April 12, 1932. B. G. GOBLE 1,853,046

PUMPING JACK

Filed Nov. 8, 1926 2 Sheets-Sheet 1

Fig. 1.

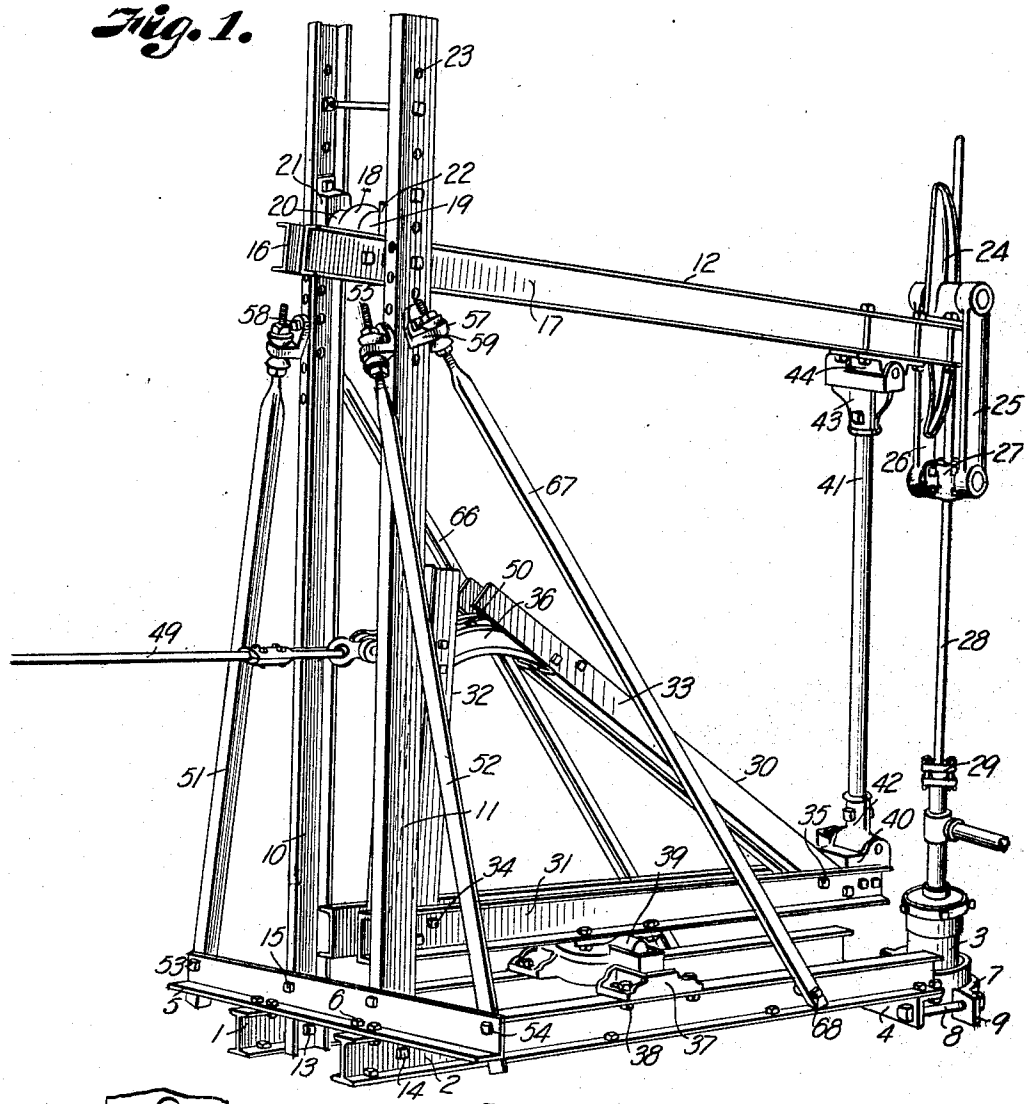

Fig. 2.

