May 3, 1927. 1,626,864

J. P. NEILSON, SR

COMBINATION RELEG AND JACK CLAMP

Filed Dec. 7, 1925 2 Sheets-Sheet 1

Fig. 1.

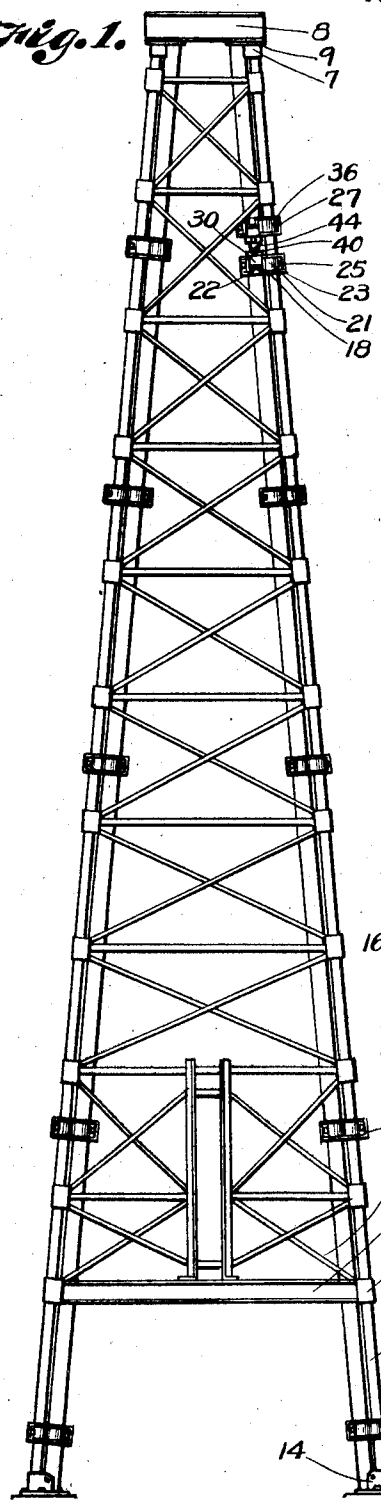


Fig. 2.

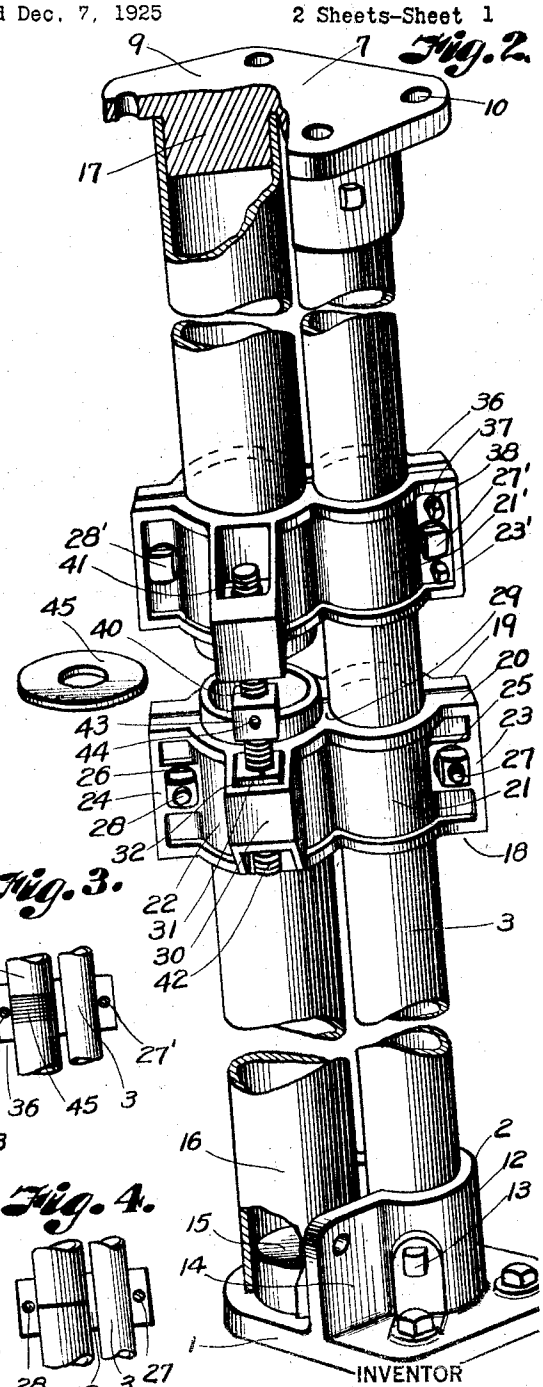


Fig. 3.

