace the external surfaces of the body 6 and be adjustable on the bolt threads 16. Its contact plate 17, is enlarged preferably and provided with ball bearings 18 to enable the power plate 19 to freely rotate thereon. This power plate is operated by a motor 20 through the transmission 21. This motor is indicated at the side of the plate 19 mounted on a frame 22.

The center of the plate 19 is rectangularly recessed at 23 to take and hold the base 24 of a jack shell 25. The latter is formed with bolt threads 26 interiorly, and arranged for the adjustment of the lifting nut 27 screwing therein. Passage 28 is provided in the jack shell and the passage 29 in the lifting nut to allow the casing or drilling shafts to pass freely therethrough. A jack head 30 is formed like a sleeve with internal bolt threads 31 to engage in the bolt threads of the nut 27 to give adjustment. The nut 27 has a bevelled passage 41 therein which contacts the bevelled sides 32 of clamp jaws 33 and serve to hold on to the pipe and raise same. The clamp jaws 33 are adjustable in the nut and wedge tightly therein under the weight of the casing which they hold as they slide on the beveled sides 32. The adjustment of the jaw sections 33 to enable them to control their pressure against the wall of the casing 12, is provided for through ad-

justment of jack head 30 and the horizontal plates 42 extending from each jaw section 33 as indicated.

The casing or drilling equipment extending out of the jaw sections 33 is attached to the cable of the derrick, if one is used for removing it in single sections, if the derrick is not used it may be removed manually at the proper moment. In the operation of the device, the jaws 33 are adjusted to suit the pipe to be drawn, the motor is started to run the power plate 19, which in turn rotates on the contact plate 17 freely. As the power plate rotates it turns the jack shell 25. This is provided for by the rectangular form of the recess 23 and the rectangular base 24 within it as indicated in Figure 3. They lock each other together for the purpose of operating in this manner. The rotation of the shell 25 forces the jack nut to move vertically upward and raise casing 12 the desired amount, and its coupling 36 with it. The motor is then stopped and the clamp means 10 allowed to act on the casing below while the jack head 30 and jaws 33 are released. The projecting section of casing or drilling equipment lifted is then removed after disconnecting the coupling 36. The clamp means 10 is provided with chains or cables 37 for lifting its sections up when so required and preventing their becoming detached from the device. The jack nut is returned to the bottom of the jack shell by reversing the motor, holding the jack nut from rotation with a rod 38 in the hole 39 causing it to move vertically back into the shell. The positioning of the jack nut back in the shell permits it to be reused for raising more casing 12. This is repeated as often as necessary. The lowering of the casings into the well can be accomplished by using the jaw members 33 to frictionally control its movement. The bolts 50 are utilized for tightening the jack shell rigidly to plate 19.

While but one form of the invention is shown in the drawings and described in the specifications, it is not desired to limit this application to such form or in any other way, otherwise than restricted by the limitations therein, as it is appreciated that other constructions could be used, that would employ the same principles and come within the scope of the appended claims.

Having thus described the invention, what is claimed is:

1. A device of the class described comprising in combination, an annnular arrangement of gripping segments forced into gripping engagement with a rod by the wedge action between conical outer surfaces of the segments and a coacting conical surface formed in the upper end of the passage of a lifting nut, a jack headnut adapted to raise or lower the said gripping segments therewith, and having internal threads thereon, a lifting nut exteriorly threaded to operate on the screw threads of the jack head and having a conical bevelled passage arranged to coact with the conical outer surfaces of the segments and coordinate the action of the jaws on the rod proportionally to the position of the segments in regard to the lifting nut, said lifting nut having a central passage therethrough large enough to allow a substantial spacing about the rod passing therethrough, means for holding the lifting nut from rotation, a jack shell surrounding the lifting nut with internal screw threads adapted to engage with the screw threads cut on the periphery of the lifting nut, said shell having its base enlarged to provide a bearing surface extending out from the shell and undercut to provide an overhanging flange, a power plate mounted in the under-cut portion and below the overhanging flange arranged for motor drive, a contact plate member under the said shell and power plate, ball bearings or the like for supporting the power plate and spacing it away from the contact plate member, an extended base adapted for resting on a stationary surface with an upwardly extending screw threaded cylindrical body engaging with the internally screw threaded body of the contact plate for raising or lowering same, said body having a passage for the rod to pass through and allow substantial spacing around same and a conical bevelled mouth portion formed in the upper end of the passage, clamp means operably on the rod for clamping same and with its external surface coacting with the said bevelled mouth portion for promoting a wedging action of the clamp means on the rod as the latter travels therein.

2. A device of the class described comprising in combination, an annular arrangement of gripping segments forced into gripping engagement with a rod by the wedge action between conical outer surfaces of the segments and a coacting conical surface formed in the upper end of the passage of a lifting nut, a jack head nut adapted to raise or lower the said gripping segments therewith, and having internal threads thereon; a lifting nut exteriorly threaded to operate on the screw threads of the jack head and having an internal bevelled passage arranged to coact with the conical outer surfaces of the segments and coordinate the action of the jaws on the rod proportionally to the position of the segments in regard to the lifting nut, said lifting nut having a central passage therethrough large enough to allow a substantial spacing about the rod passing therethrough, means for holding the lifting nut from rotation, a jack shell surrounding the lifting nut with internal screw threads adapted to engage with the screw threads cut on the periphery of the lifting nut, said shell having its base enlarged to provide a bearing surface extending out from the shell and undercut to provide an overhanging flange, a power plate mounted in the undercut portion and below the overhanging flange arranged for motor drive, a contact plate member under the said shell and power plate, ball bearings or the like for supporting the power plate and spacing it away from the contact plate member, an extended base adapted for resting on a stationary surface with an upwardly extending screw threaded cylindrical body engaging with the internally screw threaded body of the contact plate for raising or lowering same, said body having a passage for the rod to pass through and allow substantial spacing around same and a conical bevelled mouth portion formed in the upper end of the passage, clamp means operable on the rod for clamping same and with its external surface coacting with the said bevelled mouth portion for promoting a wedging action of the clamp means on the rod as the latter travel therein, means for locking the overhanging flange and power plate together and means for tying the clamp means to the contact plate member.

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