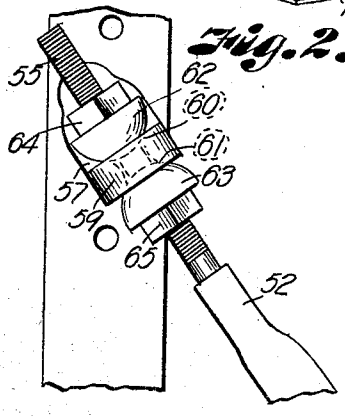

Fig. 3.

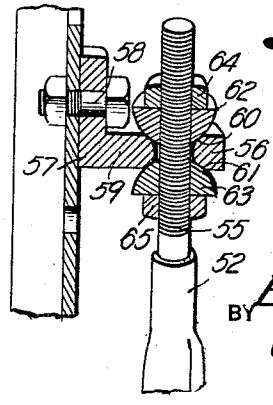

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Fig. 4.

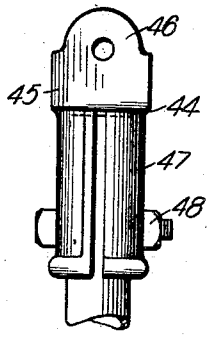


Fig. 5.

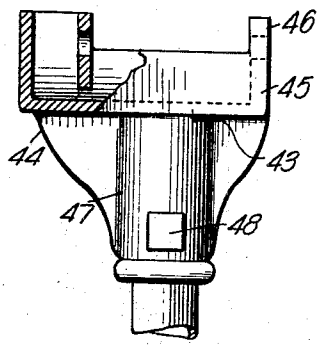


Fig. 6.

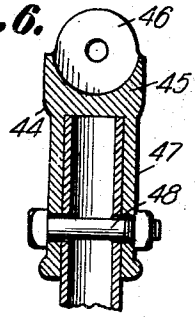


Fig. 7.

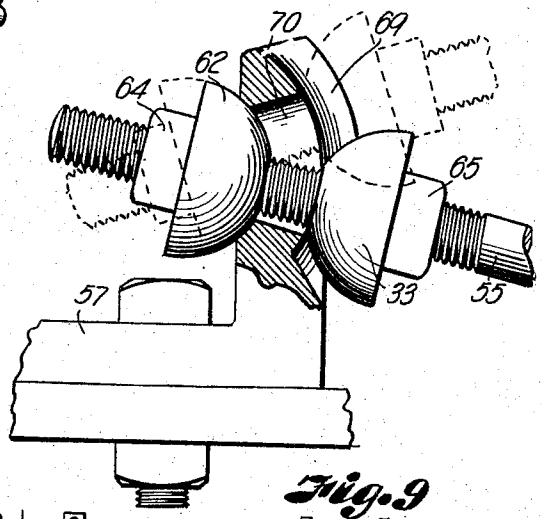


Fig. 8.

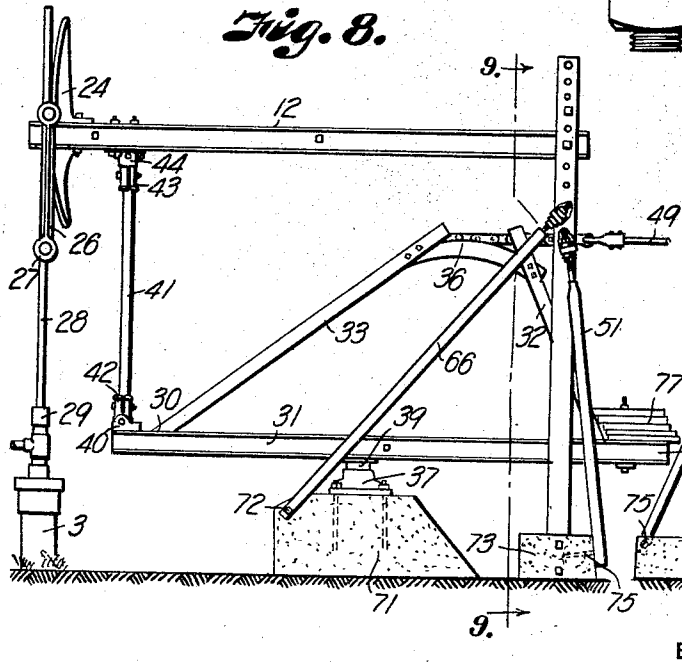
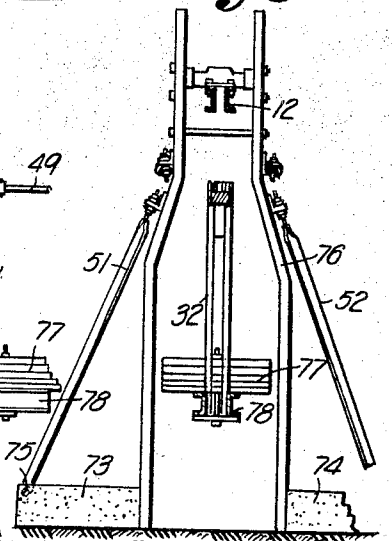