Fig. 4.

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Fig. 5.

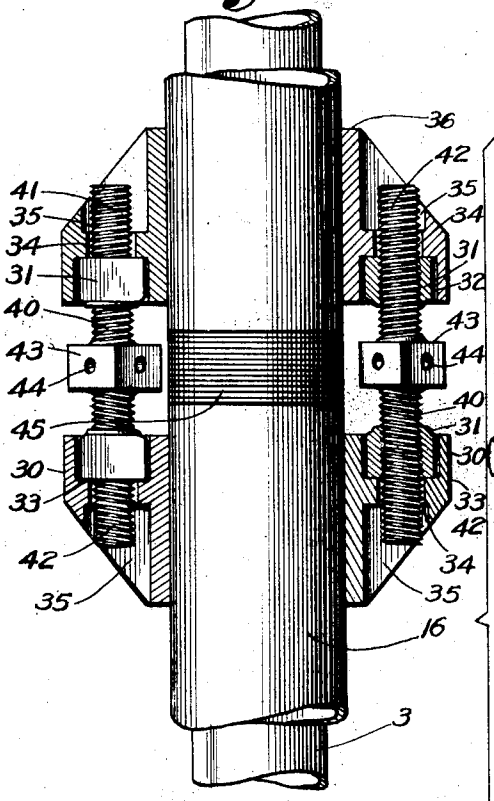
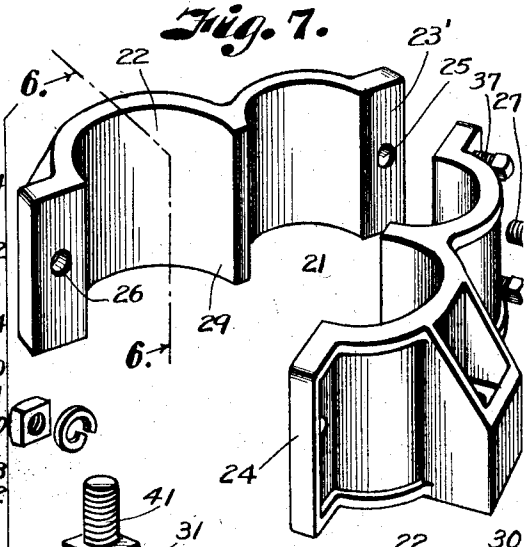


Fig. 7.



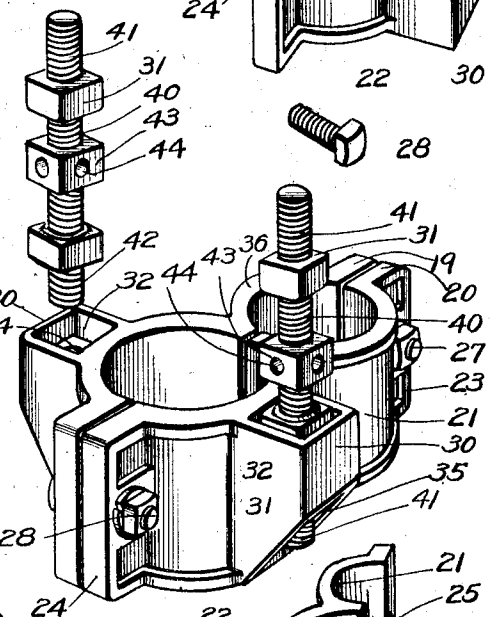


Fig. 6.

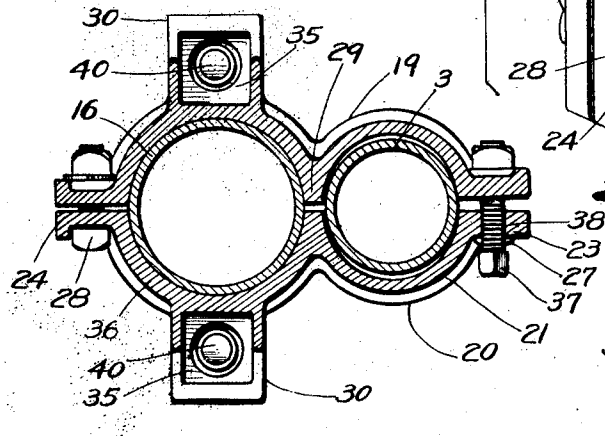
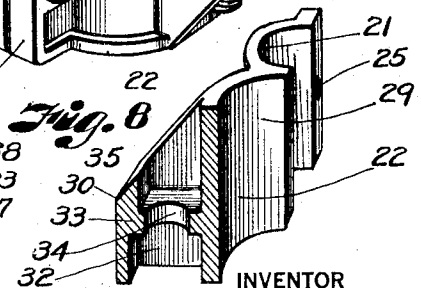


Fig. 8



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Patented May 3, 1927. 1,626,864

UNITED STATES PATENT OFFICE.