Fig. 9



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Patented Apr. 12, 1932 1,853,046

UNITED STATES PATENT OFFICE

BERT G. GOBLE, OF TULSA, OKLAHOMA, ASSIGNOR TO W. A. QUIGLEY

PUMPING JACK

Application filed November 8, 1926. Serial No. 146,993.

My invention relates to pumping jacks and more particularly to a device of this character for use in pumping oil wells; the principal object of the invention being to maintain the jack frame in alignment to provide true vertical lift of the polish rod.

Another object of the invention is to so construct the jack frame and connect the braces therefor as to eliminate torsional strain that might tend to shear and disrupt connection of these elements.

A still further object of the invention is to so attach the braces that the frame may be readily adapted to any type of foundation, as well as to provide for adjustment of the braces after adjustment of the jack for a varied leverage.

In accomplishing these and other objects of the invention I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a detail perspective view of a jack and frame constructed according to my invention, illustrating the jack as applied to a structural foundation.

Fig. 2 is an elevational view of one of the brace connections for the jack.

Fig. 3 is a sectional longitudinal view of the connection taken at right angles to the showing in Fig. 2.

Fig. 4 is an end elevational view of a pitman connector for the jack.

Fig. 5 is a side elevational view of the pitman connector.

Fig. 6 is a cross sectional view through the same.

Fig. 7 is a view illustrating a modified form of connection for the frame braces.

Fig. 8 is a side elevational view of the jack as equipped with counterweights and illustrating the installation on a concrete foundation.

Fig. 9 is a vertical cross section on the line 9—9 of Fig. 8.

The foundation for the jack, as shown in Fig. 1, comprises spaced I beams 1 and 2 resting on the ground or a derrick floor and extending laterally from the well casing 3; the beams being connected at their front ends by an angle 4 extending across the lower faces of the I beam flanges and at their rear ends by an angle 5 extending across the tops of the beams and bolted to the flanges as at 6. The foundation frame thus constructed is tied to the well casing 3 by a clamp 7 which extends around the side of the casing opposite to the foundation and is fastened to the angle 4 by bolts 8 extending through ears 9 on the clamp and through the vertical leg of the angle 4.

Mounted perpendicularly and in side contact with the I beams at their rear ends and in engagement with the angle 5 are spaced, inwardly facing channels 10 and 11 forming a standard for pivoting the walking beam 12 as hereinafter described, the channels 10 and 11 being bolted to the webs of the I beams 1 and 2 as at 13 and 14 and to the vertical leg of the angle 5 by bolts 15 which pass through the angle legs and through the side flanges of the respective channels.

The walking beam 12 comprises outwardly facing spaced channels 16 and 17, of substantially the length of the base beams 1 and 2, and secured together at their rear ends by a casting 18 constituting a bearing member for the walking beam, the casting having trunnions 19 and 20 projecting from its sides.

The trunnions 19 and 20 are pivotally mounted in inwardly facing journal castings 21 and 22 carried adjacent the upper ends of the channels 10 and 11 respectively, the castings being vertically adjustable on the channels by selective location in pairs of holes 23 in the channels.

The walking beam 12 carries at its forward end a horse head 24 and a pair of connecting links 25 and 26 for connecting the walking beam with a polish rod clamp 27 fixed on the polish rod 28. The polish rod is slidable through the stuffing box 29 at the end of the well tubing and is connected to the sucker rods as in common oil field practice.

Pivotally mounted on the top faces of the base I beams 1 and 2, substantially midway of their length, is a rocker member 30 for actuating the walking beam 12. The rocker member 30 is of triangular shape and comprises spaced longitudinal members 31, upright members 32 and diagonals 33, all of

which are structural shapes, the upright and diagonal members being connected to ends of the horizontal members by bolts, as at 34 and 35, and the upright and diagonal members are connected by an arcuate casting or bearing member 36 located eccentrically with relation to the point of pivot of the rocker member for a purpose hereinafter described.

The pivotal mounting of the rocker on the base beams comprises a plate 37 bolted to the top flanges of the base beams by bolts 38. Receivable in the plate 37 is a trunnion member 39 bolted to the longitudinal members 31 of the rocker 30 about midway of their length, as clearly shown in Fig. 1.

The longitudinal members of the rocker protrude slightly beyond their connection with the diagonals and carry a casting 40 fixed thereto for pivotally mounting a pitman 41 for supporting and actuating the walking beam 12 in swinging synchronism with the rocker.

The pitman preferably comprises a tubular member having a casting 42 clamped to its lower end and receivable in the casting 40 and a similar casting 43 is clamped on its upper end pivotally engaging a casting 44 bolted adjacent the forward end of the walking beam. The casting 44 (shown in detail in Figs. 4, 5 and 6), comprises a trough-shaped head 45 having upwardly extending ears 46 at its ends for receiving a bolt or like pivotal connector for connection with the casting 44 on the walking beam. Projecting downwardly from the head 45 and preferably integral therewith is a split socket member 47 for receiving the end of the pitman tube and which is bolted thereto by a bolt 48 extending through the casting and the pitman tube as clearly shown in Fig. 6. The split casting allows for drawing the socket member tightly about the pitman tube so as to be frictionally engaged thereby and prevent liability of a loose connection.

The rocker member is swung on its pivotal mounting to rock the walking beam through the pitman connection to reciprocate the sucker rods in the well by a pull rod or shackle line 49 connected to the rocker by a chain section 50 running over the arcuate casting 36 heretofore described. Due to the eccentric location of the arcuate casting in relation to the pivoting point of the rocker member the leverage of the rocker is in reality varied throughout its limit of travel so that with the use of the rocker a substantially uniform amount of power is required to lift a load vertically from the beginning to the end of its stroke.

In order to provide an easily operated jack and to prevent twisting and bending of the polish rod by swinging of the walking beam it is necessary to position the horse head in exact vertical alignment with the polish rod and to maintain this position at all times, and in order to thus position the horse head I have provided the jack with novel adjusting features whereby the beam may be moved from side to side or backward and forward until the horse head is in exact alignment with the polish rod.

In accomplishing this feature I have also provided bracing means for rigidly bracing the jack against the severe pounding and torsional strains to which the jack is subjected when in pumping operation.

The angle 5 connecting the rear ends of the base beams projects from opposite sides of the beams to provide an anchoring point for lateral braces 51 and 52 comprising angle irons securely bolted to the ends of the angle 5 as at 53 and 54 respectively and welded to the upper ends of the braces are threaded rods 55 which project through apertures 56 in angle-shaped brackets 57 bolted to the web portions of the column channels as at 58. The apertures 56 are located in laterally projecting portions 59 of the brackets and the projecting portions are recessed at each side concentrically with the apertures, as at 60 and 61, to provide arcuate seats for semi-spherical washers 62 and 63 loosely received on the threaded rod and tightened against the projecting ears by nuts 64 and 65 threaded on the rods and engaging the flat faces of the washers, as best shown in Fig. 3.