JAMES P. NEILSON, SR., OF TULSA, OKLAHOMA.

COMBINATION RELEG AND JACK CLAMP.

Application filed December 7, 1925. Serial No. 73,945.

My invention relates to oil well derricks and more particularly to combination drilling and pumping derricks of that type wherein reinforcing legs, commonly termed "doublers" or "relegs," are removably erected in connection with a comparatively light pumping derrick to strengthen the latter so that it may be employed for drilling operations, and may remain in place after the drilling has been completed and the reenforcing removed.

In installing derricks of this type it is customary to first erect a permanent, light, pumping derrick and then raise the reenforcing doublers or relegs along the permanent derrick legs so that the stronger relegs may carry the heavy loads incident to drilling operations.

It is under present methods difficult to adjust the relegs as to balance the load, and it not infrequently occurs that all or a part of the drilling load is thrown onto the pumping derrick, resulting in twisting or buckling of the lighter derrick.

It is the object of my invention to provide means for setting and adjusting the relegs in the pumping derrick to properly support and divide the drilling load, and whereby the relegs may be easily and quickly removed after the drilling has been completed, to relieve the derrick of wind hazard and so that the relegs may be employed in other locations.

More specifically the invention comprises a form of clamp which may be attached to the derrick legs and to the adjacent relegs during installation of the relegs, and includes a jack element whereby the relegs may be spread to permit insertion of a filler, such as steel disks or washers, whereby the length of the legs may be adjusted to properly support the headers and crown block, the jack clamp being likewise employed when the relegs are to be removed.

In the accompanying drawings I have illustrated the invention in a form adapted for use with a tubular derrick and in the following description I will refer to that form, with the understanding that this specific construction and use may be varied without departing from the spirit of the invention.

In the drawings:

Fig. 1 is a front elevation of a releg derrick of the tubular type, equipped with my invention.

Fig. 2 is an enlarged perspective view of one set of legs and their mountings, illustrating the use of my improvements.

Fig. 3 is a detail view of parts of the permanent derrick and relegs, showing fillers between the relegs.

Fig. 4 is a similar view showing an unfilled joint and illustrating use of a clamp for holding the legs together.

Fig. 5 is an enlarged view of portions of a set of legs, illustrating use of the jack clamp, the clamp being in vertical section.

Fig. 6 is a cross section of a set of legs and an applied jack clamp, particularly illustrating the slidable mounting of the upper clamp member in the permanent derrick leg.

Fig. 7 is a detail perspective view of the jack clamps, showing the parts in disassembled but relative relation.

Fig. 8 is a detail perspective view of one of the clamp members, particularly illustrating its jack screw socket.

Referring more in detail to the drawings: 1 designates sill plates which may be mounted on a concrete foundation (not shown) in such spaced relation as to mark the four corners of the derrick, and 2 are socket members mounted on and attached to the sill plates.

Anchored in the socket members and rising therefrom in gradually converging lines are the permanent derrick legs 3, here illustrated as of tubular formation, although as heretofore stated, this detail is not material.

Attached to the legs 3 at intervals throughout their height are gusset collars 4 carrying girts 5 and sway braces 6.

The derrick legs are extended to a desired height, where they terminate in a horizontal plane, and are equipped at their upper ends with caps 7 upon which the headers 8 are supported, the caps having flanges 9 forming extended flat bases to which the headers are secured by bolts (not shown) which may be extended through apertures 10 in the cap flanges.

With the tubular construction, the sockets 2 comprise tubular members 12 within which the permanent derrick legs are snugly fitted, and secured by cap screws 13, the cylindrical members having flared flanges 14 at their inner sides forming braces for the relegs.

On the tops of the sill plates 1 and between the socket flanges 14 are circular

bosses 15 of a diameter to snugly project into the open ends of the lower joints of the tubular relegs 16, which rise along the permanent derrick legs at the interior of the derrick, the upper joints of the relegs fitting snugly over annular bosses 17 formed integrally with and depending from the cap flanges 9.