It will thus be seen that I have provided a universal connection for the braces and that the semi-spherical washers can position themselves in their seats so that there is a direct pull on the threaded rods since the nuts tightly and snugly engage the flat faces of the washers and the washers seat firmly around their periphery for a maximum of angles at which the braces may extend.

The column may now be moved laterally to shift the horse head into vertical alignment with the polish rod by taking up and slacking off the nuts on the rods until the braces are of the proper length to give the required lateral adjustment of the beam.

To brace the column in the opposite direction or in the plane of the jack and to shift the horse head into alignment with the polish rod, similar braces 66 and 67 are provided adjustably connected to forward side flanges of the column channels and to the sides of the foundation beams forwardly of the column, the column connections being made in the same manner as the connections for the lateral braces and through the webs of the beams so that either brace may be lengthened or shortened at the connections to the columns to secure the proper positioning of the walking beam.

In Fig. 7 I have shown a modified form of adjustable connection wherein the ear of the bracket 57 is provided on its side adjacent the brace with an arcuate groove 69 and an inwardly tapering slot 70 for the threaded

rod so that greater spread of the braces may be provided without placing a strain on the threaded rods.

In Fig. 8 the pump jack is shown as mounted upon a concrete foundation in place of the I beams 1 and 2. The rocker casing in this case is mounted directly on a concrete block 71 and the forward braces are connected to the block as at 72. The column channels are secured to spaced concrete blocks 73 and 74 set rearwardly of and spaced from the block, the lateral braces being bolted to the blocks as at 75.

I have also spread the channel members as indicated at 76 to provide room for counterweights 77 mounted on a rearward extension 78 of the rocker member. In other respects this jack is of substantially the same construction as the jack heretofore described.

From the above description it will be apparent that I have provided a jack frame that may be readily constructed of straight structural shapes without bending and which is strong, easily put into pumping position, which may be easily adjusted for the proper operation of the jack, and wherein the braces are so positioned to resist the pushing and pulling strains offered by the pull rods in the operation of the pump.

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

1. In a line-actuated jack of the character described, a rocker having a point of pivot and an arcuate bearing surface in eccentric relation with said pivot for engaging the line.

2. In a line-actuated jack of the character described, a rocker bounded by three plane edges having a pivot on one of its plane edges, and an arcuate bearing surface in eccentric relation with said pivot connecting the other two plane edges and engaging the line.

3. In a line-actuated jack of the character described, a rocker including a longitudinal member having a point of pivot, an upright member secured to the longitudinal member, a diagonal member secured to the longitudinal member, and means for connecting the upright and diagonal members, said means having an outer arcuate bearing surface in eccentric relation to said pivot for engaging the line.

4. In a line-actuated jack of the character described, a rocker including a longitudinal member having a pivot intermediate its ends, oppositely inclined members having their lower ends secured to the longitudinal member, and an arcuate bearing member in eccentric relation with said pivot for engaging the line and for connecting the upper ends of the inclined members.

5. In a line-actuated jack of the character described, a rocker including a longitudinal member having a pivot intermediate its ends, a bearing member having an arcuate outer face in eccentric relation with the pivot for engaging the line, a pair of diverging supporting members connected to opposite ends of the bearing member and to the longitudinal member on opposite sides of the pivot, and a counterweight on one end of the longitudinal member.

6. In a line-actuated jack of the character described, a rocker including a bearing member having an arcuate outer surface for engaging the line, a pair of inclined members having their upper ends connected to opposite faces of the bearing member adjacent one end of said bearing member, a pair of diagonal members having their upper ends connected to opposite faces of the bearing member adjacent the opposite end of the bearing member, and a longitudinal member having opposite ends connected respectively to the lower ends of the inclined and diagonal members, and having a pivot in eccentric relation with said arcuate surface.

In testimony whereof I affix my signature.

BERT G. GOBLE.