The gusset collars 4 of the permanent derrick construction are usually provided with interior flanges and the joints of the permanent derrick legs slipped into the collars to abut against the flanges to connect the joints and form a stable derrick structure. The relegs, however, cannot be connected in this way, for the reason that they do not constitute a permanent part of the derrick but are intended for removal following the drilling operation, and must be capable of adjustment independently of each other and of the permanent derrick legs in order to balance the load on the crown block.

For convenience in erection of the relegs, in order to effect the adjustment and to securely connect the releg members at their joints, I have provided the combination clamp and jack, constituting the present invention.

My construction comprises a split clamp member 18 including the separate mating halves 19 and 20, each comprising a semi-cylindrical main leg grip 21, adapted for engagement with the main derrick leg 3, a similar but larger releg grip 22, adapted for engagement with a releg, end flanges 23 and 24 having bolt holes 25 and 26 through which the connecting bolts 27 and 28 are projected, and a lip 29 separating the grip members 21 and 22 to complete the semi-cylindrical formation of the respective grip members.

On the releg grip member 22 is a laterally-directed housing 30 formed integrally with the clamp member, having a square socket 31 of a size slightly in excess of a nut 32 which is adapted to seat therein, a diaphragm 33 for supporting the nut and having an aperture 34 through which a bolt may be projected, and a chamber 35 for receiving the bolt when the latter is projected through the socket and diaphragm aperture. The separate halves of the clamp are identical in construction and adapted for attachment to the adjacent permanent derrick leg and the releg with which the clamp is associated.

The clamp just described may be and is employed alone for connecting the joints of the releg when the latter have been installed, in which use the socket 30 is not employed.

The principal use of the clamp is, however, in combination with another substantially similar clamp for jacking the relegs after all have been installed, to properly set the relegs to the header caps and equalize the lengths of the legs to effect a balancing support for the crown block.

It is apparent that as the relegs are anchored at top and bottom on the bosses 15 and 17 on the sill plate and header cap respectively, setting of the relegs necessitates an original shortness in length in order that the last joints of the legs may be fitted over the header cap bosses, and that some means must be provided for lengthening the legs or otherwise they could not function as a support.

In setting the legs the joints are built up, one upon the other, from the sill plates, clamps being applied at the abutting ends of the leg joints to hold them to the permanent derrick legs, and finally, after all of the releg joints are in place their adjustment is effected by means of my improvement, which includes, in addition to the clamp just described, an upper jack clamp 36 similar in all respects to the lower clamp jack 18 heretofore described, except in that the flanges 23′ at the permanent leg grip end of the clamp are provided with set screws 37 which project through threaded apertures 38 in one of the clamp halves, so that they may contact the inner face of the flange of the other half of the clamp to spread the grip away from the permanent leg so that the clamp may slide thereover.

In describing use of the invention I will assume that the permanent derrick has been erected in the ordinary manner and with the usual equipment, including the flared leg sockets and bosses on the sill plate, and the leg bosses on the header caps.

The relegs are installed one at a time and in the following manner:

A joint is set on the sill plate over the boss 15 and one of the clamps applied to the permanent derrick leg, and the bolt 27 at the permanent leg end of the clamp tightened to hold the clamp in place, the grip portions 22 being extended beyond the upper end of the leg joint to form a socket into which the lower end of a next higher joint may be set. The releg is built up in this way until the top of the derrick is reached, each joint being clamped as described. The other legs are then installed in turn.

When all of the relegs have been set the clamp 18 at the connection between the two upper joints of one of the legs is dropped down to expose the top joint of the leg (Fig. 3). The bolts 27 and 28 of clamp 17 are then tightened to firmly and securely attach the clamp to the permanent leg and to the next to the top releg joint. Bolts 40, each having right and left hand threads 41 and 42 at opposite sides of a central jack nut 43 are then located on opposite sides of the clamp, with threaded ends of the bolts projected through the apertures 34 in the hous-

ings 30, the nuts 31 fitting within the sockets 32 to support the bolts and hold the nuts against rotation. An upper clamp member 36 is then applied to the permanent derrick and relegs so that the upper ends of the bolts 40 project through the openings in the diaphragms of the socket housings on the upper clamp members, so that the upper clamp member is supported on the nuts 31 on the upper ends of the bolts. The bolt 28′ of the upper clamp member is then tightened so that the upper clamp member firmly grips the top joint of the releg, the bolt 27′ at the permanent leg end of the clamp remaining loose and the halves of the clamp spaced by the set screws 37 so that the grip members 21′ of the upper clamp member may slide freely over the permanent leg.

With the parts so arranged, the bolts 40 are turned with a wrench or by a tool projected into an aperture 44 in the jack nuts 43 of the jack bolts, the right and left hand thread combination of the bolts tending to spread the clamp members apart. As the lower joints of the releg have a firm bearing on the sill plate at the bottom of the derrick, the leg can not spread in this direction, and therefore the upper joint of the releg is elevated so that its upper end is projected over the boss 17 on the header cap, elevation of the upper joint being continued until its upper edge contacts the header cap. The spacing between the two upper joints of the releg is then filled, preferably with metal disks or washers, of a diameter corresponding to that of the releg, enough washers being inserted to completely fill the spaces between the leg joints, the upper joint having been preferably raised a little beyond its desired level, so that when the washers have been inserted and the jack released, the upper leg joint will settle back onto the filled joint and finally assume its permanent level.

When the leg has been set as described, the upper jack clamp member is removed and the lower clamp member loosened and moved up to house the joint, as described in connection with the lower joints. This operation is continued about the derrick until all of the relegs have been properly adjusted, but one jack clamp member being required as it can be used from leg to leg and in connection with any of the primary clamps.

When all the legs are set the jack clamp member is preferably allowed to remain on the derrick so that it may be available when the reinforcing or releg elements of the derrick are to be removed.

When the drilling has been completed and when only a pumping structure is required, the relegs may be removed, the jack clamp being employed in the same manner as heretofore described for first raising the top joints of the relegs so that the spacing washers may be removed, and then lowering the joints to the ground and moving the jack clamp member from joint to joint and leg to leg until the removal of all the legs is effected.

It is apparent from the foregoing description and from the illustration in the drawing that with the aid of my improved jack, the releg reinforcing of the light derrick may be easily and quickly installed, that the relegs may be properly adjusted to balance the load on the crown block, and that the structure embodying my improvement is simple and economical, both in manufacture and operation.

While I have referred specifically to derricks of the tubular type, and have illustrated and described specific details of structure, such specific references and disclosures has been only for the purpose of better explanation of the invention and not intended as limitation of the invention.

What I claim and desire to secure by Letters Patent is:—

1. A pair of clamps having gripping portions, and sockets therein, members having socket engaging portions thereon and means for extending said members to separate said socket engaging portions, whereby said clamps are moved away from each other.

2. A pair of separate clamps comprising gripping portions and jack sockets, threaded members in said sockets, and jack screws having right and left hand threaded portions extended respectively into the threaded members of the jack sockets of the separate clamps.

3. A pair of separate clamps, each comprising gripping portions and jack sockets, nuts in said sockets, and bolts having right and left hand threaded ends projected respectively into the nuts in the jack sockets of the separate clamps.

4. In combination with two clamp members, each comprising a plurality of gripping portions and jack sockets at opposite sides of one of said portions, the sockets each comprising an apertured nut seat, and jack screws each having right and left hand threaded ends projecting through the apertures in the nut seats of the separate clamp members and having nuts thereon seated in said seats.

5. In combination with two split clamp members, each comprising a plurality of gripping portions, means connecting the split portions of each clamp member to anchor the gripping portions to separate objects, means on one of the clamp members for spacing the members of its gripping portions from its object, and jack connection between the clamp members.

6. In combination with a main leg and separate joints of a releg, a clamp attached to the main leg and to one of the releg joints,

a clamp attached to the other releg joint, and jack connection between the clamps for spreading the releg joints along the main leg.

7. In combination with a main leg and aligning joints of a releg, a clamp attached to the main leg and to one of the releg joints and having jack sockets, a clamp attached to the other releg joint and having jack sockets on its opposite sides, nuts in said sockets, and jack screws threaded into said nuts, the threads on opposite ends of the screws being reversed to spread the clamp upon operation of the screws.

8. In combination with a main leg and aligning joints of a releg, a split clamp having gripping portions engaging the main leg and one joint of the releg and having end flanges, bolts on the end flanges for tightening the clamp to the legs, a split clamp having gripping portions engaging the other releg joint and enclosing the main leg, and having end flanges, bolts connecting the end flanges for tightening the clamp to the legs, means for spreading the gripping portions for the main leg to permit the clamp to slide thereover, means on the clamps for receiving jack screws, and jack screws seated in said means, opposite ends of the screws being right and left hand threaded to spread the clamps upon operation of the screws.

In testimony whereof I affix my signature.

JAMES P. NEILSON, SR.